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A CULTURE-BASED APPROACH TO THE MANAGEMENT OF CONFLICT ON MULTI-NATIONAL CONSTRUCTION PROJECTS: PARTICIPANTS AND PERFORMANCE

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ABSTRACT

By definition, multi-national construction projects bring together organisations and individuals from different countries and, therefore, almost inevitably, different cultures. As cultures underpin behaviour, and behaviour has major impact on performance – both what is desired and what is realised – issues of cultural compatibility between project participants are important. A further aspect relates to attitudes to conflict and, thence, disputes, concerning their likelihood, causes and consequences – in essence, how they may be managed. This paper comprises a critical review of theory and literature regarding cultures and their categorisation with particular attention to selection of multi-national project participants, management of conflict and resulting outcomes for project performance and participant satisfaction. Of particular note are aspects of cultural compatibility / cultural distance for both selection of project participants and resultant performance.

Keywords: culture, cultural distance, conflict management, participant characteristics project performance, temporary multi-organisations

INTRODUCTION

Notoriously, the construction industry is perceived to have a culture of conflict. Disputes are regarded as inevitable and performance is, consequently, reduced. Dissatisfaction ensues in which all participants, except self, are blamed. Such a caricature portrait, as perceived both within and outside the industry (notably, clients, government and the general public), is exacerbated on multi-national projects. Over many years, a variety of initiatives have been invoked in attempts to address the situation – at best, they have enjoyed very limited success.

Increasing specialisation / division-of-labour, etc. not only indicates differing and expanding areas of expertise but, also, strongly suggests diverging interests, values and objectives – at least, in a technical sense. If some form of pooling of such separate specialisms is necessary for the realisation of construction projects, then coordination and cooperation is required – that involves communication, leadership, etc. (the essences of management!) given the likely perceived conflict of interests between joint and individual costs and benefits. Essentially,

those are the fragmentation issues beloved of reports on the construction industry around the world.

A central tenet of this paper is that such initiatives have addressed only the superficial manifestations of the issues involved and, as such, have been doomed to failure by ignoring fundamentals – possibly due to lack of analyses, pressures of time and political manoeuvrings. As for any economic activity, especially occurring in increasingly market capitalist contexts, it is essential to address the business imperatives in conjunction with the technical particularities relating to the activity under examination, recalling that outcomes can be achieved only via people – the active factor – as managers and operatives. Both categories occur within a context of social institutions which generate a formalised legal framework for operating. Thus, the immediate and distant environmental constituents comprise both formal and informal institutions, systems and frameworks which shape behaviour and performance.

However, depending on the level and unit of analysis, there is much in the literature to indicate that conflict may, in fact, have significant positive effects. Those effects may concern performance of tasks (via processes) but may concern the development of relationships also. Thus, it may be that it is not so much the culture of conflict which is, *necessarily*, detrimental to performance but the negatively-oriented escalation of conflicts beyond any productive potential into the almost inevitably detrimental arena of disputes.

Further, the literature, notably in the field of psychology, employs the typology of personal / organisational conflicts. That, implicitly, adopts the perspective of organisational identity and behaviour, if not personality as well, separate from and beyond those facets of the individuals comprising the organisation (i.e., its members rather than its stakeholders).

There is not a great array of literature either which examines conflict by addressing differences between the natures of different societies – i.e. their cultures. Although some attention has been given to such differences' impacts on the management and resolution of conflict, causal aspects remain rather un(der)-investigated. This paper endeavours to take a small step in that domain.

CONFLICT

“Two individuals, an individual and a group, or two groups, are said to be in conflict when and to the extent that at least one of the parties feels it is being obstructed or irritated by the other” van de Vliert (1998). More popularly, Deutsch (1973) defines conflict as “...incompatible behaviour between parties whose interests differ.” In a capitalist business context, such differing of interests may arise through opportunistic endeavours to appropriate a greater share of a finite total benefit for self, which Cox (1999) articulates as, “Essentially, business is about appropriating value for oneself...only by having the ability to appropriate value from relationships with others...can business be sustained....must...be conflicts of interest between vertical participants in supply chains, just as there are between those competing horizontally.”.

A common theme in the array of definitions of conflict is anticipated or actual frustration of one actor perceived by that actor to be caused by the actions or inactions of another(s) which impact on the former's potential outcomes – often couched in terms of goal attainment (see, e.g., McKenna, 2000: 407). Thus, the presence of conflict arises from negative feelings.

Thus, Amason, Hochwarter, Thompson and Harrison (2000), determine that, within management teams, conflict may be classified as cognitive (regarding intellectual / technical issues) or affective (concerning subjective / emotional aspects). Such typology is reflected in much of the pragmatic conflict resolution literature (e.g. Fisher and Ury, 1991) which advocates focus on cognitive issues to achieve resolution due to the negative/blocking/destructive potential of the affective aspects.

Further, conflict may be classified in terms of its effects – either functional/constructive or dysfunctional/destructive. Functional conflict, somewhat akin to competition (actors have a common objective, even if the outcome is of win-lose form, as in construction bidding) is believed to stimulate ideas, innovation etc, as it is regarded as a motivator. Dysfunctional conflict, however, yields the well-known consequences which are detrimental to relationships and technical performance.

There are three main perspectives on conflict. The traditional, functionalist perspective regards conflict negatively – as disruptive and so, harmful. Behaviourists are neutral, regarding conflict between individuals and groups as inevitable and differences in the consequences of conflict arise through differences between people – perceptions, personalities, interests/expertise, and goals. Interactionists view conflict as carrying out useful functions to ensure social dynamism and to enhance decisions; however, the conflict should be managed, including the amount of conflict.

Generally, sources of conflict tend to follow the classification developed by Robbins (1974) of communication, structure and personal factors. In addition to the well-known communications issues which may give rise to conflict – semantic differences, difficulties, insufficient or excess information, noise, and filtering of information (distortion, withholding, etc.) – other aspects including indexicality (see, e.g., Clegg, 1992), choice of channel(s), and the nature of the language (high content – high context) impact also. The structural factors comprise:

- size and constituent members of the group – the more diverse, the more scope for conflict,
- ambiguity – correlated with conflict,
- leadership – participatory may encourage conflict,
- rewards – win/lose system is conducive to conflict,
- interdependency – emphasising common goals reduces conflict which, otherwise, may arise through diversity of expertise and interests,
- changes to structure and/or processes – people tend to resist change, especially if they view the consequences as detrimental.

Personal factors include personality characteristics (traits, etc.) and peoples' value systems (fundamentals of culture).

Various models of the conflict process have been advanced – notably, the bargaining model, the bureaucratic model and the systems model which Pondy (1967) examines to produce the episodic model. Alternatively, van de Vliert (1998) examines the content and operation of the escalation (and de-escalation) model. The models acknowledge that conflict incidents (episodes) are not individual, isolated events but cycle iteratively, each episode having antecedents and quite enduring consequences, the latter impacting on persons' dispositions and so, inputting to antecedents for future conflict episodes, the subject(s) of which may be proximate or distant. The escalation / de-escalation perspective is determined by how an episode is managed and so, yields the nature of an episode's consequences as future antecedents.

Generally, five generic styles of conflict management (handling / coping) are considered – Avoiding (unassertive and uncooperative), Competing (assertive and uncooperative), Collaborating (assertive and cooperative), Accommodating (unassertive and cooperative), and Compromising (mid-assertive and mid-cooperative). Those styles fill the two dimensional space of conflict management between axes of assertiveness and cooperativeness (Thomas, 1992).

Avoiding involves suppression of the conflict matter or/and withdrawal so that the conflict matter is not addressed and may remain dormant or festering for others to resolve. Competing takes the form of a zero-sum game in which own interests may be pursued aggressively by use of authority, power, etc. Collaborating seeks to follow mutuality in seeking a solution to yield a non-zero-sum game and to preserve or, even, enhance relationships by striving together for a solution. Accommodating resembles appeasement by subjugating own interests to those of the other(s) which tends to take the form of a zero-sum

game. Compromising, again, seems to be a zero-sum game of give and take to yield a solution of balanced gains and losses for each.

Conflict behaviour, then, is a person's outward reaction to the conflict which is felt/perceived so, the components of such behaviour are interrelated. "Interpersonal conflicts really are complex situations in which different motives and concerns about own goals, the reaction with the other, other's goals, as well as short and long-term objectives, direct behaviour..." (Euwema and van Emmerik, 2007).

Sherif (1967) found that identifying and pursuing a superordinate goal(s) is effective in resolving inter-group conflict – the groups identify a common problem which dominates and, to resolve which, cooperation between them is required. However, significant disparity in the distribution of power between the groups may preclude such resolution.

Conflicts arise between and are resolved by people. Given the likely performance depleting effects of affective conflict but the potential performance enhancement through good management of cognitive conflict, managers should endeavour to prevent affective conflict, whilst recognising the great potential for the conflict types to become mixed in practice. For such management of people to be possible, comprehension of their cultures, which lead to the behaviour and communications giving rise to conflict, is essential.

CULTURE

Simplistically, culture is "how we do things around here" (Schneider, 2000). However, culture is not merely *how* things are done, the scope is much more extensive – to include *what* is done, *why* things are done, *when*, *by whom*.... Thus, Hofstede (1994a) defines culture as, "...the collective programming of the mind which distinguishes one category of people from another." Hofstede (1980, 2001) applies the definition to the two primary levels of culture analyses – the nation and the organisation. Although the dimensions employed for assessing culture differ between the two categories, because the superficial manifestations must be addressed for such assessments, the fundamental underpinnings in beliefs and values apply to both. Further, organisational culture is embedded in the national culture of the organisation's domestic location – an increasingly fuzzy perspective with internationalisation and globalisation – as well as being impacted by the institutional environments in which it has operated (Oliver, 1997).

Alongside the many definitions of culture, there exists an array of sets of dimensions which are variously employed to measure culture (national / organisational); many of the metrics are intended to yield relative measures on the dimensions. Given the content of the enduring significant debate, it seems appropriate to regard the resulting measurements as indicators, rather than absolute, accurate quantifications. That perspective is extended by the recognition that within group variances frequently exceed between group variances – a vital consideration in comparative analyses (Au, 2000).

Cultures comprise beliefs, values and norms which are shared by members of a community and adopted by them through their socialisation and education. Models of culture often depict physiological instincts and beliefs at the core (survival imperatives; religion, morality etc.), values as the intermediate layer (the hierarchical ordering of aspects of beliefs, perhaps with visions of trade-offs) and behaviour at the outer layer of culture manifestations (as in language, symbols, heroes, practices, artefacts, etc.).

The "...beliefs are statements about reality that individuals accept as true, values are generalised principles of behavior to which people feel strong positive or negative emotional commitment, and norms are shared rules of standards regarding the extent to which specific behaviors are to be considered socially acceptable..." Wagner and Moch (1986). Given the nature of the major components of culture typology, it is clear that variability within determined cultural boundaries (geographical, etc.) may be large, especially at the surface of manifestations (behaviour, norms, etc.).

Hofstede (1980) determined four dimensions for national cultures: Power Distance, Individualism/Collectivism, Masculinity/Femininity, and Uncertainty Avoidance. A fifth dimension of Long-Termism / Short-Termism was added later (Hofstede, 1994b) following studies in Asia which found important impacts of 'Confucian Dynamism' (The Chinese Culture Connection, 1987).

Trompenaars and Hampden-Turner (1997) advance five value-oriented dimensions of culture which, they suggest, "...greatly influence our ways of doing business and managing as well as our responses in the face of oral dilemmas". Those dimensions are: Universalism – Particularism (rules-relationships), Collectivism – Individualism (group-individual), Neutral – Emotional (feelings expressed), Diffuse – Specific (degree of involvement), and Achievement – Ascription (method of giving status).

Hofstede (1994b) proposes six dimensions for analysis of organisational cultures:

- Process – Results Orientation (technical and bureaucratic routines {can be diverse} – outcomes {tend to be homogeneous})
- Job – Employee Orientation (derives from societal culture as well as influences of founders, managers)
- Professional – Parochial (more highly educated personnel identify with profession(s) – people identify with employing organisation)
- Open – Closed System (ease of admitting new people, styles of internal and external communications)
- Tight – Loose Control (degrees of formality, punctuality etc., may depend on technology and rate of change)
- Pragmatic – Normative (how to relate to the environment, n.b. customers; pragmatism encourages flexibility).

Cameron and Quinn (1999) employ a competing values model in which flexibility and discretion are juxtaposed to stability and control on one dimension; the other dimension juxtaposes internal focus and integration and external focus and differentiation. The resultant model yields four quadrants, each denoting a type of organisational culture: Clan, Adhocracy, Market, Hierarchy.

Scrutiny of the various dimensions used to analyse both national and organisational cultures indicates considerable conceptual commonality. Additionally, Hofstede's dimensions of organisational culture align with the human relations – task schools of management thought (e.g., Herzberg, Mausner and Bloch Snyderman, 1967 – theory X and theory Y). Notably, organisational cultures are embedded within the national culture of the home country, hence, the manifestations along dimensions of organisational culture are underpinned by, and embedded in, those pertaining to national culture.

As societies are increasingly dynamic, so are cultures. Thus, especially when employing cross-sectional data or findings, the potential impacts on the culture due to forces of change must be acknowledged. The dynamism arises from the continual construction and reconstruction of culture as the context for setting goals, taking action, making meaning, constructing images and forming identities (akin to structuration, Giddens, 1984), which operates in an iterative, interdependent way.

Cultures evolve in path-dependent directions, occasionally punctuated by periods of stability and by rapid, step-type changes, "The evolution of culture is shaped by agency and power, but cannot be created by fiat" (Weeks and Gulunic, 2003). However, "...despite agreement that cultural evolution occurs..., espoused approaches to culture interventions are more commonly revolutionary in nature..." (Harris and Ogbonna, 2002). When faced with change, most people exhibit strong preference for the familiar and so, tend to resist; if change does occur, there is a strong tendency to revert to prior norms.

Cameron and Quinn (1999) consider that organisations may not exhibit a single, unitary culture and that measures used for strengths of cultures are subject to significant question.

However, Schneider (2000) does assert that every successful organisation has a core culture (control; collaboration; competence; cultivation) which is central to its functioning – echoing the findings of Peters and Waterman (1982) – whose findings have proved somewhat questionable.

Perspectives on changes in cultures span two extremes. Functionalists believe that organisational culture can be controlled by management directly and so, are instrumental in promoting the cultural basis for determining organisational performance. The alternative perspective regards culture as a context within which action must be taken and so, necessitates compatibility of action with the cultural environment. However, a third category is the perspective that culture is malleable and so, may be adapted – albeit that adaptations are likely to be difficult, replete with ethical problems, and require effort over long periods.

Importation of alien methods etc., commonly generates rapid rejection – whether overt (such as refusal to comply) or implicit (such as in low levels of performance). However, even the most carefully devised and conducted change initiatives are likely to have unanticipated consequences – including ritualisation of change, cultural erosion, hijacking of the process, and uncontrolled and uncoordinated effects (Harris and Ogbonna, 2002).

Thus, cultural sensitivity towards the people affected and the processes and norms of their behaviour and operations is required in order that initiatives which are intended to aid the situation through enhancing relationships and performance are not, of themselves, significant contributors to detrimental outcomes.

PROJECT PERFORMANCE

In construction, a vital consideration is the impact of culture on what performance is achieved and measured against pre-determined, culturally-bound, targets. Those targets are determined by project participants and depend upon their values within the project realisation as undertaken by a temporary multi organisation (TMO) which operates with significantly transient membership of both individuals and organisations whose influence waxes and wanes according to the realisation process and its stages as well as the fluid power structuring of the TMO.

Traditionally, issues regarding the workings of a TMO (Tavistock, 1966) stem from its nature (temporariness and diverse membership) and its context (operating in a capitalist market environment). The context promotes opportunistic, self-interest oriented behaviour, whilst also imposing parameters and constraints which are largely institution-determined – law, codes of conduct, behavioural norms, etc. The nature of the TMO is manifested in its structure, both formal and informal, dispositions, experiences and, hence, expectations of its members which evolve as the project is realised and the nature of the TMO changes commensurately. Thus, given the membership of the TMO, its nature is of an alliance form, wherein relationships impact on performance and are determined by objectives (n.b. congruence), risk, trust, culture, etc.

Formally, the structure and activities of the TMO and its individual members is determined by the procurement approach adopted (see, e.g., Masterman, 2002); although structures and membership varies, data/information requirements, interactions and requisite processing and outputs are common. In any event, it is acknowledged that, although formal systems specify and provide the structural framework, most performance is achieved through the informal system (Tavistock, 1966), through the generic functional perspective depicted in figure1. The temporariness suggests that it is common for the members not only to be in transient relationships in the particular TMO but for such contact between them to be unique – they have not worked together before and are unlikely to do so again – that fosters self-oriented, opportunistic behaviour.

Performance of construction projects falls into two categories – project performance (the functioning of the completed project in occupation and use) and project management

performance (relating to the realisation process, usually using time, cost, quality metrics). Performance in both categories is determined by design of the project – how the building functions in use; constructability, etc. Focussing on the realisation process, the hard, often quantified, measurements are both impacted and supplemented by soft, subjective measurements. It is helpful to note that many of the hard, apparently objective, quantifications (n.b. time, cost) result from negotiations between actors and so, are not objective in a positivistic sense.

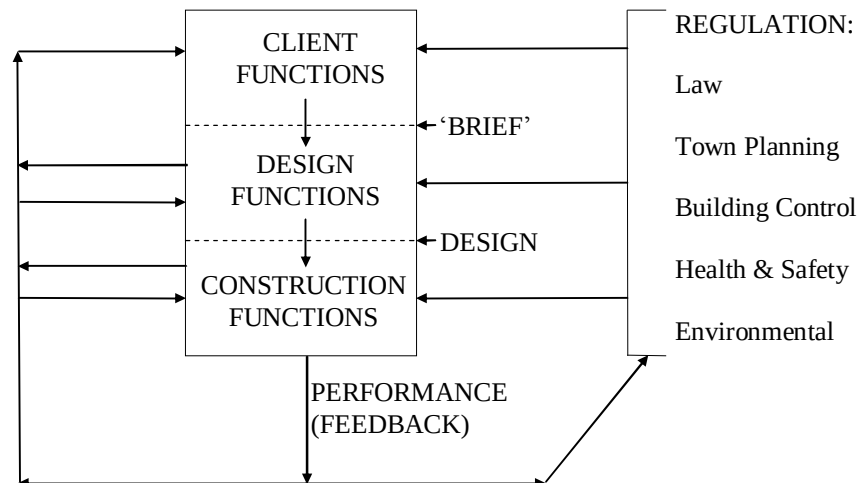


Figure 1: The Project Realisation Process

- Note: (1) Performance leads to satisfaction of participants and, hence, (perspectives of) project success.
- (2) Performance-Satisfaction-Success also produces feedforward in the ‘cycling’ of project data and information to aid realisations of future projects through participants’ perception-memory-recall filtering (‘experiences’).

Much in the construction literature, reinforced by anecdotal evidence, asserts the importance of satisfying the client. That raises a number of questions, including:

Who is the client? – normally, the commissioning client.

What does the client want? – should be identified in the brief; but may not be known and quite likely to change.

What is the hierarchy of wants? – should be identified in the brief.

What are the parameters? – determined by analysis of the environment and limitations noted in the brief (e.g. finance).

What about the desires/needs/business imperatives of other project participants? – usually ignored.

What flexibilities exist? – usually ignored.

Ireland (2004) notes that "...clients...do not always fully understand their demand profile....construction companies are effectively the 'integrator' for a myriad of construction supply chains...[and]...Adversarialism and opportunism are rife at all stages..."

Often, performance is reported as falling significantly below expectations. Reasons proffered include inadequate briefing, poor design, lack of productivity in the construction process, lack of constructability, poor coordination, lack of skill, institutional/regulatory framework, claims (see, e.g., Green and Siminster, 1999; Rooke, Seymour and Fellows, 2003). Although value management and value engineering have been employed on some projects, their specialist application, beyond cost planning by quantity surveyors, has not been extensive. When value-oriented analytic methods have been applied, they tend to adopt a single participant

perspective, usually relating to the commissioning client, and to freeze the value hierarchy at the time of executing the study at a particular stage in project realisation – often, later in the design phase than desirable (see, e.g., Green and Popper, 1990; Kelly, Male and Graham, 2004).

However, even if value structures are accurately determined for briefing (nb, values of the commissioning client), the likelihood of powerful others (somewhat) imposing their own value structures on the project during realisation is likely to yield outcomes different from those determined initially. A consequence is that cognitive dissonance (Festinger, 1957) is likely to occur and constitute an element of the value perceived (for both the suppliers and the consumers). Such comparisons and their consequences for value perceptions constitute a significant area of risk for project participants and, due to the differing interests/objectives, are likely to promote conflict.

SELECTION OF PARTICIPANTS

By far the most common basis on which project participants are finally selected – by the commissioning client and ‘close advisors’, irrespective of the procurement approach – remains lowest bid price under (selective) competition. For large projects, single or multi-stage selective tendering is employed; open tendering is very uncommon. Often, similar methods are used to select design consultants although the appropriateness of such is highly questionable given that those consultants are engaged for their design skills; their fees, as a component of total cost to the commissioning client, are small and so, differences between bids are negligible.

In the pre-selecting of participants for the realisation of construction projects prior to price competitive bidding, the criteria remain firmly founded in the perceived technical expertise/capability of the organisations; the ability of the organisations to integrate and cooperate to work together to deliver the project effectively and efficiently remains, almost invariably, ignored (Baiden, Price and Dainty, 2006). Nicolini (2002) notes five categorical factors which are critical to success and superior performance of cross-functional teams – task design, group composition, organisational context, internal processes, and group psychosocial traits. Those factors are important contributors to ‘project chemistry’, which is a range of antecedent variables necessary for project management success. Dainty, Bryman, Price, Greasley, Soetanto and King (2005) assert that project affinity, emotional attachments to the project intended outcome (objectives/purpose), enhances how people work, especially their organisational citizenship behaviour (OCB), thereby fostering performance. Both constructs are culturally-bound and, to their degrees of presence, enhance performance via team formation and commitment of personnel.

Within price bidding by pre-selected contractors, it is common for opportunistic approaches to be adopted in attempting to submit the lowest acceptable bid but incorporating potential for future price and profit enhancement due to anticipated occurrences during the construction phase (Rooke *et al.* 2003; 2004). Such opportunism includes ‘variation spotting’, ‘claims potential’ and ‘bid loading’ (usually, front-end) (Fellows, Langford, Newcombe and Urry, 2002). Further manipulations to improve cash flows include endeavours to over-value interim payments. In respect of cost reducing means of enhancing profit, contractors have employed ‘pay-when-paid’ provisions, late payments (unilateral extensions of credit), deducting discounts illegitimately, and ‘Dutch auctioning’ / ‘bid shopping’ with subcontractors and suppliers. All such business plays are likely to invoke conflict – in the longer term, if not on the instant project (depending on evolution of economic conditions) and, once discovered, impact on the attraction of trading with that organisation in the future.

Increasingly, multi-national projects are undertaken through formal alliances between the primary participants. However, even if no formal alliance is executed, the interdependence between the activities of the participants requires informal alliancing. Given the high incidence of failures amongst formal alliances, identification and avoidance of reasons for

failures are important together with pursuit of potential for success, notably, selection of partners.

Trust is always an element in the decision to engage in a (business) relationship, whether the source(s) of trust be founded in legal/contractual mechanisms, in institutions (Hagen and Choe, 1998; Bachmann, 2001), or in individuals – singly or in combination. Buckley and Casson (1995: 127) define cooperation as, “coordination effected through mutual forbearance”. Here, forbearance is refraining from cheating, both weak cheating and strong cheating. Cheating, then, may be considered as encompassing the risks involved in business activities. Hence, trust may be considered to be adequate confidence on the part of the subject actor/participant that the other participant(s) will not cheat, that is distinct from assurance – which is provided through constraints imposed by the formal framework (e.g., contract provisions).

Uncertainty and trust are the two primary constructs which affect formal alliance relationships and their institutional arrangements (Sheth and Parvatiyar, 1992). Bachmann (2001) examines trust and power as means for social control within business relationships. Bachmann notes that “...today, trust based on individual actors’ integrity can only fulfil a supplementary function, compared with trust produced by institutional arrangements.” Strong institutional arrangements are demonstrated to foster the development of trust, whilst, otherwise, business actors resort to power to safeguard their interests – through actual or perceived, potential conflict and outcomes thereof.

DISCUSSION

As in many areas of management, the majority of research on conflict, culture and performance has been embedded in Western perspectives – researchers, context(s) or both; only recently have studies addressed the issues from other perspectives and in other contexts. Culture research strongly acknowledges the importance of context, methods, etc. in considering the transferability of findings – that caveat is vital in the context of this paper.

It is acknowledged widely that, once conflict is aroused (the episode becomes manifest), it is difficult to control. Such difficulties are likely to expand geometrically in multi-cultural settings according to cultural distance perspectives and where the stakes are high, as on large, multi-national construction projects, especially those with high political profiles. Appreciation of the cultural contexts is essential to prevent felt / latent conflicts from festering such that they become manifest only when they have, effectively, reached the stage of dispute and so, are likely to have destructive effects. Such situations are more likely to arise in cases where actors from cultures where preserving (overt) harmonious relationships are important – the more collectivist and higher power distance cultures.

Although research has portrayed Eastern cultures as collectivist, high power distance, they do seem subject to quite rapid change in certain behaviour. Thus, “...conflict management styles of Chinese managers or executives have switched from the adoption of the ‘compromising’ or ‘withdrawal’ approach to the ‘confrontation’ approach...effective in handling conflict, especially the intergroup conflict and the outcome is usually constructive to an organisation Cheung and Chuah (1999). That contrasts with the findings of Tang and Kirkbride (1986) who found that Chinese executives preferred to use the ‘compromising’ and ‘withdrawal’ approaches. Of course, (some of) the change could be attributable to methods of research or/and temporal proximity of the reversion of sovereignty of Hong Kong to China. However, Cheung and Chuah note that many firms remain owned by the same families or clans in which “...autocracy in decision making and conflict resolution is still very much the norm”.

Mwaura, Sutton, and Roberts (1998), from studying staff at a major hotel in Beijing, found that both Chinese managers and operative staff did not want to accept responsibility, even if they had appropriate authority, but preferred to pass the responsibility to expatriate managers. That finding raises questions over the effectiveness of empowerment in culturally-ordered hierarchies, especially where persons from individualistic cultures head the structure (as in a

multi-national hotel chain, and on many major, multi-national construction projects) – that concerns both design of the management structure for effectiveness and efficiency and the potential for role conflict through persons failing to exercise appropriate positional power (French and Raven, 1959).

On construction projects, it is common for there to be two, quite enduring, causes of conflict. Due to the nature of TMOs, akin to matrix organisations, the potential for role conflicts are very high – any person is likely to be subject to incompatible role demands, or perceived expectations, from others on the project and from stakeholders beyond the immediate boundary of the project. The other common issue is competition for resources (aggregate demand for resources on the project exceeds current supply); although competition is, itself, different from conflict, such immediate scarcities yield conflicts amongst interest groups – commonly addressed by a bargaining approach which, of course, may include a significant element of power invocation to achieve the resolution of the conflict episode.

Clearly, many of the typologies of conflict denote categories which, in practice, are likely to become interactive in a conflict episode. An important component of endeavouring to manage conflict is the recognition of the categories and to manipulate the progression of the episode such that category types which are likely to have destructive effects are avoided, minimised or terminated early and quickly so that the focus is the potentially productive effects. Following the analysis of Amason *et al.* (1995), that involves minimising affective conflict (which would result in reduced progress, poorer decisions, reduced commitment, decreased cohesiveness and decreased empathy) and so, keeping the conflicts which do arise (inevitably?) as cognitive conflicts (resulting in better decisions, increased commitment, increased cohesiveness, increased empathy and understanding). That requires managers to ensure that (subordinate) groups remain focussed on core issues and, through concentration on cognitive aspects and minimisation of affective aspects, the problems can be identified and addressed quickly to arrive at good solutions. Reactive/proactive management is necessary to achieve such outcomes.

Within the domain of culture research, the analysis of individualism collectivism into vertical and horizontal components is germane. Individualism-collectivism (IC) is often adopted as a primary measure to distinguish the characteristic behaviours of people (e.g. see Triandis, 1995; Trompenaars and Hampden-Turner, 1997). IC is a bi-polar construct where an individualist considers his/her personal interests more important than the interests of a group. On the other hand, a collectivist values membership of a group and looks for the benefits to the group even at the expense of his/her own personal interests (see, e.g., Hofstede, 1980, 1994b). Collectivists are members of very few in-groups and are highly loyal and positively disposed to other members; individualists may have loose membership of many in-groups but are tied much less to each one.

Gomez, Kirkman and Shapiro (2000) explain that people in collectivist cultures favour in-group members but discriminate against out-group members. Individualism is characterised as low concern for collectivity coupled with low concern for in-group others. Both individualism and collectivism may be differentiated into vertical and horizontal components; horizontal components emphasise equality whilst vertical components emphasise hierarchy (Triandis and Gelfand, 1998). They note that vertical individualists stress competition and hedonism, horizontal individualists stress self reliance; vertical collectivists tend to be authoritarian and traditional, horizontal collectivists stress sociability and interdependence.

Chen, Meindl and Hunt, 1997 assert that “Because the vertical scale items refer to work situations and the horizontal scale items primarily refer to non-work situations, one may speculate that the Chinese are becoming ‘organizational individualists’ even though they are still cultural collectivists in other domains...”. That finding, which may be extended to the ‘Asian Tiger economies’, could be consequential upon their rapidly rising levels of industrialisation and wealth (e.g. Triandis, 1990; Hofstede, 1983, 1994b:75). Hofstede (1983) notes the correlation between wealth and individualism in various countries and continues that “...Collectivist countries always show large Power Distances but Individualist countries do not always show small Power Distance”.

Sama and Papamarcos (2000) conduct a meta-analysis on the predictive power of IC on allocative behaviours and call for an understanding of how to design management systems that are most effective, given any particular cultural setting. From the perspective of conflict management, people from individualistic cultures prefer dominating or obliging styles while those from collectivistic cultures adopt avoiding or integrating styles (Kaushal and Kwantes, 2006). However, traditional Chinese organisations are hierarchical, large power distance with centralised, autocratic decision making and so, internally at least, promote more assertive and less accommodative styles of dealing with conflict; externally, the cultural and institutional factors (including *face* and *guanxi*) dominate (see, e.g., Earley, 1997). Thus, overtly, "...people from collectivistic cultures...[are]...more likely to utilize the avoidance conflict management strategy with the goal of maintaining a positive relationship...collectivistic cultures tend to emphasize harmony (high power distance)..." (Kaushal and Kwantes, 2006).

Thus, in selection of persons and organisations with whom to conduct transactions, there is much evidence indicating that compatibility is essential. That concerns both the selection processes and the execution of the transaction(s) and is particularly important where transactions are enduring. One element is minimisation of cultural distance (see, e.g., Fellows and Liu, 2006) which, for multi-national construction projects, may not be feasible; the other is to secure interculturally competent partners who have the ability to think and to act in ways which are appropriate to the cultures involved, individually and in combination.

Such intercultural competence is more likely amongst actors who are adventurer – to desire and explore new situations which are, then, considered to be challenging (thus, positivised) rather than threatening (emphasising negative possibilities). Thus, adventurism is conducive to "Cultural empathy...the ability to empathize with the feelings, thoughts and behaviors of members of different cultural groups....related with extraversion, agreeableness and intellectual autonomy. Agreeableness is also a key component of cooperative behaviors..., and intellectual autonomy with creative problem solving. Expect that this cultural empathy is associated with cooperative approaches in conflict management." (Euwema and van Emmerik, 2007).

CONCLUSIONS

The nature of construction TMOs – transience of membership etc. and the behavioural consequences – seems to be mitigated by evolving industry structure – larger and multi-disciplinary organisations – such that it is increasingly common for members of a TMO to have had previous working contacts and expect more in the future – thereby fostering a more interdependent perspective to impact on behaviour. Thus, the less isolated / independent the individual/organisation perceives themselves to be, the more attention and consideration which is likely to be given to the welfare of others in determining behaviour towards them – exacerbated by institutional factors (as discussed by, e.g., Bachmann, 2001).

It seems helpful to consider any (array of) conflict episode(s) in terms of sources (persons), causes (reasons), mechanisms (processes), and effects (outcomes/consequences). The persons are those individuals, whether as themselves or as agents of organisations, and, if so, the organisations too, who are involved in the conflict episode. The reasons may be classified as personal (which give rise to affective conflict) or technical (which yield cognitive conflict); now, given the almost universal environment of market capitalism, the technical causes may be classified as business (generic objectives and activities in the market capitalist environment) or technological (the particular activities of the (sub-)industry). The mechanism concerns how the episode arises, progresses and terminates and the effects are what remains after termination of the episode regarding people, organisations, business and technology.

In selecting others to engage in the realisation of construction projects, the criteria, quite appropriately, are founded in technical abilities. However, such abilities comprise two elements – abilities in the particular, technological discipline (architecture, engineering, etc. design; construction) and business abilities (as manifested in submitting low(est) bid) – the

former are employed in pre-selection whilst the latter are used to determine which pre-selected contender is employed. The former abilities are specialisms and so, are complimentary and must be integrated whilst the latter are competitive / conflictual and so, must be managed / reconciled to yield acceptability amongst all participants.

Further, in selecting those others with whom to embark on multi-national projects, two related personality factors seem important – adventurism and cultural empathy. Adventurist persons regard differences as challenges (and so, likely to be motivational), rather than threats, therefore fostering the positive potential of competition and conflict. Cultural empathy, invokes sensitivity to others and preparedness and ability to operate in differing environments, accepting and responding positively, but not unquestioningly, to secure reasoned and appropriate changes to processes etc. to enhance performance in a situational / contingent way. Combination of those two traits should yield significant, positive outcomes on multi-national projects through building on motivations, trust and preparedness to cooperate.

The essence transpires to be selecting appropriate participants who are prepared to be sensitive, flexible and adventurous and with cultural empathy to accept different value structures and procedural systems to realise projects in which the project functional performance requirements may be significantly different from participants' domestic norms. Further, that their behaviour will adhere to pursuit of the value structure established for the project and its realisation with changes that occur only through informed, reasoned and accepted dynamism, from a collaborative perspective rather than the usual self-oriented and opportunistic exercising of power. That should, also, lead to proactive approaches to conflict to secure any envisaged positive consequences but avoiding negative ones – notably, by maintaining attention on the cognitive issues and preventing affective aspects from taking hold; that includes incorporating foresight towards potential disputes and so, resolve such issues before a dispute can take hold.

Thus, successful management of conflict must be sensitive to the objectives of the participants, their behavioural characteristics and preferences/norms (derived from culture) and, in so doing, overtly acknowledge the existence of conflicts as early as possible so that management of conflict is both active and appropriate.

PROSPECTIVE RESEARCH AGENDA

The analysis and conclusions of this paper indicate that a number of important gaps exist which suggest a research agenda as follows:

- Identification and appropriate quantifications of the sources, causes and effects of conflict episodes, acknowledging that these may be culturally-specific and so, studies may relate to particular cultural contexts, potentially with subsequent meta-analysis.
- Research into relationships between cultural distances between participants and the incidences, natures, and effects of conflicts/disputes; preferably, the examinations of cultural distances would use individual dimensions rather than an aggregate index. That study could be extended to address measures of performance and stakeholder satisfaction.
- Measurement of compatibility amongst project participants, potentially as an index, with respect to participant selection to minimise negative conflict.
- Research into the hierarchy of performance criteria, categorised as business, technology, and relational, in various cultures with attention to the values espoused by the participants.
- Investigation of the evolution (changes) in performance criteria for projects during the project realisation processes and of the consequences of such changes for the stakeholders.

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Construction project culture vs. national culture

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ABSTRACT

Globalization means that industry practitioners will increasingly find themselves in the situation of having to deal with team members from different cultural backgrounds. This will mean that dealing with cultural issues will become an important aspect of a manager's role, in both the general and construction context.

The impacts of culture in the construction industry have been studied at different levels e.g. national culture, industry culture, organizational culture and professional culture just to name a few. As a project-based industry, there is a clear need for a better understanding of culture at the project level in the construction industry.

This paper reports on a preliminary study of interaction between project culture and national culture within construction projects. The established hypothesis suggests that a strong project culture will override the national culture when there are conflicts between them. Accordingly the authors suggest that efforts need to be made to develop a positive project culture and maintain it through the project life cycle. The project team can not ignore the culture at the project level. Further research is recommended at the end of this paper.

Keywords: culture, national culture, construction industry, China.

INTRODUCTION

Culture is a set of learned mores, values, attitudes and meanings that are shared by the members of a group and so culture is often one of the primary ways to differentiate one group from another (Duarte & Snyder 1999). Duarte and Snyder use a metaphor – an iceberg – to describe the 'hidden nature' of culture:

“... culture is ... the hidden 'scripts' that people use to guide their behaviours. These scripts are created by repeated interactions between members of the group that create them. Over time, they become second nature and serve as shortcuts for guiding actions and making decisions. Like an iceberg, culture is often partially or

totally hidden. It can, however, affect people's assumptions, behaviours, and expectations about leadership practices, work habits, and team norms." (Duarte & Snyder, 1999, p.54)

In this statement culture refers to basic assumptions and beliefs, which form the deeper part of organisational culture, which Schein (1992) described in his book, *Organizational culture and leadership*. This part of culture, which is often hidden, always guides the behaviours and practices that we can observe.

In the construction context, a number of studies have been undertaken to investigate the cultural issues at different levels, i.e. national culture, organizational culture, industry culture and professional culture. For instance, national culture impacts on quality management and hence affects the (quality) performance of construction projects (Low & Winifredo 2000). The implementation of total quality management (TQM) in construction projects is influenced by both the national culture and the organisational culture (Ngowi 2001; Maull et al. 2001). McGeorge, Palmer & London (2002) identified the culture of the construction industry as: adversarial relationships, fragmented approaches and confrontational relationships. There are differences between cultures of the different professions involved in construction projects (Liu and Fellows 1999). However, there are very limited studies on culture at the project level.

This paper reviews the literature on culture at the project level in various countries and discusses the interactions between national culture and project level culture in construction projects.

NATIONAL CULTURE

According to Hofstede (1980), national culture is the collective programming of the mind that distinguishes the members of one nation from another. Hofstede (1980, 2001) developed a widely-cited model to investigate national culture based on an empirical approach. There are five dimensions of national culture defined in this model: 1) Power distance; 2) Individualism versus collectivism; 3) Masculinity; 4) Uncertainty Avoidance Index; and 5) Long-term orientation. The meanings of each dimension are described in Table 1.

Definition	Explanation
Power Distance Index (PDI): the degree of equality, or inequality, between people in the country's society (centralisation of the power).	A high power distance ranking indicates that inequalities of power and wealth have been allowed to grow within the society. These societies are more likely to follow a caste system that does not allow significant upward mobility of its citizens. A low power distance ranking indicates the society de-emphasizes the differences between citizen's power and wealth. In these societies equality and opportunity for everyone is stressed.
Individualism (IDV): focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships.	A high individualism ranking indicates that individuality and individual rights are paramount within the society. Individuals in these societies may tend to form a larger number of looser relationships. A low individualism ranking (collectivism) typifies societies of a more collectivist nature with close ties between individuals. These cultures reinforce extended families and collectives where everyone takes responsibility for fellow members of their group.
Masculinity (MAS): the degree to which the society reinforces the traditional masculine work role model of male achievement, control, and power.	A high masculinity ranking indicates the country experiences a high degree of gender differentiation. In these cultures, males dominate a significant portion of the society and power structure, with females being controlled by male domination. A low masculinity ranking indicates the country has a low level of differentiation and discrimination between genders. In these cultures,

	females are treated equally to males in all aspects of the society.
Uncertainty Avoidance Index (UAI): focuses on the level of tolerance for uncertainty and ambiguity within the society – i.e. unstructured situations.	A high uncertainty avoidance ranking indicates the country has a low tolerance for uncertainty and ambiguity. This creates a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty. A low uncertainty avoidance ranking indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions. This is reflected in a society that is less rule-oriented, more readily accepts change, and takes more and greater risks.
Long-Term Orientation (LTO): the degree to which the society embraces a long-term devotion to traditional, forward thinking values.	High long-term orientation indicates the country prescribes to the values of long-term commitments and respect for tradition. This is thought to support a strong work ethic where long-term rewards are expected as a result of today's hard work. Low long-term orientation indicates the country does not reinforce the concept of long-term, traditional orientation. In this culture, change can occur more rapidly as long-term traditions and commitments do not become impediments to change.

Table 1 Hofstede's national culture model, Source: Hofstede (1980, 2001); cited from Robie et al. (2005)

Chinese culture

Numerous cultural studies have indicated that Chinese culture is more collective than individualistic, with high uncertainty avoidance and large power distance compared with western cultures (e.g. Fan 2000; Brockner et al. 2001; Atuahene-Gima & Li 2002; Zhao & Hu 2003). In other words, the Chinese are conservative; feel uncomfortable with uncertainty; avoid risks; and focus on collective benefits and achievements. With a strict hierarchy; subordinates don't have many chances to participate in decision-making.

The Chinese culture focuses on maintaining harmony and building trust among people (Batonda & Perry 2003). *Face* is very important for the Chinese people and face-saving behaviour ensures harmony within the group. Wherever possible, efforts should be made to save the face of self and others. It is embarrassing if face is challenged in public. In China, representing respectability, reputation and pride, *Face* connotes the dignity of a person resulting from interpersonal relationships with his superiors, peers and subordinates (Tu 1984, as cited in Kwan & Ofori 2001). In business, to give face, considerable time may be spent in socialising and exchanging pleasantries (Tan 1990). It is essential for the Chinese to avoid confrontation and preserve any vertical authority relationship.

Guanxi is important for achieving business success in Confucian societies (Yeung & Tung 1996). Kwan & Ofori (2001) defined *Guanxi* as "a relationship combined with reciprocity of special relationships that two persons have with each other" (p. 622). The building blocks of *Guanxi* have reflected Confucian teaching related to 'harmony, hierarchy, the building of moral potential and kinship' (Buttery & Wong 1999).

Australian culture

With a British heritage, Australian culture can generally be considered as being close to the UK and also to that of the USA (Willcoxson & Millett 2000; Peters, Hampson & Walker 2001).

Commentators on Australian culture have claimed that it is characterised by lower power distance, individualism and masculinity (e.g. Jarvenpaa & Tractinsky 1999; Choe & Kim 2004; Saha & Hardie 2005). In addition, Australian business people are willing to accept risk compared with other countries (Gierczycki & Reid 1998). Rawlinson and Cheung argue that

Australian culture suits relationship contracting very well and relationship management can be easily adopted within the Australian culture (Rowlinson & Cheung 2004).

Liang and Whitely have compared the Australian and Chinese cultures using grounded research (Liang & Whiteley 2003). They found that Australian culture differs from Chinese culture in many ways. The Australians have greater emphasis on mind, while the Chinese tend to rely more on passion in their approaches. Liang and Whitely (2003) showed noted the following comments from the study respondents in regards to these differences:

“Way of thinking – The Chinese culture is one of problem solving from basic principles. This often is very frustrating for foreigners.

Communication – Australians tend to be very direct in their communications sometimes even at the risk of offending someone. Chinese use a lot of body language, for example, laughing, smiling, to express reservation or rejection and the Australian would take it as a positive sign or agreement.

Risk taking – [The Chinese staff is] very, very risk-averse, very conservative.

Egalitarianism – Chinese behaviour with respect to the authority, with respect to the boss or to an authority figure – it's very much that the authority figure delivers all the wisdom.

Patience – Australians are very impatient. If they want something done, they want it done straight away. Chinese people are, I think, a lot more patient than Western people.

Prioritizing – Here (in China), it's a different timetable, different way to deal with relationships and a lot of other issues. Western management gives priority to outcomes, whereas Chinese management gives priority to processes, interpersonal relationship and feelings” (p. 47-49)

A study conducted by Chen & Partington (2004) compared the relationships in construction project management work between Chinese project managers and Western project managers. This study found that there were fundamental differences in conception of the meaning and significance of different forms of relationship even though both stressed the importance of maintaining good relationships. These differences include: self-identify, relationship with the client, relationship with subcontractors, conflict resolution and attitude towards uncertainty. Chen & Partington (2004) argued that the cultural differences between Chinese project managers and Western project managers resulted in the different conceptions about the relationships with other project team members and the way that the project is executed (for example, the conflict resolution, attitude towards uncertainty).

PROJECT CULTURE

The above review indicates that there are many differences between the national culture of China and western countries (e.g. Australia). According to Hofstede's theory, practitioners in the Australian construction industry will behave with more individualism and will place their own goal(s) as highest priority. This individual approach raises the question as to why the team approach appears to work well in the Australian construction industry?

Two hypotheses were established to try to arrive at an answer viz:

“The behavior and attitude of industry practitioners in a construction project is influenced by both national culture and project culture”; and

“The project culture overrides the national culture if there is conflict between them.”

Under these assumptions, there is a culture at the project level which has more power to decide how project participants behave across different stages of a project.

Having regard to the well-recognised definition of organisational culture (Hofstede 2001, Schein 1985), Zuo & Zillante (2005) defined project culture as:

“...the shared values, basic assumptions and beliefs that the participants involved in a project hold that determine the way they process the project and the relationship with each other in the project environment” (p. 357).

An effective project culture can help to achieve business success. Palmer (2002) identified the key characteristics of effective project culture as: defining clear objectives for the project, defining the clear processes and roles and gaining commitment from team members.

It is very important to establish a unified, strong project culture for successful projects because a lack of a unified culture can be detrimental to the attainment of the overall project objectives (Korzilius 1988).

Project culture is one of the project objectives during the project management process, along with the scope of work, the project schedule, the project costs, the project organisation and the project context (Gareis & Huemann 2000). It is a project manager's responsibility to shape a project culture that stimulates teamwork and high levels of personal motivation, as well as a capacity to quickly identify and resolve problems that threaten project work (Gray & Larson 2000).

After interviewing a number of industry professionals, Zuo, Ness & Zillante (2006) identified some of the common features of appropriate project culture as:

- best for the project;
- no blame, no dispute;
- flexible;
- understanding of each other's roles, expectations, and values
- high level of commitment from all parties
- outcome-oriented;
- straight talk;
- ownership of the project;
- effective communication
- collective decision-making
- early warning of problems
- no feeling of being threatened by others
- etc.

These features were also very common within projects procured via relationship-based contracting. The client's role in driving an appropriate project culture was highlighted by the interviewees.

INTERACTIONS BETWEEN NATIONAL CULTURE AND PROJECT CULTURE

Kumaraswamy et al. (2001) suggested a framework to explain and analyse the origins and formation of the project culture in construction projects. In this framework, a typical project culture is derived from a set of four overlapping sub-cultures:

- organisational sub-cultures that are influenced by national culture, industry culture, ownership and historical factors;
- operational sub-cultures such as quality culture, safety culture, learning culture, and so forth;
- professional sub-cultures that are influenced by the type of members, origin and history, type of task/function, et al ; and
- individualistic sub-cultures that are influenced by national culture, ethnic factors, social status, religion, and so forth.

To simplify the above framework, a conceptual framework was established (as showed in Figure 1) based on the hypotheses established in the previous section.

In an international project, the attitudes and behaviour of participants are affected by:

- National culture of all participants;
- Differences between these national cultures;
- The project culture

In addition, a strong project culture will be able to override the national culture of project team members.

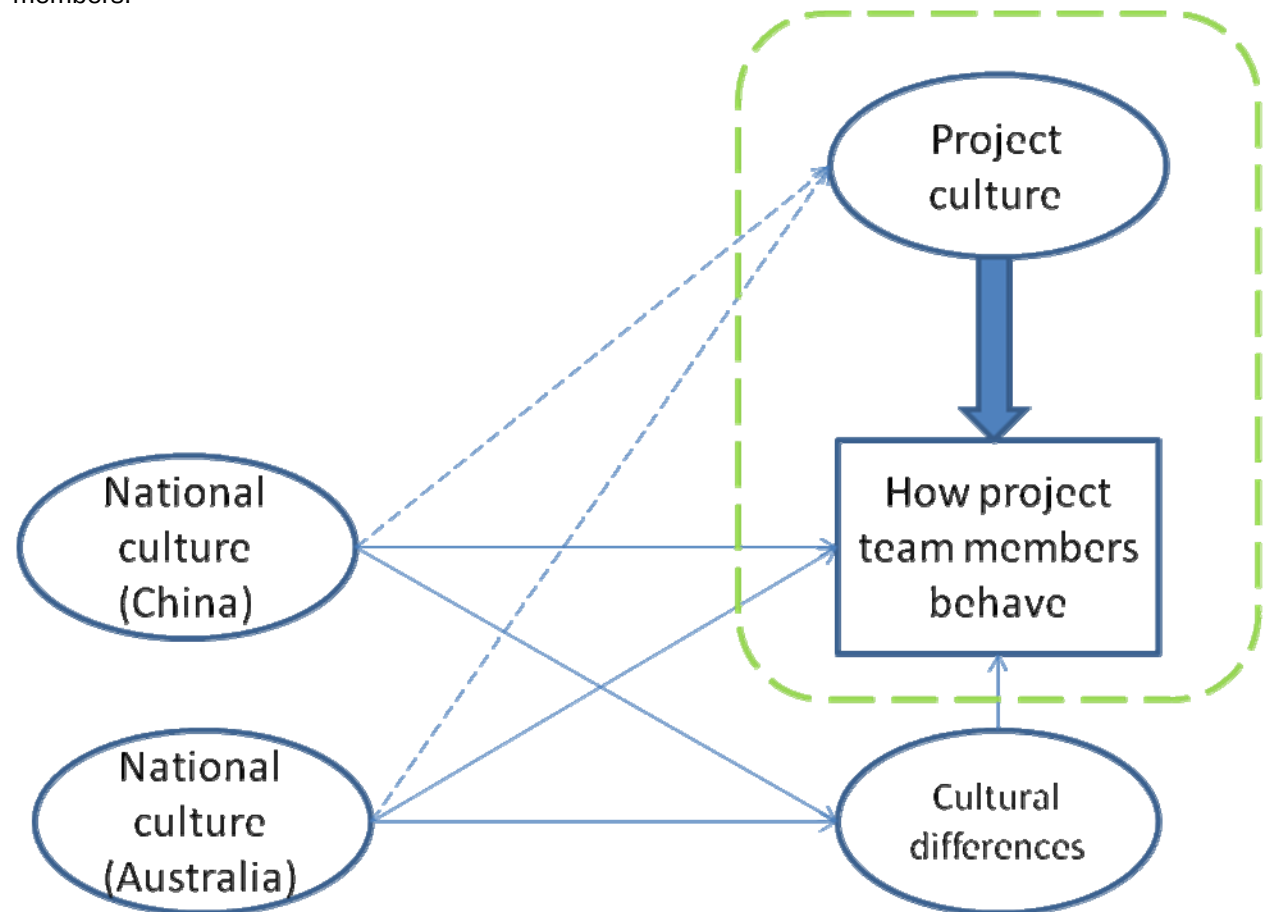


Figure 1. Interactions between project culture and national culture

CONCLUSION

The literature indicates that the various cultural factors have a significant influence on the management of construction projects and the project outcomes. Accordingly, attention should be paid to cultural issues, especially in international projects.

Based on the theory of national culture, it is hard to explain why project team members with individualism oriented national cultures can perform well in terms of teamwork. This study made an assumption that: 1) both the national culture and project culture have influences on the behaviors and attitudes of the project participants and 2) a strong project culture is the determining factor if there is inconsistency between project culture and national culture.

Given the above, it is clear that it is important to develop a strong project culture which will serve to bring all parties and participants together and work towards a common goal –

accomplishing the project objectives and satisfying the client's requirements. This is even more important in a project which involves participants from different countries with different cultural background.

A limitation of this study is the lack of empirical evidence for the proposed conceptual framework and that it concentrates on the national culture of China and Australia. Specific studies will need to be done to compare projects carried out in these cultures in order to determine whether project culture does in fact override national cultures.

Future research opportunities exist to examine the conceptual framework which is shown in Figure 1. Empirical evidence is required to measure the relationship between the national culture, cultural differences and project culture as shown in the conceptual framework. More investigation is required in order to determine how a project culture can develop in the context of other existing cultures, e.g. national, organizational and professional cultures.

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TRAINING IN A MULTICULTURAL ENVIRONMENT: THE EFFECTS OF THE LANGUAGE OF INSTRUCTION

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ABSTRACT

The training of construction professionals takes place in an increasingly multinational higher education environment. Globalisation of education affords significant opportunities for quality improvements as global partnerships allow access to education to a greater number of students, alleviate the stress on academic resources by providing state-of-the-art instruction without requiring the addition of extraordinary faculty resources, foster special interest group networks and disseminate contemporary knowledge and research findings to wider audiences in shorter time frames. However, it also poses challenges as, for example, increasing numbers of students are exposed to instruction in foreign languages. In addition, institutions, particularly those in developing countries and small nations must choose between teaching in an internationally recognised language or in their native language. This raises issues of understanding, knowledge transfer and, ultimately, professional performance. Estonia's recent history provides a unique opportunity to investigate the extent to which the language of instruction influences learning outcomes since a large Russian-speaking minority of engineering students are now receiving instruction in the Estonian language where previously courses were available in both Russian and Estonian languages. This paper describes research into the performance of civil engineering students from different language-cultural backgrounds at the Tallinn University of Technology. Results from a number of courses are compared to determine the effect that the language of instruction has on the relative performance of students from the two main language-cultural groups.

While a considerable body of literature examines the role of language-cultural affiliation in education generally, the originality of this research stems from its focus on the education of civil engineers in a multicultural and multilingual environment. The research has implications not only for training and knowledge transfer but, more broadly, for the effectiveness of communication in multinational projects.

Keywords: Engineering education; education globalisation, influence of language, cultural differences.

INTRODUCTION

The multinational project environment is multicultural and, while this presents numerous opportunities, it also poses challenges among which communication between people of different language groups with differing levels of proficiency in the project working language(s) is of particular importance.

Research exploring multicultural issues in the construction context has tended to focus on communications between managers and labourers or among culturally diverse teams in the construction project environment. The focus of research into the training of construction professionals appears to be the development of more appropriate curricula. Consideration of the language-cultural influences on the effectiveness of education and training has, to date, largely been the preserve of the general education literature.

Given the importance of the education of construction professionals to the construction industry and the increasingly globalised and multicultural nature of both construction projects and university education environments, the strategic significance of language-cultural considerations in the education of construction professionals cannot be overstated. In addition, the education and training context allows for relatively direct measurement of the effectiveness of communication as course examination results are intended to serve as a measure of successful knowledge transfer.

Estonia's recent history provides a unique opportunity to investigate the extent to which the language of instruction influences learning outcomes since a large Russian-speaking minority of engineering students are now receiving instruction in the Estonian language where previously the same courses were available in both Russian and Estonian languages.

This paper describes research into the performance of civil engineering students from different language-cultural backgrounds at the Tallinn University of Technology. Results from a number of courses are compared to determine whether the relative performance of students from the two main language-cultural groups differs significantly when the language of instruction is the native language of only one group. In doing so, it provides insight into the wider issues of training, knowledge transfer and communication in multicultural environments.

LANGUAGE-CULTURAL CONSIDERATIONS IN CONSTRUCTION

A review of the literature regarding language-cultural issues in construction suggests a knowledge gap with respect to language-cultural considerations in the training of construction professionals.

Research from the industry perspective has tended to focus on the management of cultural diversity within the construction process. Research regarding the training of construction professionals typically relates to the consideration of curricula improvements while the investigation of language-cultural effects in education and training has been largely confined to general education research.

The Industry Perspective

Industry-oriented reviews tend to regard issues of cultural diversity from the viewpoint of how they influence the efficiency and effectiveness of construction processes and whether investments in on-site communication skills training are justified. In principal, they concur that there is a need to gain familiarity with cultural peculiarities in the construction workforce and that misunderstandings based on language inabilities may lead to a deterioration in the workplace 'atmosphere' and reduced productivity.

The increasingly globalised and therefore culturally diverse nature of construction projects is illustrated by J. Wells' highlighting of the relationship between international contracting and labour migration. She traces the emergence and development of an international market for

construction labour, describing major patterns and characteristics of the international migration of labour for work in the construction industry, focusing on the Middle East and the Far East (Wells 1996).

A number of studies including those of (Ayoko 2007, Fontaine 2007, Jaselskis *et al.* 2007, Loosemore & Lee 2002, Rosso *et al.* 2007) consider issues of communication and conflict resolution in managing a multicultural labour force in the construction project environment.

Research from Singapore aims to investigate how foreign architectural, engineering and construction professionals manage cross-cultural encounters with mainland Chinese in the construction industry. The authors recommend a framework for managing cross-cultural encounters between foreigners and Chinese working together on construction projects (Ling *et al.* 2007).

Several international and global initiatives involving country comparisons and knowledge sharing have reported findings bearing on the multicultural project context including:

- How organisations operating in different cultural contexts (United States and Hong Kong) differ in their reactions to uncertainties in the business environment (Fields *et al.* 2006);
- The effectiveness of partnering to restore the inter-organisational teamwork in construction for the purpose of examining how construction practitioners view themselves working in such teams (Fong & Lung 2007);
- Differences in firm cultures and top leadership styles in construction firms in a West- and an East-European country comparing the Netherlands and Lithuania are discussed in a study by the University of Twente (Ozorovskaja *et al.* 2007);
- Country comparisons regarding the continuing professional development of construction professionals, specifically an international team from Lithuania, Portugal, Poland and Spain report on training needs in four European countries for the management of infrastructure construction projects (Teixeira *et al.* 2006) and a case study in the UK and Ireland considering different distance learning techniques (Wall & Ahmed 2008).

Research Regarding the Training of Construction Professionals

Research into the education of construction professionals is primarily concentrated on issues of curriculum development from various perspectives and analyses of problems concerned with education quality, choice of subjects and the adequacy of curricula in relation to the needs of the construction industry with many researchers expressing their concern about the prestige of the civil engineering profession.

Spanish, Honk Kong, Canadian and South African studies from (Aparicio & Ruiz-Teran 2007, Chau 2007, Nehdi & Rehan 2007, Rwelamila 2007) respectively find a mismatch between construction industry needs and the content of training courses for construction professionals.

(Bernold 2007, Heintz & Mühren 2007, Lawson 2007, Le & Bronn 2007) discuss specific technical aspects of curriculum development for engineering and architectural studies at university.

Country-specific insights into engineering education are provided by (Tan 2003) regarding the Japanese educational system and (Cubillo *et al.* 2006) from Spain present a model of international student's preferences in choosing a country to study.

Language and Cultural Differences from the General Education Perspective

The importance of proficiency in the language of tuition and testing has been investigated by many researchers covering a variety of taught subjects at both school and university level, e.g. (Cuevas 1984) for mathematics education in schools, and, unsurprisingly, an inadequate understanding of the language of instruction is found to be a major source of underachievement. Similarly, a considerable collection of factors have been variously found to

be correlated with academic performance including:

- (Alfan & Othman 2005): secondary school academic performance, admission qualifications, gender, attendance (full-time / part-time), linguistic capacity, ethnicity, culture, age;
- (Eskew & Faley 1988): academic aptitude, past performance; effort / motivation, previous experience of subject matter, exposure to more generally related subject matter areas;

Some have considered these in the context of ethnic groups, e.g. (Hofman & van den Berg 2003), – ethnic specific differences: prior education, financial considerations (minorities need to earn more to afford university) and effort.

Language Issues in Engineering Education

There appear to be few papers which concentrate on language issues within civil engineering education. Terry Clayton of the Asian Institute of Technology in Bangkok indicates the importance of language knowledge in engineering education noting that engineers must, of course, be fluent in the mathematical codes required of the profession; but an engineer equally fluent in the linguistic codes necessary to communicate with a wider society might, perhaps, be a better engineer (Clayton 1996).

Authors from Singapore (Collins et al. 2000) complain that communication courses are often given low priority by engineering students. In Singapore, students who need additional help with their English skills are required to take an English proficiency course and each school designs its own course to cater to the specific needs of the students in that particular discipline.

One case study from Hong Kong (Gilleard & Gilleard 2002) links well with the survey described in this paper and has implications for any university engineering department where students are taught either partially or solely in a second language. Students and staff within a university engineering department were surveyed to identify how cross-cultural language use potentially impacted academic and communication performance. The findings suggest that students do experience problems with communication skills that may be exacerbated when studying in a second language. The main difference with our study is that both students and lecturers were Chinese, but the teaching language was English, not Cantonese. In this way both students and lecturers were communicating in a foreign language. Estonian lecturers, in contrast, are typically teaching in their mother tongue.

HISTORICAL BACKGROUND TO THE LINGUISTIC ENVIRONMENT IN ESTONIA'S UNIVERSITIES

Largely as a consequence of Soviet era settlement of ethnic Russians, Ukrainians and Belarusians in Estonia, a Russian-speaking minority comprises approximately 30% of Estonia's population. Throughout the Soviet era, education was provided separately in both Estonian and Russian languages, the majority of schools being either monolingual Russian or monolingual Estonian schools. At university level, students were taught separately in Estonian and Russian groups with both groups following the same programme but each in their native language.

Since the restoration of independence in 1991, one of the most significant government policy changes in Estonia has been the adoption of Estonian as the only official state language. In order to integrate the Russian-speaking minority, the Estonian Government has elaborated a State Programme for Integration (State_programme 2000). Among the comprehensive measures planned are different methods for the teaching of Estonian language. However, most schools remain as either Estonian schools or Russian schools and a considerable proportion of Russian-speaking children complete secondary school with limited Estonian-language proficiency. As the language of instruction at state-funded universities is mainly Estonian, this constitutes a potential disadvantage in pursuing further academic studies (Leino *et al.* 2006).

With an Estonian-speaking population in the order of only 1 million people, it is debatable whether it is possible to provide universities with high quality professors in all the necessary fields. Consequently, universities are faced with a choice between two working language directions for the future:

- to maintain the requirement that academic staff be able to teach in Estonian and thereby effectively preclude foreign staff with the risk that quality might be compromised; or,
- to drop the demand for teaching in Estonian and thus increase the pool of eligible academics. However, this involves risks associated with the quality of engineering knowledge transfer if students are not fluent in the language of instruction and the negative effects that this will have on Estonian engineering and scientific language. Having avoided it during 50 years of Soviet occupation, voluntarily accepting the demise of the Estonian language through changing the language of instruction in universities at a time of national independence would be unthinkable.

There is a need to find a reasonable compromise to this problem by deciding which disciplines, at what levels, etc. might be taught in other languages in such a way so as to complement the core, Estonian language, university courses. The current study's investigation into the influence of language of instruction on course results offers empirical input to this debate by providing insight into the effectiveness of knowledge transfer where issues of language proficiency exist.

BASIS OF RESEARCH

An initial study carried out by the authors (Lill & Witt 2008) showed that, for a Building Technology course for the years 1999 to 2006 inclusive, the Russian and Estonian language-cultural groups performed to a similar standard in the years 1999 and 2000 when each group was taught separately in their own language. But, from 2001, when the course was taught to the combined group in the Estonian language only, a statistically significant gap in the relative performance of the two groups was observed (probability of the observed performance gap between the language-cultural groups occurring by chance, $p < 0.05$). The Estonian-speaking students' average results recorded were between 12.7% and 36.2% above those of their Russian-speaking counterparts for these years. In addition, the influence of gender was tested and found not to be a statistically significant determinant of performance (probability that the performances of female and male students do not differ, $p > 0.05$). All other factors were considered to be equal as there was no reason to suspect any other important parameters besides the language of instruction had changed.

Having thus determined a link between the performance of different language-cultural groups and the language of instruction for a particular course, a further investigation was called for to determine whether the observed phenomenon was apparent in other courses offered by the Faculty of Civil Engineering. This paper focuses on whether a significant performance difference between the two language-cultural groups is detectable in the students' results from a range of courses offered by the Civil Engineering Faculty over a number of years.

RESEARCH APPROACH

Description of the Study Group

Tallinn University of Technology (TUT) was founded in 1918 as an engineering college and it was granted university status in 1936. Today TUT is one of the largest public universities in Estonia and has over 10,000 students. In the Faculty of Civil Engineering there are approximately 800 students. The faculty currently offers Master of Science in Engineering and PhD study programmes with nominal study durations of 5 years and 4 years respectively. At TUT civil engineering students are mostly taught separately in Estonian and Russian for the first two years during which time non-Estonian-speaking students can take the Estonian language course offered by the university. Starting from the third year the language of

instruction is primarily Estonian. From this point, Russian-speaking students are taught in a combined group with their Estonian-speaking counterparts in the Estonian language.

Methodology

This research takes the form of a comparative study of the performance of Russian-speaking students relative to Estonian-speaking students when the language of instruction is Estonian.

The null hypothesis: “Students belonging to the Russian language-cultural group do not under-perform relative to members of the Estonian language-cultural group” was adopted and tested in relation to a sample of different courses.

Student’s results for 23 courses taught in the Estonian language were obtained from the Civil Engineering Faculty records. The courses in the sample cover a wide range of subjects and are drawn from semesters 3 – 9 of the 5 year (10 semester) Master of Science in Engineering programme. The students were classified according to their language-cultural groups on the basis of their selection of either the Russian-language-based or the Estonian-language-based programme for their initial studies.

The course results used in the study cover the years 2003 to 2007 inclusive but, in the case of courses which were initiated later than 2003, results were obtained for less than 5 years.

These course results are recorded in the form of grades 0, 1, 2, 3, 4 and 5 which reflect course outcomes in the following percentage ranges:

- Grade 0 represents a course mark of $\leq 50\%$ (and constitutes a failure of the course);
- Grade 1 represents a course mark in the range: $50\% < \text{course mark} \leq 60\%$;
- Grade 2 represents a course mark in the range: $60\% < \text{course mark} \leq 70\%$;
- Grade 3 represents a course mark in the range: $70\% < \text{course mark} \leq 80\%$;
- Grade 4 represents a course mark in the range: $80\% < \text{course mark} \leq 90\%$;
- Grade 5 represents a course mark of $> 90\%$.

Limitations

The results available do not refer to years (prior to 2001 in most cases) when the same courses were taught to the separate language-cultural group students in their own languages. The initial finding from (Lill & Witt 2008) that the performance gap measured between students taught in their native language and students taught in a foreign language was due to the change in the language of instruction can therefore neither be challenged nor corroborated by the current study.

Students’ performance data is captured by grades (as opposed to the precise percentages achieved, for example) and these provide a form of interval measurement for which calculated quantities such as arithmetical means do not yield sensible values. In addition, distributions of grades for any course tend to be less close to a ‘normal’ distribution than those for percentage marks. Finally, for some courses, sample sizes (particularly of the number of Russian-speaking students) are very small.

RESULTS AND ANALYSIS

For each of the 23 courses surveyed and for each year for which results were available, a notional “average” grade was calculated as the arithmetic mean of the grade numbers (0, 1, 2, 3, 4 or 5) of all students taking the course. This “average” represents a datum at approximately the mid-point of the distribution of grades to which any given student’s grade may be compared thus allowing the number of students who achieved grades below this reference point to be determined.

The number of students achieving below “average” grades for each year of each course was summed to determine the total number and proportion of students gaining below “average”

grades in each course by language-cultural group membership. The resulting proportions of Estonian- and Russian-speaking students performing below “average” are shown in Table 1.

Name of the Course	Nr. of Students		Nr. of Students Gaining below "Average" Grades		% of Students Gaining below "Average" Grades		Fisher's Exact Test
	Estonian	Russian	Estonian	Russian	Estonian	Russian	p
Economics in Construction Enterprise	227	75	98	36	43.2%	48.0%	0.275249
Structures of Houses	424	134	143	92	33.7%	68.7%	1.00E-12
Organization of Construction	297	69	120	38	40.4%	55.1%	0.019039
Assessment of Construction Cost	260	68	153	51	58.8%	75.0%	0.009502
Soil Mechanics and Engineering Geology	184	51	97	28	52.7%	54.9%	0.453804
Building Materials II	220	63	88	37	40.0%	58.7%	0.006383
Construction Machinery	347	103	177	52	51.0%	50.5%	0.581505
Concrete Theory	113	13	46	5	40.7%	38.5%	0.669944
Corrosion Protection of Construction	67	11	29	7	43.3%	63.6%	0.176647
Planning and Roads	76	7	32	5	42.1%	71.4%	0.136898
Building Technology I	328	76	119	55	36.3%	72.4%	1.01E-08
Building Technology II	222	52	78	41	35.1%	78.8%	9.08E-09
Building Physics I	299	97	102	51	34.1%	52.6%	0.000969
Reinforced Concrete Structures	147	18	62	7	42.2%	38.9%	0.695052
Steel Structures I	140	24	68	11	48.6%	45.8%	0.679593
Foundations	95	17	49	10	51.6%	58.8%	0.388544
Timber Structures	95	21	40	11	42.1%	52.4%	0.268127
Economics of Real Estate	71	15	41	5	57.7%	33.3%	0.978166
Planning and Marketing	68	17	32	5	47.1%	29.4%	0.945812
Construction Management	51	12	18	3	35.3%	25.0%	0.846349
Construction Investments	60	19	31	13	51.7%	68.4%	0.154778
Real Estate Administration	77	22	30	7	39.0%	31.8%	0.804143
Urban Economics	68	19	31	10	45.6%	52.6%	0.387561
TOTAL (overall)	3936	1003	1684	580	42.8%	57.8%	1.03E-17
TOTAL (Bachelors level, semesters 1-6)	2884	768	1186	465	41.1%	60.5%	5.78E-26
TOTAL (Masters level, semesters 7-10)	1052	235	498	115	47.3%	48.9%	0.355057

Table 1. Student under-performance by course and language-cultural group membership

From the 23 courses in the sample, a greater proportion of Russian-speaking students achieved below “average” results than their Estonian-speaking counterparts in 15 of these courses.

Fisher's Exact Test was used to determine the probability of the results occurring by chance (the sample sizes were too small for Chi-squared testing in some cases and Student's t-test requires that arithmetic means are comparable and the distribution of data approximate a 'normal' distribution) and this revealed a statistically significant under-performance by Russian-speaking students in the case of 7 courses (using an alpha level of $p = 0.05$) and a statistically significant under-performance by Estonian-speaking students in the case of a single course - the “Economics of Real Estate” course.

For all courses combined, the under-performance of students from the Russian language-cultural group was significantly greater ($p = 1.03E-17$) than that of students from the Estonian

language-cultural group. It was also noted that this effect was considerably more pronounced in the courses taken earlier (between semesters 1 and 6 of the programme, equating to the Bachelor's level) with $p = 5.78E-26$ than for the courses taken at a later stage in the programme (semesters 7-10, equating to the Master's level) where the difference between the language-cultural groups' performance was not statistically significant $p = 0.355$.

This suggests that the under-performance effect may be diminishing as students progressed through the programme. Table 2 shows the relative under-performance in all courses per semester and these data are represented graphically in Figure 1.

Semester	Nr. of Students		Nr. of Students Gaining below "Average" Grades		% of Students Gaining below "Average" Grades	
	Estonian	Russian	Estonian	Russian	Estonian	Russian
3	424	134	143	92	33.7%	68.7%
4	567	166	265	89	46.7%	53.6%
5	924	242	341	144	36.9%	59.5%
6	969	226	437	140	45.1%	61.9%
7	391	86	194	46	49.6%	53.5%
8	406	92	192	38	47.3%	41.3%
9	255	57	112	31	43.9%	54.4%

Table 2. Student under-performance by semester and language-cultural group membership

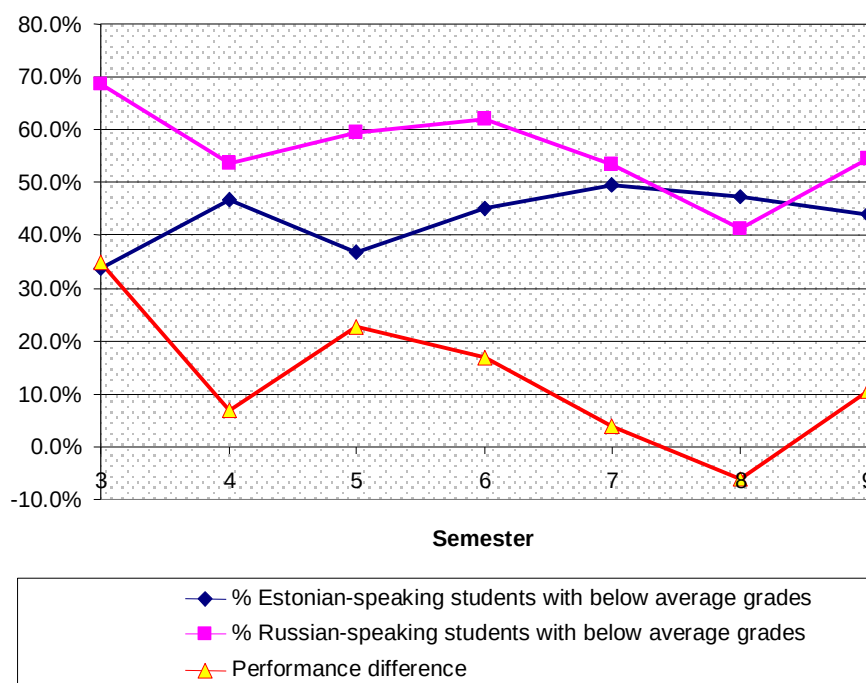


Figure 1: Under-performance of the language-cultural groups by semester

CONCLUSIONS AND RECOMMENDATIONS

A statistically significant under-performance by Russian-speaking students in comparison to their Estonian-speaking counterparts when the language of instruction is Estonian is observable from the data analysed. This effect appears more pronounced at the earlier stages of the civil engineering programme than at later stages suggesting that the performance gap diminishes as the programme proceeds. This may be influenced by numerous factors including greater choice of courses, smaller numbers, better developed coping strategies as well as greater proficiency in Estonian language by this stage of education.

The under-performance is not uniform across the courses. Indeed, in some cases, Russian-speaking students out-perform Estonian-speakers and the Building Technology course on which the initial findings were based which led to this study is shown to be an extreme case in terms of Russian-speakers' under-performance.

The language of instruction may thus be shown to significantly influence the effectiveness of knowledge transfer in civil engineering courses at university level. With the education of construction professionals increasingly being undertaken in non-native languages, this may have long-term implications for the construction industry as a whole. In addition, given the relatively high levels of language proficiency within the university education context, the degree to which communication on construction sites may be hampered by ineptitude in language could be expected to be far greater.

Where universities have determined to teach in English or another international language rather than the local language or languages, the perceived advantages in terms of education quality, better opportunities for students to continue their studies in other universities worldwide and the broader choice for graduates in their career development should be weighed against the corresponding communication problems and the need for parallel language support programmes.

There appears a need to investigate the extent of language-related communication difficulties in multicultural construction project and construction education and training environments.

A number of the courses within the study showed no significant performance differences between language-cultural groups. This provides an opportunity for further, more detailed study in order to identify the specific factors which influence the extent of the performance gap and the teaching and examination approaches which compensate for differences in language ability.

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APPLICATION OF INFORMATION PROCESSING THEORY ON THE INTER-RELATIONSHIP OF ORGANIZATIONAL CULTURE AND ORGANIZATIONAL STRUCTURE

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ABSTRACT

A conceptual model of the inter-relationship between organizational culture and organizational structure has been formulated. However, it is still unable to explain the direction of interaction of organizational culture and organizational structure in real day-to-day operation. This paper explains this relationship through the application of Information-Processing Theory. It has been established that, on one hand, organizational structure modifies organizational culture and, on the other hand, organizational culture determines organizational structure. Based on the Information-Processing Theory, it is hypothesized that a good fit between organizational structure and organizational culture, has a positive relationship with the effectiveness of the organization. This model is illustrated by an empirical study of the Facilities Management Unit (FMU) of a public health care institution. The information-processing requirements of organizational culture and information-processing capacities of organizational structure of FMU are measured through a questionnaire adopted from the Competing Values Model and a self-administered questionnaire respectively. Preliminary results show that the information-processing requirement of the FMU is high as the organizational culture is dominated by clan. However, the information-processing capacity of the FMU is low as the organizational structure is highly formalized and centralized while the level of integration is only medium. The organizational culture of the FMU is not fitted by its organizational structure.

Keywords: effectiveness, health care, information processing, organizational culture, structure.

1. INTRODUCTION

People, one of the key resources, play important roles in an organization. According to Van De Ven's (1976) application of System Theory (Von Bertalanffy, 1972), manpower (people), raw material, money, plant and equipment etc. – the resources input into the organization, are transformed into outputs as goods and services. Studies have shown that transformation process is determined by the structure of an organization (Hall, 1996; Lawrence and Lorsch,

1967; Mintzberg, 1980; Sathe, 1978; Van De Ven, 1976), which affects the effectiveness of the organization. Organizational structure is “the arrangement and specification of formal relationships, rules, formal rules, operating policies, work procedures and similar devices adopted by management to guide employee behaviour (including that of executives) in certain ways.” Peterson and Garrison (1971:139) The major function of organizational structure is to facilitate “the collection of information from external areas as well as permitting effective processing of information within and between subunits which make up the organization.” (Tushman and Nadler, 1978:615)

2. MEANING OF TERMS

The term “organization” means a “system of interrelated behaviours of people who are performing a task that has been differentiated into several distinct subsystems, each subsystem performing a portion of the task, and the efforts of each being integrated to achieve effective performance of the system.” Lawrence & Lorsh (1967: 3) Organizations have also been interpreted as information processing systems in coping with uncertainties. Information processing refers to the gathering, interpreting, and synthesis of information in the context of organizational decision making (Tushman and Nadler 1978:614) while uncertainty is defined as the “difference between the amount of information required to perform the task and the amount of information already possessed by the organization.” (Galbraith 1973:5) There are studies supporting that information-processing capacities of effective organizations are able to meet their information-processing requirements in facing the uncertainty arising from the environment and technology. (Akgün 2007; Egelhoff 1991; Galbraith 1973)

There are also studies supporting that effectiveness of an organization is closely related to its culture (Cameron and Quinn, 1999; Deal and Kennedy, 1982; Denison, 1990; Hofstede, 1980; Peters and Waterman, 1982; Schein, 1985) where organizational culture is the “underlying values, beliefs, and principles that serve as a foundation for an organization’s management system as well as the set of management practices and behaviors that both exemplify and reinforce those basic principles.” Denison (1990:2) The underlying values, beliefs and principles exist deep in the minds of people. Therefore, where there are people, there is culture. People in a society form the societal culture. People in an organization form the organizational culture. Organizational culture is embedded in the societal culture.

3. INTERACTION OF ORGANIZATIONAL CULTURE AND ITS STRUCTURE

Studies have shown the interaction between organizational culture, organizational structure and its effectiveness respectively (Li and Liu, 2007:35-36). Based on studies of Van De Ven’s (1976) application of System Theory (Von Bertalanffy, 1972) and Gidden’s (1984) duality of structure in Structuration Theory, a refined conceptual model from Li and Liu (2007:35-36) is established on the interaction between organizational culture and organizational structure. The interaction is formulated by a People-Behaviour-Performance-Organizational Structure loop, Liu’s (1996) application of Stimulus-Outcome-Response Theory (Naylor, Pritchard and Ilgen, 1980) and her Goals-Behaviour-Performance-Outcome Cycle. The conceptual model is shown in Figure 1.

This conceptual model is able to illustrate the existence of inter-relationship between organizational culture and organizational structure. However, it is still unable to explain the direction of interaction of organizational culture and organizational structure in real day-to-day operation. To explain this, Information Processing Theory is applied.

4. DIRECTIONAL RELATIONSHIP OF ORGANIZATIONAL CULTURE AND ITS STRUCTURE

4.1 Organizational Structure modifies Organizational Culture

The flow of work and information among employees in the organization signal the instrumental and maintenance processes within and between organizational components. (Van De Ven, 1976:65) The simplest way to guide the flow is through rules, programs and procedures – the organizational structure, as their function is to eliminate the need for further communication among the subunits (Galbraith, 1973:10). These rules, programs and procedures provide employees with guidance to deal with anticipated situations and reduce the requirement to seek decision-making by upper levels in the hierarchy and, therefore, reduce the information flow. The flow of work and information is facilitated by organizational structures and also bound by it.

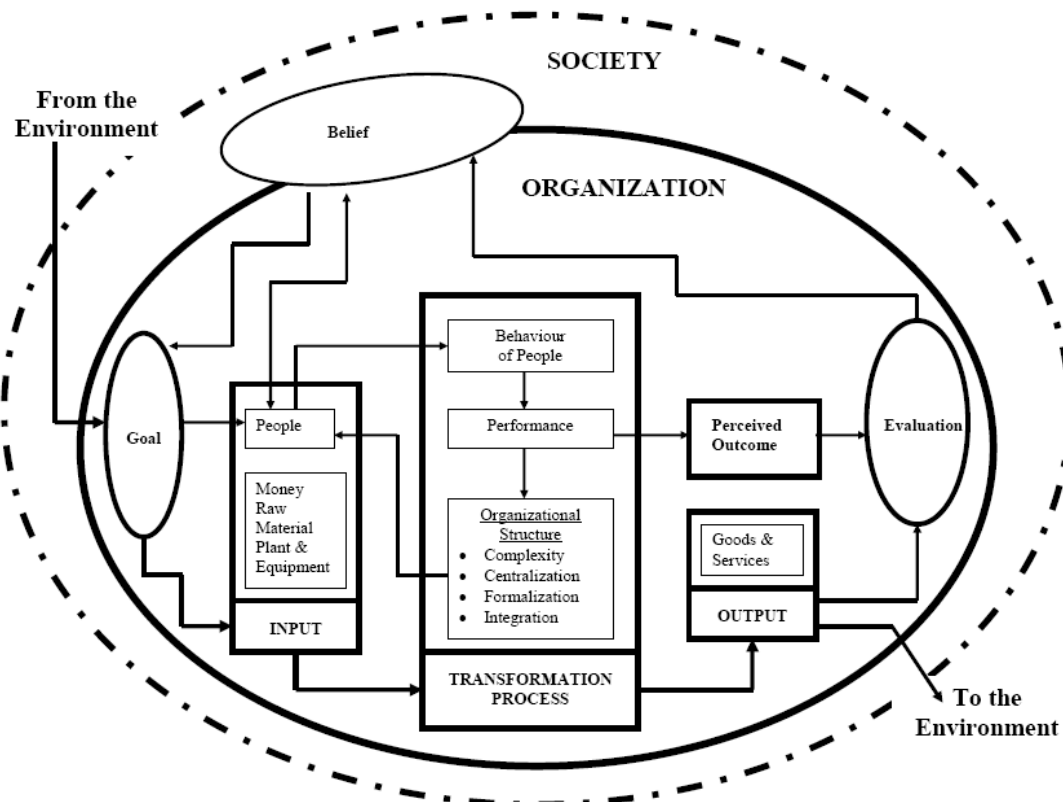


Figure 1: A conceptual model on the interaction of organizational culture and organizational structure (modified from Li and Liu, 2007)

Empirical evidence (Aguila 1967, Galbraith 1977) confirms that organizational structure influences the information flow in organizations as organizational structure acts to “constrain and channel information flows to follow the formal reporting and advisory channels expressed by a particular structure.” (Egelhoff 1982:438) Employees learn, through their day-to-day operation, to act within these rules, programs and procedures – the defined organizational structure. As this becomes a habit, their values, beliefs and principles of the organization are, thus, established as the (current) organizational culture. This signifies how organizational structure modifies the organizational culture.

4.2 Organizational Culture determines Organizational Structure

The system works well when the job-related environment is stable and can be anticipated in advance (Galbraith, 1973:10). However, when new situations arise, such as advancement in technologies and change in environment, uncertainties increase. When uncertainties increase to an extent that current values, beliefs and principles are no longer effective, according to Naylor Pritchard and Ilgen's (1980) Stimulus-Organism-Response paradigm,

based on an assumption that people's behaviour is rational (or at least non-random) for the most part, people will then choose to act in order to maximize the amount of positive outcome. Under these circumstances, the positive outcome will be to reduce uncertainties. To maximize this outcome, people intend to adjust their behaviour.

However, people's preferred ways of behaving is limited by the rules, programs and procedures in the hierarchical communication system of the organizational structure. There creates a gap between people's preferred way to behave – the preferred organizational culture, and the defined way of behaviour under the organizational structure – the current organizational culture. If the hierarchical communication system is not able to provide sufficient guidelines for responses to the increased uncertainties, the gap between the current organizational culture and the preferred organizational culture will enlarge. That is, if the information-processing capacity of the existing organizational structure is not high enough to accommodate the information-processing requirements, employees have to refer the uncertainties to upper levels of the hierarchy seeking for decision-making and direction. This increases the demand for flow of work and information from the upper level of the hierarchical communication system. The information-processing requirement is increased.

As the situation worsens, the hierarchy may become overloaded. This will result in delay in decisions and transmissions of responses downward. The organization will become less efficient. In fact, reduction in efficiency or productivity is a way of creating slack resources to allow the organizational structure to process more information (Galbraith, 1973). However, the less efficient organization will not be able to meet its pre-identified goals and the organization will become less effective.

To maintain effectiveness, the organization has to develop new strategies. The ultimate purpose of the new strategies is to "reduce the number of exceptional cases referred upward into the organization through hierarchical channels (Galbraith, 1973:15). According to Galbraith (1973:15), strategies will be taken to reduce the amount of information to be processed, that is the information-processing requirement of the organization, and/or to increase the information-processing capacities of the organizational structure to handle more information.

As illustrated by Galbraith (1973), to reduce the need for information processing, the possible strategies are:

1. creation of slack resources and
2. creation of self-contained tasks;

to increase the capacity to process information, the possible strategies are:

1. investment in a vertical information system and
2. creation of lateral relations

4.2.1 Creation of Slack Resources

According to Galbraith (1973:15), one way of reducing the need for information processing is simply reducing the required level of performance by consuming more resources. The additional resources are called slack resources. The reduced performance levels reduce the amount of information to be processed which will prevent overloading the hierarchical channels. However, this strategy does not improve the effectiveness of the organization and does not lead to a positive outcome.

4.2.2 Creation of Self-Contained Groups

Through creation of self-contained groups or decentralization, there will be a reduction of division of labour and the point of decision is moved closer to the source of information (Galbraith, 1973:26-27). As such, the need for flow of information, or the information-processing requirements, will be reduced. Therefore, with the increase in the degree of decentralization, the information-processing requirement of the organizational will decrease or

the information-processing capacity of the organizational structure will comparatively be increased.

4.2.3 Investment in Vertical Information System

The purpose of investment in a vertical information system is to reduce the frequency (or timing) of information flow, increase the scope of data base available, increase the degree of formalization of the flow of information and increase the capacity of the decision mechanism (Galbraith, 1973:31). Therefore, with the increase in the degree of formalization, the information-processing capacity of the organizational structure will increase.

4.2.4 Creation Lateral Relations

The creation of lateral relations is to reduce the number of decisions being referred upwards and, therefore, increase the information-processing capacities of the organization (Galbraith, 1973:46). This strategy is similar to the creation of self-contained groups that decisions are made at points where information originated, and discretion at lower levels of the organization is increased. The difference is that some of the lateral relations are through “informal organization” or cliques (Galbraith, 1973:47). As these informal structures exist in most organizations and many tasks are accomplished through these informal processes, instead of the formal structure, this strategy is to formalize and improve these informal structures by designing them into the formal organization (Galbraith, 1973:47). That is, to increase the level of integration of the organization. Therefore, with the increase in the level of integration, the information-processing capacity of the organizational structure will increase.

These new strategies will change the degree of decentralization, degree of formalization and the level of integration of the organizational structure. Therefore, increase in organizational culture gap leads to an increase in information-processing requirements and lead to changes in organizational structure. This explains the direction how organizational culture determines its structure.

4.3 Organizational Structure-Culture-Structure Loop

After the organizational structure has been changed by introducing new processes and increasing the discretion and delegated authorities to employees at lower levels, in order to increase the probability of the employees behaving in the appropriate manner, either the skill mix of the employees has to be substituted or training of the employees has to be enhanced. Through training, and employee’s learning capabilities, the behaviour of employees changes under the Behaviour-Performance-Outcome (B-P-OC) path (Liu 1996). This explains again the direction how organizational structure modifies its culture. An Organizational Structure – Organizational Culture – Organizational Structure loop has thus been formulated.

4.4 Contribution to Effectiveness

It has clearly been illustrated by Information Processing Theory of the directional relationship of organizational culture and organizational structure. It is still necessary to explain how it contributes to the effectiveness of the organization. This is further explained by theories of Galbraith (1973) and Egelhoff (1982).

According to Galbraith (1973), an organization has good structural fit when the information-processing capacity of its structure fits the information-processing requirements of its environment and technology. Egelhoff (1982:435) interprets that the relationship is good “fit” if the organization’s structure is well suited to exploiting the resources of its environment. The relationship is not a good “fit” if organizations “fail to structure properly to implement their strategies, or to fit the environmental conditions implied by the strategies, [and so] find themselves at a relative disadvantage in exploiting their environments.” (Egelhoff 1982:435)

Under the Organizational Structure – Organizational Culture – Organizational Structure loop, matching the organizational culture and its structures profiles of an organization is considered

as the same as fitting the information-processing requirements of organizational culture and information-processing capacities of organizational structure, and therefore, contributing to the effectiveness. As the gap between preferred and current organizational culture increases due to the increase in uncertainties, the demand for communication, that is flow of work and information, to deal with the gap, will increase. The information-processing requirement in the organization is, thus, increased. If the information-processing requirement derived from the gap is not matched by the information-processing capacities of the organizational structure, the organization is considered ineffective.

5. THE HYPOTHESIS

Therefore, it is clear that if the information-processing capacities are meeting the information-processing requirements of an organization in facing uncertainties from the environment, the organization is considered as effective. It is hypothesized that a good fit between organizational structure and culture profile of an organization has a positive relationship with the effectiveness of the organization.

In order to determine the fitness between organizational culture and organizational structure, it is, thus, necessary to measure the information-processing requirements of an organization's culture and the information-processing capacities of the organization's structure.

6. INFORMATION-PROCESSING REQUIREMENTS OF ORGANIZATIONAL CULTURE

Different researchers consider organizational culture to consist of different elements (Cameron and Quinn, 1999; Cooke and Rousseau, 1988; Deal and Kennedy, 1982; Denison, 1990; Peters and Waterman, 1982). In order to measure cultural strength of organizations, it is necessary to identify a model which allows the measurement of the relative strength of the dimensions of organizational culture. Out of the many studies, the Competing Values Model from Cameron and Quinn (1999) is considered the best of the time, in terms of comprehensiveness and application. Furthermore, only the Competing Values Model is able to measure the relative intensities of current and the preferred organizational culture styles.

One way of detecting the information-processing requirement is to identify the gap between preferred and current organizational culture. As illustrated in section 4 above, the gap increases due to the increase in uncertainties, the demand for communication, that is flow of work and information, to deal with the gap, will therefore be increased. The information-processing requirement in the organization is, thus, increased.

Another way of detecting the information-processing requirement is to identify the degree of "culture incongruence". That is, the variation of organizational culture profile in various parts of the organization (Cameron and Quinn, 1999:64). The culture incongruence indicates that some aspects of the organization are not clear about and focused on the same values and sharing the same assumptions (ibid). It leads to differences in perspectives, goals and strategies within the organization and results in complaints of the ambiguity, lack of integration and absence of fit (ibid). The larger the culture incongruence, the larger is the complications, disconnects, (ibid), and therefore, the larger is the demand for clarifications and instructions and, the higher is the information-processing requirement of the organization and the more is the obstacles towards effectiveness (ibid).

According to Cameron and Quinn, there are four styles of organizational culture – hierarchy, adhocracy, market and clan. The questionnaire derived from the Competing Values Model from Cameron and Quinn (1999) is used to measure the relative intensities of the four styles of organizational cultures. The population is members of the Facilities Management Unit (FMU) of a public health care institution.

7. INFORMATION-PROCESSING CAPACITY OF ORGANIZATIONAL STRUCTURE

7.1 Constructs of organizational structure

There are many studies on the constructs of organizational structure (Hall, 1996; Lawrence and Lorsch, 1967; Mintzberg, 1980; Pugh et al., 1969; Sathe, 1978; Van De Ven, 1976). Based on the literature search, measurement tools are developed to measure the degree of complexity, formalization (or standardization), centralization and level of integration – the generic constructs of organizational structure.

7.1.1 Degree of Complexity

Hall (1996) analyses the degree of complexity in three elements – horizontal differentiation, vertical differentiation and spatial differentiation. The degree of complexity is, thus, measured by counting, from the organization chart, the number of occupational and professional specialties, the job titles within an organization and the number of levels from the Head of the FMU. The number of locations in which an organization has offices or plants is also counted. A summation of these numbers is used to represent the degree of complexity.

7.1.2 Degree of formalization or standardization

Formalization is defined by Pugh et al., (1968:75) as “the extent to which rules, procedures, instructions, and communications are written”. The degree of formalization concerns the extent to which standardized skills, knowledge, work processes and output are written. (Mintzberg, 1980; Sathe, 1978). That is, whether the team has the freedom to do work in their own way. To measure the degree of formalization, an instrument developed by Hage and Aiken, the Formalization Inventory (Aiken and Hage, 1966), is adopted.

7.1.3 Degree of Centralization

Centralization is defined as “the locus of authority to make decisions affecting the organization”. (Pugh et al., 1968:79) A similar definition of centralization by Hage and Aiken (1967) is how power is distributed among social positions. Dewar et al. (1980) verify that the indicators of centralization in Aiken and Hage’s study are both reliable and valid. Aiken and Hage’s scale of personal participation in decision-making and hierarchy of authority is considered valuable as a reference to measure the degree of centralization in this study. The original scale of Aiken and Hage’s (1968) instrument has not been fully adopted since their scale is applicable only to survey the organization as a whole. As this study considers the FMU as the unit of “organization”, their scale is not entirely suitable to this study. However, based on Aiken and Hage’s scale, a self-administered questionnaire is developed to measure the level of centralization in this study.

7.1.4 Level of Integration

Integration is the means, or liaison devices, of linking members of an organization (Mintzberg, 1980). It is also “the process of achieving unity of effort among the various subsystems in the accomplishment of the organization’s tasks” (Lawrence et al, 1967:4). The degrees of integration, connectedness and coupling of organizations, albeit others, have important consequences for its effectiveness (Ranson et al., 1980:2). As there is no other valid reference on the measurement of the degree of integration, a survey approach is used in this study where a self-administered questionnaire, including modified questions from Hage et al. (1971), is prepared based on the literature search. A similar scale of measurement to that of Lawrence and Lorsch (1967:24) study is adopted. Follow up interviews of selected samples are conducted to ensure the reliability and validity of the responses received.

8. ANALYSIS OF RELATIONSHIP AMONG VARIABLES

Scholars in the past decades (Cameron and Quinn, 1999; Deal and Kennedy, 1982; Denison, 1990; Hofstede, 1980; Peters and Waterman, 1982) studied and formulated various models

on the measurement of organizational culture. Out of the many models, the Competing Values Model from Cameron and Quinn (1999) is considered the most appropriate instrument on measurement of organizational culture in this research as it is able to measure the relative intensities of the context of organizational culture. According to Cameron and Quinn (1999), there are four contexts of organizational culture, namely hierarchy culture, market culture, adhocracy culture and clan culture.

8.1 Hierarchy Culture

According to Cameron and Quinn (1999), organizations dominated with hierarchy culture are very controlled and structured places. Formal procedures govern what people do. The information-processing requirement is thus, relatively low.

8.2 Market Culture

Organizations with market culture are very results oriented (Cameron and Quinn, 1999). The glue that holds the organization together emphasizes achievement and goal accomplishment. As Egelhoff (1991:344) indicates, goal-setting and planning allow more decisions to be made at lower levels in the organization as long as they are within the plan and so, relieves the information-processing load on the hierarchy structure, the information-processing requirement is, thus, higher than that of hierarchy culture.

8.3 Adhocracy Culture

Organizations with adhocracy culture are innovative and risk taking (Cameron and Quinn, 1999). Task units have much freedom to do the work and work is unique. As the natures of work are unique, innovative and risk-taking, the uncertainty is high, and thus, the information-processing requirement is also high.

8.4 Clan Culture

The management style of organizations with clan culture is characterized by teamwork, consensus and participation (Cameron and Quinn, 1999). The success of an organization is based on the development of human resources, teamwork, employee commitment, and concern for people. As the leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing, the information-processing requirement is high.

9. THE FACILITIES MANAGEMENT UNIT

All organizations work within boundaries. As indicated by Lawrence and Lorsh, (1967:4) "the boundaries of organizations will not always coincide with their legal boundaries". Similar to Tushman and Nadler's (1978:615) study, the basic unit of analysis in this study is the subunit (a department) of public health care institutions in Hong Kong – the Facilities Management Units (FMU). FMUs are responsible for the planning, organizing and liaising with the policy makers, users, and monitoring the performance of consultants and contractors for the implementation of construction projects within the compound of the institution.

10. DATA COLLECTION

The study is carried out in stages. In stage one, a pilot study has been conducted where a group of 8 people working in a public health care institution were invited to answer paper questionnaires on organizational culture and organizational structure. Returns on the pilot study were carefully reviewed and clarified with the respondents. The questionnaire on organizational structure has been further modified to cover comment from the pilot study. In stage two, invitations were sent to over 400 staff working in a public health care institution having an intranet email account for an online organizational culture survey. The third stage is to invite all the staff working in the FMU, altogether 10 people, of that institution to respond

to a paper questionnaire on organizational structure. The last stage is to further study the organizational structure of FMU through the organization chart. A summary of the population and samples drawn is shown in Table 1.

	Population	Sample	Return	%
Institution	6,319	400 (6.3% of population)	53	13.3
FMU A	10	10	10	100

Table 1: Summary of Population and sample drawn

All respondents were requested to answer a questionnaire developed by Cameron and Quinn (1999) indicating the current and preferred status of the organization. Staff working in the FMU were further requested to answer a self-administered questionnaire on organizational structure.

11. DATA ANALYSIS

11.1 Organizational Culture of the Institution

As shown in Figure 2, the current organizational culture profile of the public health care institution is dominated by hierarchy. The less dominating organizational culture types are market and clan. The weakest organizational culture is adhocracy. The preferred organizational culture profile shows a very different pattern where clan culture dominates and then followed by hierarchy and adhocracy. The weakest preferred organizational culture is market.

This is reflecting that employees of the institution, in general, prefer to have larger flexibilities, freedom, be innovative and willing to take risks. They value opportunities for new things. They consider the organization as too results oriented or achievement oriented. People are too competitive, too aggressive, too hard-driving, high demands and achievement oriented.

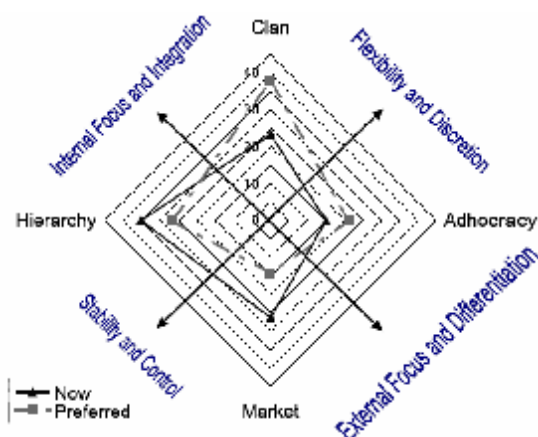


Figure 2: Organizational Culture Profile of the Institution

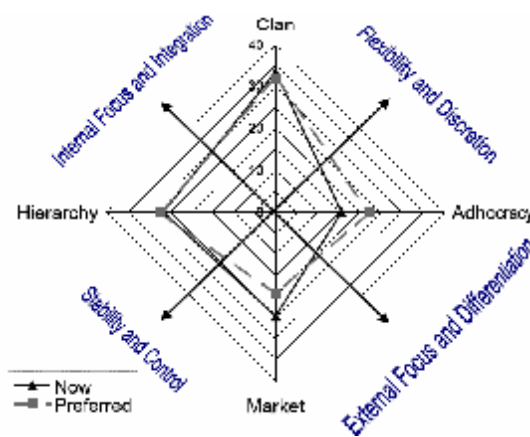


Figure 3: Organizational Culture Profile of the Facilities Management Unit

It is a dilemma of a public health care institution which is accountable to the society on one hand and a caring institution demanding teamwork in a dynamic environment on the other hand. There are clearly stated policies, rules and guidelines, both internal and external in the institution to bind the way in which people work. The main concern of the institution is stability,

control and continuity – the characteristics of hierarchy culture. However, as a caring institution, a close personal contact, both between staff and patient (or relatives) and among staff, is expected as shown in the preferred organizational culture profile.

11.2 Organizational Culture of Facilities Management Unit

As shown in Figure 3, unlike the general organizational culture profile of the institution, the current organizational culture profile of the Facilities Management Unit (FMU) is dominated by clan. The less dominating organizational cultures are hierarchy and market. The weakest organizational culture is adhocracy, which is similar to the organizational culture profile of the institution. The preferred dominating organizational cultures are clan and hierarchy, which are having almost the same relative intensities as the current organizational culture profile. The less dominating preferred organizational culture is adhocracy and the weakest preferred organizational culture is market.

It is worth noting that the relative intensities of the dominating organizational cultures, that is, clan and hierarchy culture, for both the current and preferred organizational culture profile of FMU are almost the same. It seems that employees of FMU agreed with and share the dominating clan and hierarchy culture of the organization.

11.3 Organizational Structure of Facilities Management Unit

Preliminary analysis of returns shows that the degree of formalization of FMU is, generally, high as is the degree of centralization. The level of integration is medium. The degree of complexity is low as it is a small unit consisting of only 10 people. A summary of the results is shown in Table 2. This reflects that, as a public institution, the organization is accountable to the public. Policies and procedures are clearly defined and staff is constantly checked for their compliance with the rules and regulations.

<u>Context of Organizational Structure</u>	<u>Profile of FMU</u>
Degree of Formalization	High
Degree of Centralization	High
Level of Integration	Medium
Level of Complexity	Low

Table 2: Summary of Organizational Structure Profile of the Facilities Management Unit (FMU)

Owing to the highly formalized structure of the organization, the level of integration of members is only medium. It is noted that senior staff members prefer using formal ways of communication such as memos and emails while the junior staff prefer communicating by phone and face-to-face. The differences reflect that the senior staff are more aware and take more responsibilities for accountability. For junior staff, or the front line, they may have to deal with situations where formal communication may be ineffective. As formal communication such as memo and emails are uni-directional at one time, to communicate by phone and face-to-face can obtain immediate response and clarify ambiguities and so, is considered more effective.

It is noted from the frequency and time spent on meetings – one of the formal ways of communication – that, the senior staff tend to have more and longer meetings than the junior staff. This is considered as a supplement to the impersonal way of formal communication by memos and email.

12. SUMMARY AND DISCUSSION

12.1 Choice of FMU as the Unit of Study

Preliminary result of the study shows that the organizational culture profile of FMU differs from that of the institution. This supports the choice of FMU as the unit of study instead of the health care institution as a whole, since the organizational culture profile of the latter has been generalized by the various departments of the institution. Furthermore, as FMU is responsible for the planning, organizing, monitoring and implementing all alteration, addition and maintenance works within the compound of the institution, its nature of business is similar to a property management organization rather than a health care institution where it belongs. The tasks of FMU are basically construction projects which involve the close cooperation of working partners – the construction related professionals and contractors.

12.2 Information-Processing Requirement of the FMU

As shown in a summary of the organizational culture of the institution and FMU in Table 3, the current organizational culture profile of the institution is dominated by hierarchy. However, the preferred organizational culture profile of the institution is dominated by clan. Both the current and preferred organizational culture profiles of FMU are also dominated by clan.

The nature of works of FMU demands heavily on teamwork and is very customer oriented. It is both preferably and practically requiring staff's commitment and participation for the success of the Unit. Furthermore, majority of the staff are working in the same office, it is thus considered reasonable that both their current and preferred organizational culture is dominated by clan culture.

Organizational Culture Profile		The Institution	The FMU
Current	Dominated by	Hierarchy Culture	Clan Culture
	Weakest	Adhocracy Culture	Adhocracy Culture
Preferred	Dominated by	Clan Culture	Clan Culture
	Weakest	Market Culture	Market Culture

Table 3: Summary of Organizational Culture Profiles of the Institution and the Facilities Management Unit (FMU)

Organization dominated by clan culture is like an extended family. The leaders are acting as mentors and perhaps even parent figures (Cameron and Quinn, 1999:82). As the organization attaches great importance to cohesion, the information-processing requirement of the FMU is high.

12.3 Information-Processing Capacities of the FMU

The organizational structure of FMU is highly formalized and highly centralized. Their level of integration is medium and the level of complexity is low. As a department of the public health care institution, FMU has to be accountable to the public and subject to be audited on the expenditure. The FMU has to work in accordance with the established rules and procedures. This is particularly critical to the senior management. The organizational structure is therefore highly formalized and highly centralized. These are the typical characteristics of hierarchy organizational culture and the information-processing capacity is comparatively very low.

The relatively high intensity in clan culture emphasizing teamwork seems to contradict with the high intensity in hierarchy culture which emphasizes stability and control. However, clan culture is considered as a balance in organizations dominated with hierarchy culture. Owing

to the stringent control of formal procedures and high level of division of labour, in order to efficiently deliver the tasks, it is necessary to work closely as a team where informal contacts are supplementing the formal communications and thus the intensity of clan culture is also high.

Majority of FMU's clients are clinical professional of the institution. Facing with the two groups of stakeholders of totally different background and both are experts in their field, one of the major roles of FMU is to translate messages from the groups for delivery of messages between the two groups of professionals. Therefore, much time is spent on communication or integration. However, owing to the domination of hierarchy culture in the FMU, much of the communication is through the formal structure. The medium level of integration is considered matching the nature of business and organizational culture of FMU.

12.4 Fitting of Information-Processing Requirement and Information-Processing Capacity

The information-processing requirement of the FMU is high but the information-processing capacity is very low. The information-processing requirement of the FMU is not fitting the information-processing capacity.

13. CONCLUSION

As illustrated above, the information-processing requirement of the clan organizational culture is high. The information-processing capacity of the organizational structure of FMU is low as the degree of centralization and formalization are both high. The medium level of integration further even lower the information-processing capacity of the organizational structure.

Based on the preliminary analysis of the organizational culture profile of FMU and its organizational structure, the organizational culture profile of FMU is basically not matching its organizational structure. Both the current and preferred organizational culture profiles of FMU are dominated by clan while the level of integration of the organizational structure is only medium, the information-processing requirement is not fitted by the information-processing capacity of the organizational structure which may affect the effectiveness of the FMU.

To further assess the effectiveness of FMU, a customer satisfaction survey will be conducted. Similar study will continue to be conducted on the FMU of another public health care institution. The results of the two institutions will then be compared and so as their effectiveness.

The theoretical model is applicable to all organizations. In order to fully testing the model, further studies on the relationship among the sixteen variables, that is, combination of the four organizational culture styles defined by Cameron and Quinn (1999) and the four constructs of organizational structure, have to be carried out.

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INTERNATIONAL CONFERENCE ON MULTI-NATIONAL CONSTRUCTION PROJECTS
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Verifying and Evaluating Critical Factors for Rural Housing Construction based on vernacular culture in Iran

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ABSTRACT

Efforts taken in the development of rural housing did not consider all aspects related to housing development in rural areas. This lecture is going to know the influential factor on development of rural housing in a specified zone. It also is going to evaluate and prioritize them relative to each other from dwellers'. For this purpose, the factors effective on development process of rural housing have been identified by using the existing resources such as Theories, Internal experiences and Experiences of other countries. It emphasis on countries that have similar condition to Iran. Selected area which has been used as case study bed on the rim of the Caspian Sea. Choosing the samples has been followed purposive (non probabilistic) method.

Final factors analyzed in the study areas and measuring components of each factor have been introduced. Main factors are: increased executive efficiency with respect to workforce and cost, Regional accordance with natural environment, Physical effectiveness, Increased capabilities and social compatibilities, Stability (rigidity), Dynamism, Economic development, Coordination and protection of natural environment, Cultural durability, Visual desirability and Applied endurance.

In continuance, the contribution of each factor has been defined in fulfilling the general desirability in development in area as per in users' point of view. Next steps are: Commenting and analyzers of results, Conclusion and some Recommendations.

Keywords: Rural Housing, Construction, Factor

INSTRUCTIONS

Despite extensive planning on rural housing in the recent years in Iran and the huge budget allocated to this concern, the trend of rural housing construction has not been satisfactory, according to the experts' views. This lack of desirability would concern different dimensions of the problem, from fulfilment of physical and non-material needs of the rural settlers to

retaining identity of their settlements and maintaining their historical continuation. Efforts taken in the development of rural housing have mostly been one-dimensional; in that, they did not consider all aspects related to housing development in rural areas. A review of experiences and related written documents confirms lack of multi-lateral conception in rural housing development. It is extremely important to notice the lack of a holistic general program that considers different aspects effective on formation of rural housing and simultaneously, present a mechanism or system with the help of which, it would be possible to have a general and multi-aspect overview on all planning and executive decisions related to the main objective toward selection of the best option available, considering all variables influencing the selection. By firstly studying the basic theoretical concepts related to the main theme, this paper has developed a conceptual framework on the basis of which, the main theme may be defined and specified later in the process, considering the case studies frame of reference.

1-Research methodology and process

The aim of this article is to know the influential factor on development of rural housing in a specified zone and to evaluate them relative to each other from dwellers' views and to prioritize them. For this purpose, the factors effective on development process of rural housing must be identified first. Identification of the above factors is a process by itself and is not covered in this paper. Therefore, we only mention a summarized explanation of steps of exploiting the factors and in continuation we try to introduce the final factors and evaluate them. For being informed on complete explanation of factor selection, its different steps and its finalization in the environment (Raheb, 2008). The steps of selection of factors are:

1.1. Derivation of a conceptual framework effective on selection of proper rural housing development method, using the existing resources. In this condition, the framework is chosen out of the following domains:

- Theories including identification of the concept of village and rural housing, theories connected with the way of interfering in man-built environment, especially rural regions (with emphasis on theories relying on dwellers' participation) and theories related to proper technologyⁱ
- Internal experiences including macro-policies and programs and experiences on construction and reconstruction of rural housingⁱⁱ
- Experiences of other countries (with emphasis on countries that have similar condition to Iranⁱⁱⁱ)

2.1. Specification and interpretation of the factors chosen using the case study method

The objective of this part of the work is to make the factors accurate and finalized in an environment. The case study method is used for this purpose. The preliminary conceptual framework provides ground for the case study, which in combination with taken from the local area identifies the final criteria. Field studies are based on backdrop qualitative procedures. In a backdrop qualitative research, the researcher is pursuing to let natural conditions of environments set the data so that a concept or theory is finally emerged, regardless of beliefs and perceptions (Grooth and Wang, 2005, 180). The tool for scaling observations and

interviews are based on the lists and the aim is to provide experts with a collection of data so as to let them free to apply their idea(s). In this method breath-taking interviews are done with the residents based on pre-directed, purposeful dialogues in which, the researcher in pursuit to discover the purpose follows a few major concerns while respecting the responsive framework and structure and with combining interview and observations, he or she understands the logic behind daily activities of people (Marshal and Rossman, 2002, 112). For this purpose and based on housing development method, eight major types of housing were identified in the region. Field data regarding residential units of each type were separately reviewed. The results of two case studies included two fundamental parts:

- Data collection relative to the value of each of the factors in the process of rural housing development in the region.
- The desirability of development method of each building with respect of functioning for the user.

In continuation, for converting the acquired qualitative data in each type, and in the above two cases, to quantitative data, spectrum scaling techniques and five-party "Likert" -scale were used^{iv} (Rafipour, 2001, 200).

-Defining final factors: The results of this part of the work is accumulating and reducing the factor or making sure of number and the way that existing factors form. For this concern, the cluster analysis has been used. In this sense, final factors and components for comparing each factor in each area were defined and will be explained in the following.

- After defining all factors effective on the proper method of rural housing development in the selected area, the contribution and the way that factors effect on formation of this method were defined. The contribution of each mentioned factor in fulfilling the desirability of the building functionally for user were measured by multiple variable regression analysis and based on exploited data. Statistic analysis has been done by SPSS software.

2-Selected area:

That selected bed on the rim of the Caspian Sea was relatively proper from researcher's point of view^v, but considering the extent of the area and the large number of villages existing in that area (about 7000 villages), it was not possible to scale and measure the whole area. For limiting the study area that could comparatively represent the characteristic of the whole region, the preliminary studies were carried out. Accordingly, "Guilan" province relatively included all the characteristics needed in the selected area, according to the effective variables in selecting the villages, except for "Torkamansahra". Thus, selected areas as the study bed zone Includes Guilan province and the north of Golestan province covering townships "Gonbadekavoos" and "Kolaleh" (the upper part of "Kenareh" road). Choosing the samples through rural settlement of the selected area has been followed purposive (non probabilistic) method.

Based on studies, the housing types in "Guilan" villages in three distinct formations include plane zone, foothill zone and mountainous zone. The study area in Guilan is allocated to

Torkaman race for settling in and there are some people of Sistani origin in that area. The short history of permanent settlement in addition to profound cultural differences between these and other races in the province have brought about different types of housing among these races and these races' settlements are clearly distinct from those of native races.

3-Final effective factors on development of housing and their measurement components

Final factors analyzed in the study areas and measuring components of each factor are as follows:

1.3-increased executive efficiency with respect to workforce and cost: the objective is the complete fulfilment of related necessities by developing the building and providing smooth trend of its implementation in a way that interfering factors do not stop or delay the work trend. In addition, the budget spent to develop the housing and the special procedures taken to reduce spending are the criteria for logicity of the cost with respect to priority needs of the household.

§ *components for measuring the factor are: speed of implementation, independency on expert forces in making, repairing and maintaining, lack of need to sophisticated and unavailable equipments, achieving gradual durability, possibility to avoid flaws and mistakes, ease of implementation, smoothly accessed resources, low cost construction and maintenance, fair balance between housing budget and credits allocated to it, compatibility with current economic conditions and lifestyle, increased self confidence, avoiding luxury, desirability to work and to construct a house, convertibility to a capital commodity.*

(Alexander,1979), (Alexander & others, 1977), (Alexander & others, 1975), (Broome, 2005), (Green,1965), (Fathy, 1993, |(Uni , 1965, (Moatasim, 2005, (Rapoport, 1969), (Afghanistan. MRPD, 2003), (ERRA-Pakistan, 2006), (Compiled by: J.K. Varshneya and O.N. Mathur, 1968,(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Ardam Engineer Group, 1984), (Housing Foundation, 2005), (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan-Taybad, Ministry of Housing &Urban Development (Iran)), (Serlad Engineer Group, 1982), (Taheri, M., Alizamani, M., 2003)

2.3- Regional accordance with natural environment: the concern is physical accordance of the building and its construction scheme using climatic elements and employing proper mechanisms to provide comfort relative to the elements used exploitation of potentials to counteract its negative effects.

§ *Components for measuring the factors: wind, rain, humidity, sunshine, and temperature.*

(Fathy, 1993), (Uni , 1965), (Sen, 2002), (Rapoport, 1969), (Ardam Engineer Group, 1984), (Housing Foundation, 2005), (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan- Taybad, Ministry of Housing &Urban Development (Iran)), (Serlad Engineer Group, 1982), (Taheri, M., Alizamani, M., 2003)

3.3-physical effectiveness: the concern is physical accordance of building with requirements, needs and demands of the residents such that fulfillment of the said needs is predicted in the development method and that physic and spaces created in this method have adequate capability to provide for engineering issues, human factors and are in compliance with human behaviors.

§ *Components for measuring the factor: observance of proportions and dimensional and space criteria from operational efficiency and visional desirability, hygiene, caring for tastes and demands of the residents, compliance with needs, avoid shortages, provide safety, establish proper relationship between open and closed spaces, and capability to construct infrastructures and facility services.*

(Alexander & others, 1977), (Fathy, 1993), (Afghanistan. MRRD, 2003), (ERRA-Pakistan, 2006), (Complied by: J.K. Varshneya and O.N. Mathur, 1968), (K.R. Uni , 1965),(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Ardam Engineer Group, 1984), (Housing Foundation, 1992), (Housing Foundation, 2005), (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan- Taybad, Ministry of Housing &Urban Development (Iran)), (Serlad Engineer Group, 1982), (Taheri, M., Alizamani, M., 2003)

4.3- Increased capabilities and social compatibilities: the intention is to make coordination with social under-layer and its expected social functions such that in proportion with configurations, values, beliefs and traditions, the building would be able to offer a desirable function to the residents relative to other sects of the society.

§ *Components for measuring the factor: care for social values, coordination with social functions, enhancing sense of cooperation and contribution, control and management of the work, self-sufficiency, improved quality of the dwellers' life style and culture.*

(Alexander,1979), (Alexander & others, 1977), (Alexander & others, 1975), , (Fathy, 1993), (Habracken, 1972), (Habracken, 1998), (Uni , 1965), (Sen, 2002), (Moatasim, 2005), (Pultar, 2000), (Rapoport, 1969), (Turner,1977), (Afghanistan. MRRD, 2003), (ERRA-Pakistan, 2006), (Complied by: J.K. Varshneya and O.N. Mathur, 1968), (K.R. Uni , 1965),(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Ardam Engineer Group, 1984), (Housing Foundation, 1992), (Housing Foundation, 2005), (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan- Taybad, Ministry of Housing &Urban Development (Iran)), (Serlad Engineer Group, 1982), (Taheri, M., Alizamani, M., 2003)

5.3- Stability (rigidity): the intention is the resistance of building against usual, common, unconventional and temporary natural forces and erosion due to facing with environment and its effects and making use of the building all along its life cycle.

§ *Components for measuring the factor: resistance against earthquake, natural and atmospheric conditions, construction quality, and durability.*

(Alexander,1979), (Alexander & others, 1977), (Alexander & others, 1975), (Rapoport, 1969), (Afghanistan. MRRD, 2003), (ERRA-Pakistan, 2006), (Complied by: J.K. Varshneya and O.N. Mathur, 1968), (NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Ardam Engineer Group, 1984), (Housing Foundation, 2005), (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan- Taybad, Ministry of Housing &Urban Development (Iran)), (Serlad Engineer Group, 1982), (Taheri, M., Alizamani, M., 2003)

6.3- Dynamism: dynamism means growth, movement and possibility for optimization of the building based on dwellers' ideas and desires. A dynamic building is the one that is capable of forming a process and a continuous life.

§ *Components for measuring the factor: partial diversity, changeability, and development possibility.*

(Alexander,1979), (Alexander & others, 1977), (Alexander & others, 1975), (Fathy, 1993), (Habraken, 1972), (Habraken, 1998), (Uni , 1965), (Moatasim, 2005), (Turner,1977), (Afghanistan. MRRD, 2003), (Compiled by: J.K. Varshneya and O.N. Mathur, 1968), (K.R. Uni , 1965),(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Ardam Engineer Group, 1984), (Housing Foundation, 1992, (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan- Taybad, Ministry of Housing &Urban Development (Iran)), (Serlad Engineer Group, 1982), (Taheri, M., Alizamani, M., 2003)

7.3- Economic development: the concern is to measure effects of the chosen approach on economic growth of the region and improvement of economical development factors in the region.

§ *Components for measuring the factor: expand the native industries and increase production capacity, improve regional commerce of the area, reduce unemployment and training expert men.*

(Alexander,1979), (Broome, 2005), (Green,1965), (Fathy, 1993), (Uni , 1965), (Sen, 2002), (Afghanistan. MRRD, 2003), (ERRA-Pakistan, 2006), (Compiled by: J.K. Varshneya and O.N. Mathur, 1968), ,(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968,) (Housing Foundation, 1992), (Housing Foundation, 2005)

8.3- Coordination and protection of natural environment: The intention is find out how loyal a building development style and the capabilities embedded in a long constructed building during its different utilization steps have been in keeping up with the rules and basics of conserving the environment and how much have they protected natural resources from getting damaged. As well, coordination with natural bed, meaning the proportionality of the development procedure, hidden capacities of the structure in its different utilization stages with current environmental conditions, optimum usage of environmental conditions and natural forces must be considered.

§ *Components for measuring the factor: usage of less basic resources, use of renewable resources, purification of environmental forces, ground slope, conservation of environmental view.*

(Alexander,1979), (Alexander & others, 1977), (Fathy, 1993), (Uni , 1965), (Sen, 2002), (Rapoport, 1969), (Afghanistan. MRRD, 2003), (ERRA-Pakistan, 2006), (Compiled by: J.K. Varshneya and O.N. Mathur, 1968), (K.R. Uni , 1965),(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Housing Foundation, 1992), (Housing Foundation, 2005)

9.3- Cultural durability: the intension is the extent of notice given to historical bed on which building is constructed, in a way that the developed building is in logical accordance with construction tradition and that the resulting product does not contradict with the existing physical background.

§ *Components for measuring the factor: conserving the native identity and laying this building construction tradition, conserving appearance of the built environment.*

(Alexander,1979), (Alexander & others, 1977), (Alexander & others, 1975), (Fathy, 1993), (Uni , 1965), (Sen, 2002), (Rapoport, 1969, (ERRA-Pakistan, 2006), (Complied by: J.K. Varshneya and O.N. Mathur, 1968), (K.R. Uni , 1965),(NATIONAL BUILDINGS ORGANIZATION AND U.N. REGIONAL HOUSING CENTER ESCAP, 1968), (Housing Foundation, 1992), (Housing Foundation, 2005), (Rafiee Sereshki, B. & Niroomand, M.,1983), (Rafiee Sereshki, B. & Niroomand, M.,1983, Reconstruction of Seismic area in south of Khorasan- Taybad, Ministry of Housing &Urban Development (Iran))

* **Visual desirability:** the concern is compliance with aesthetics principles, enabling desirable spatial quality and suitability with aesthetics power of dwellers.

The value of building should be increased.

§ *The components for measuring this factor have been distributed in measuring components of other factors but they are not counted as an independent factor.*

(Uni , 1965), (Taheri, M., Alizamani, M., 2003), (Housing Foundation, 1992)

* **Applied endurance:** the intention is the extent of ease in application and practicality and logicity of maintaining the building such that the building value is increased by time while conserving and maintaining it.

§ *The components for measuring this factor have been distributed in measuring components of other factors but they are not counted as an independent factor.*

(Alexander,1979), (Alexander & others, 1977), (Alexander & others, 1975), (Broome, 2005), (Uni , 1965), (Sen, 2002), (Moatasim, 2005), (Taheri, M., Alizamani, M., 2003), (Housing Foundation, 1992)

4-defining effectiveness of each factor on declaring desirability using "multi variable regression"

In continuance, the contribution of each factor has been defined in fulfilling the general desirability in development in area as per in users' point of view. In this part, factors are considered as the predicting, independent variables and desirability of building as dependant, predictable variable.^{vi} The results of statistic analysis are explained below:

Factor	contribution	Percent
Dynamism	0.02	%2
Increased capabilities and social compatibility	0.10	10%
Improved operational efficiency from workforce and cost point of view	0.54	54%
Applied endurance	0.001	0
Climatic coordination with natural environment	0.15	15%
Stability	0.06	6%
Physical efficiency	0.10	10%
Economic development	0.02	2%

Table 1. Effect of each factor in providing general desirability.

5- Commenting and analyzers of results:

It is firstly important to notice that the perspective through which, desirability has been analyzed and evaluated has measured building desirability as a practical fact phenomena that

impacts on the users and considers their ideas and observations. This is to say that although it is the expert that gives the final score, but expert's score factor is based on his observation of the impact of structure on quality and quantity of dwellers' lifestyle from their own view. In other words, the desirability measuring factors in which the contribution of each factor relative to fulfilling the desire is specified, has viewed desirability from the users viewpoint and their satisfaction. As the analyses results indicate, this viewpoint will be different from the factors adopted by the expert.

Conceptual interpretation and exhaustion of the results of statistical analyses notify that lack of earning score by some of the factors in providing desirability does not mean that these factors do not have any importance. Theoretical interpretation and analysis of statistical results obtained from determined contribution of factors in general desirability is as following:

The results obtained from this research indicate inattention to the priority for environment, for its protection and coordination with environment, functionally, for the user. The results also indicated that dwellers are not really biased to conserving the native models in construction and to the endurance of native identity. On the contrary, the factors that have important role on construction, cost reduction, and provision of dwellers' comfort conditions, are prioritized by the settlers themselves. This is while from expert society's opinion in Iran and in the world, deterioration of the environment is on one hand, a very important issue where sustainable development discussions and measures taken by the environment protection agency are some mechanisms to remove this problem, and on the other hand, disposing of the native models and native identity is among major problems in new construction works by rural society that keeps experts in rural housing construction field and responsible organizations searching for approaches and strategies to settle it. The rural housing typology plans that are trying to log the native rural housing models and their values, and efforts done for offering proper models to conserve the native identity of rural settlements are signs of necessity of this subject in expert society opinion. Profound thinking about settling traditions, villagers' lifestyles, its trend of evolution, also a realistic view at villagers' current conditions of life, reveals the roots of distinction between dwellers' priority regime and that of experts:

The first reason that led to community-based prioritization of the factors related to ease of construction conditions and provision for comfort conditions, proper functions is their efforts resulting into fulfilling their primary needs of life. According to "Mazlo" theory –through which fulfilling the desirability from dwellers' viewpoint also was analyzed– addressing human needs at its highest levels requires, primarily, fulfilment of the needs that bring about comfort and security for dwellers. In today's rural society most of the dwellers have problems with fulfilling desirable primary conditions of life in their homes. Since this deprivation is to a certain degree relative, it has been expanded with the growth of villagers' communication with modern societies through mass media and travelling back and forth to cities and with more understanding about their deprivation. In other words, dwellers' relative deprivation with respect to primary conditions of a desirable life has grown wider. Thus, villagers' attention has been focused on fulfilling the very primitive needs and they haven't been able to address

higher level needs such as paying attention to preservation of environments, which is one of those higher needs. In regard of the importance of primary needs and their profound effects on dwellers' life, the factors that are more effective in fulfilling the proper primary conditions of life would be prioritized.

On the other hand, the social gap in rural society has pushed collective unconscious that once directed all activities in rural society back to fade off. Many concepts such as respecting the nature and belief in it as a mother and a bed for breeding the life were once among dwellers' sustainable beliefs that had origins in their collective unconscious. But the belief has paled nowadays among settlers such that preservation of natural environment and inhibiting it from getting disturbed is not a determinant factor in new generation of villagers' opinion. This perspective of the natural environment being looked upon as the "source of reserved energy" with the only relationship between nature and human, a consumer relationship, is the global scale accomplishment being entered from cities into village life.

The necessity of returning to the nature and trying to preserve it is a requirement for human survival which is currently posed in consumer-technology origin societies where nature is only known as the source of reserved energy, but since rural societies have not reached the point of self-conscious, in this concern, preservation of the environment is thus not known as a determinant necessity qualifying for prioritization, in rural societies, as this problem is seen in general urban societies as well.

The third reason that can be as one of the origins of this distinction (of priorities) is the difference between social values and aesthetic factors in dwellers eyes. The desired home for villagers is the one that is similar to urban homes or at least has some signs or elements that seen in urban homes. This problem is more explicit in villages that have more communication with cities. From most dwellers' views in today's rural societies, the desirable home is the one that is formed in harmony with urban models but the abodes that are repetitive or close to the native models are not valued. This issue causes the "cultural endurance" factor where protection of native identity and native physical appearance is among its measuring components, not to have priority for dwellers. This is while conservation of native appearance in villages is so important for experts and concerns over extinction of the native models, their increasing fading, and their heterogeneity with rural appearance, from tourist attraction aspect is growing deeper. This issue has not been a problem for villagers and basically dwellers do not have any concerns about this trend.

6- Conclusion

Effectiveness of each factor on declaring desirability resulted by using "multi variable regression". As a whole view point, the result indicates that:

1.6- The "improved operational efficiency from workforce and cost point of view" factor has had great importance on rural housing development, from functional stand point, for the user. This factor has had high and determinant impact on selection of a proper rural housing development method, functionally; for the residents; but considering diversity of the covered

components it is quite important. Field observations and interviews with dwellers in villages of the study area indicated the high importance of cost factor for dwellers. Merging the cost factor into the factor under consideration may be an important element in the contribution increase in placing desirability.

2.6- Factors such as "climatic coordination with natural environment", "improved capabilities and social compatibility" and "physical efficiency" have had meaningful but medium effects on development of proper rural housing, regarding functionally for the user. Among the above three factors, "climatic coordination with natural environment" has had a more meaningful effect on proper rural housing development. It can thus be said that the three factors have had considerable effect on selecting a proper rural housing development method, functionally, for dwellers in the area.

3.6- "Stability" factor has had a meaningful effect but not a marked one on rural housing development for users, functionally. There are two reasons: "Stability" factor is only a small part of the components for measuring desirability of building for users and does not have a determinant role in definition of desirability. On the other hand, in only few sample cases stability acquired proper credit such that non-observance of stability by dwellers is not interpreted as its low value. Rather, is due to lack of correct understanding the concept of building rigidity and its importance.

Although this factor has been effective but not determinant in selecting the proper rural housing development method for the user, functionally, because Iran is a country susceptible to earthquake, and because of necessity to inhibit its disturbing effects, observing the minimum rules and regulations is so important for design and execution of the buildings stable against earthquake and its damaging effects (permanent committee on revision of the code of practice for seismic resistant design of buildings against earthquake). Stability factor is therefore a required condition for development of rural housing, in accordance with experts' view, but citing the outcome results, in comparison with other factors, from user's functionality stand point, paying special attention to this factor "stability" does not downgrade the importance and priority of other factors or does not even devalue them.

4.6- "dynamism" and "economic development" factors have had small but meaningful impact on selection of proper rural housing development method, functionally, for the user. These factors, along with others, should therefore be taken as acceptable criteria.

5.6- The "applied endurance" factor has had negligible effect on the selection of a proper rural housing development method, functionally, for user. However, components for measuring this factor are somehow embedded into components for measuring the "improved operational efficiency from workforce and cost point of view" factor. This factor has therefore not had a distinct impact, functionally for the user, on rural housing development than other factors. It is hence plausible to merge the components measuring this factor into others, especially the "improved operational efficiency from workforce and cost point of view" factor.

6.6- the "climatic coordination and conserving the natural environment" and "cultural endurance" factors were not given priority in selection of a proper rural housing development

method, functionally, for user; but this lack of priority is not to be interpreted as confirmation of inattention to these factors, regarding proper rural housing development method. In recent planning in Iran and other countries, consideration of the factors that can fulfill sustainable development objectives has been the main concern. The sustainable development [settlement] idea has become a fundamental and radical issue among decision makers and thinkers since the beginning of 1990s, (Sedrick.puck, 2004). Also, factors for "protection of native identity and "cultural endurance" in Iran, because of dominant critical conditions, fading native identity of rural settlements and unconditional acceptance of urban patterns in the villages, have gained central concern: Villages and villagers are involved in a race with the objective to eliminate all symbols of urban living and urban lifestyle, and all icons that have given this lifestyle a physical framework. The winner (of the race) receives the privilege of getting disposed of village identity (not being a village any more) or that of growing into a city (Alalhesabi, 2007, 9). A review on how to achieve desirability and on the definition given for it reveals that "coordination and preservation of natural environment" and "cultural endurance" factors, in accordance with the components defining them and because of critical conditions dominant on settlements, especially rural ones, are seen by specialists as a high importance issue. However, it is not considered by villagers as a concerning issue looking for desirability of their abodes.

Achieving sustainable development objectives, "coordination and preservation of natural environment" and "cultural endurance" did not have priority in dwellers' opinion but were merely posed by specialists.

7.6- As well, "visual desirability" was not a priority factor, functionally, for the user in selecting the proper rural housing development method; the reason being the strong connection between visual desirability concept and fulfilling the functions in rural architecture and emphasis on applicability aspect of the factor. In addition, factors for measuring visual desirability are capable of being dissolved in other factors measuring the desirability and in fact they can be considered as a product and not a factor that viewed separately from others, if this trend is also observed in the rural housing development logic. Thus, the components related to this factor may easily be merged in those of other factors.

A review on priority of factors, functionally, for users shows that factors which are in direct relationship with dwellers conditions of life and their impacts are seen faster in developing the building, such as reduction in construction technical and implementation complexity and cost and also coordination with individual and collective needs and fulfilling the conditions of physical comfort have had less importance in dwellers' opinion, in comparison with factors that have been generated later and their impacts would be appear some time after construction completion, such as possibility to make changes or expansions to the building or providing ground for economic development or even durability and rigidity.

It can be concluded that priority of factors in dwellers' eyes is dependent on understanding the necessity of the issue and, in other words, on knowledge of dwellers' conscious about the factors.

Residents in rural houses have reached to that conscious knowledge because of direct relationship with the above mentioned primary factors, but this issue is not confirmed for the factors that their impacts are not appeared immediately. It can be concluded, based on the issues discussed in this part that the real identification of needs by dwellers themselves is very important as the proposed factors are also in the same extension. In fact, by full and correct recognition of the factor, villagers can really correct decisions on prioritization of their needs.

The villagers should reach a conscious knowledge and look at it from the view of resolving social and individual problems because some of these factors are completely individual and their impact range is only limited to households, but for some others the impacts are seen in the entire society. Therefore, improving awareness of the dwellers is of high importance and they should come to the belief that dealing with such factors would have upgrading social impacts on their lives.

7. Recommendations

As it has been mentioned, efforts taken in the development of rural housing, did not consider all aspects related to housing development in rural areas of Iran. The result of this extent was verifying factors effective on development procedure and to evaluate this trend. It would become possible in the future following two steps:

- Presentation a method for selection appropriate alternative of rural housing in Iran.
- Assessment the proposed alternative offered to define the proper selection methodology for rural housing development.

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^{iv} . For more information on data from questionnaires related to collecting expert viewpoints, summarization of specialists' ideas by building type, and also final results on the importance of each factor for housing development, which is in fact a summary median of 5 experts' viewpoints, please refers to the text and the annexes to the dissertation.

^v In selecting the study theme, the following factors were considered:

- 1-Possibility for close identification of the region and/or record identification relative to it is available.
- 2-Adequate and formulated information and statistics exists in order to carry out research.
- 3-Variables effective on formation of building species in their region are diverse .far instance various natural situations and or different ethnics are seen in it.
- 4-Expanse of the region in such that despite diversity building types are limited and it is possible to overview in it a limited time and with limited possibilities.
- 5-Native types in the region are not extinct and some valuable types are seen among them.
- 6-The region is dynamic with respect to economical living conditions and new constructions are observed among them.

^{vi} this method is a procedure to study the relationship between two inter-dependent or more independent variables ,the objective of which may have been estimated (shewlson /2003/184).this method will help the researcher to estimate the depend variable .

Y-From a set of predicting or independent variables $x_1, x_2, x_3...$ and test the theories concerning different methods between Y and a set of Xs. (Haman, 185).the task of multi-variable regression to help specify and to variance the dependent variable and to an extent do the task through estimation of variables participation (two or more independent variables in the variance) (Krelinger, padhouser, 2005, 13).



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ORGANISATIONAL CULTURE OF CONSTRUCTION JOINT VENTURES: CASE STUDIES IN HONG KONG

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ABSTRACT

Culture can be regarded as a system of shared meanings that organises values into mental programmes which guide the behaviours of people within communities – notably, nations and organisations. Organisational culture involves cognition, affect and behaviour and reflects customary thinking, feeling and acting that are attributed to a particular group of people as they learn to cope with their environment. Largely, behaviours of organisations depend on the decisions and business strategies of top management and are greatly influenced by culture. There is a close relationship between the characteristics of organisational culture in a joint venture (JV) organisation and the parent companies; often, the organisational culture of the (most) powerful parent company dominates. That reflection relates to the top management's strategy and the allocation of authority among JV partners. The two case studies investigate the organisational culture of international JV projects in Hong Kong that pool resources from parents with different cultural backgrounds. One of the case studies compares the JV organizational culture with the parent companies from UK, Hong Kong and mainland China. The organizational cultures of the parent companies are consistent with their own national cultural characteristics but, in the JV where more than one national culture is involved, the JV organizational culture is highly influenced by the dominant national culture of the management team. In the second case study, the project director is seconded from the dominant parent company. That JV exhibits cultural characteristics which show a synergy of elements from the founding parents but with emphasis on the culture of the dominant partner in the JV.

Keywords: culture, international construction, joint venture, parent companies, Hong Kong

INTRODUCTION

The realisation process of major, international construction projects comprises a myriad of transactions amongst a huge number of participants, often involving the formation of a joint venture (JV). Viewed as a supply chain (Titus and Brochner, 2005), each component transaction is founded in the use values attributed to the subject matter of the transaction by the two transacting parties who, then, arrive at the market price at which the transaction occurs. Kotler (1972) notes that: “a transaction is the exchange of *values* between two

parties.” The things-of-value need not be limited to goods, services, and money; they include other resources such as time, energy and feelings.

The construction realisation process is a complex of interdependencies between individual transactions amongst social institutions, hence, as the realisation process depends upon those social institutions, e.g., interactions between JV partners as well as clients’ and consultants’ organisations, so too, to varying degrees, do those social institutions (performance, survival and success) depend upon the project (and other) transactions. In many international JVs, the vast number of interdependent, component transactions, coupled with diversity amongst participants leads to complexity and, consequent, boundary management issues and risks. Therefore, according to Das and Teng (1999), the partner firms may not work together efficiently because of incompatible organizational routines and cultures. It is this process of culture in action, i.e. the development of a new culture for the joint venture, which is the source of many conflicts and a major contributor to the failure of many JVs (Swierczek 1994).

JOINT VENTURES – CULTURE AND CONFLICT

Clearly, the focus of alliances is on transactions which are, otherwise, external to the individual participants that occur in a market context and so, necessitate formal relationships between independent organisations which intend to undertake activities together through some pooling of resources. Such formal relationship leads to the imposition of formal governance structures which converts to a form of hierarchy in the supply.

The reasons for forming an alliance may be the need to enter new markets, obtain new technology / best quality, economies of scale, reducing financial risk and sharing costs of R&D, achieving / ensuring competitive advantage (Elmuti and Kathawala, 2001; Glaister, Husan and Buckley, 1998). However, Li (1995) finds that international JVs involving US pharmaceutical and computer companies have a higher rate of failure than wholly-owned investment projects.

Julian (2005) reports that the presence of two or more parent organizations from different cultures and geographic locations tends to make an international JV a complex form of organisation structure that is often difficult to manage. Also, because parent organisations are legally separate entities, each has its own corporate culture and managerial way of doing things. This further increases managerial complexity and complicates the issues of coordination and joint problem solving for managers in international JVs.

Given the importance of relationships and behaviour to the operation and (successful) performance of JVs, together with their objectives, it seems clear that culture is of fundamental impact, especially when considering compatibilities amongst participants.

Culture is manifested through facets of behaviour. Behaviour is dependent upon values and beliefs, whether any behaviour is determined by conscious thought/evaluation or ‘instinctive’. Kroeber and Kluckhohn (1952), following their discovery of 164 definitions, define culture as, “...patterns, explicit and implicit of and for human behaviour acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiment in artefacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and, especially, their attached values; culture systems may, on the one hand, be considered as products of action, on the other as conditioning elements of future action”.

International JVs are autonomous organizations from their inception (Auster, 1987). However, the academic and practitioner literature suggests strongly that parent firms do not allow international JV to function independently to form their own organizational culture and identities apart from the parent companies (Geringer and Herbert, 1989; Main, 1990). Parent companies want to exert management control over the newly formed international JV through different types of parental control structures. Killing (1982) suggests that the most effective

form of control is the situation where one partner dominates decision-making control within the venture.

Conflict inevitably exists in JV projects which may lead to project failure. However, some organizational theorists (see Mullins, 2005) believe that if conflict is managed properly, it can increase organizational effectiveness. JV contractual procurement is adopted widely on major construction projects in Hong Kong. Amongst such projects, most are formed between local and foreign partners/parents. The Airport Core Program (ACP) is a classic example of international JV construction in Hong Kong. This set of projects demonstrates that, despite conflicts, if the projects are managed properly with appropriate styles, international JVs can be successful on large-scale infrastructure projects (Hung, Naidu, Cavusgil and Yam, 2002).

PROJECT-BASED CONSTRUCTION JOINT VENTURES

Most international construction JVs in Hong Kong are “Project-based”, each with a finite life span – the international JV is dissolved upon (physical) completion of the project. Sillars & Kangari (2004) state that a project-based JV is a special type of alliance and, often, is used to form a competitive organisational structure in the global market; it allows participants to assemble project-needed assets quickly – on a short-term basis without substantial investment. Such JVs are temporary in nature, i.e. the creation of a separate entity through the alliance of two or more organisations for the purpose of carrying out a specific project (as under ‘project partnering’ – Bennett, Ingram and Jayes, 1996). The JV participants join, often through contractual agreement, to contribute resources of skill, experience, financing or physical resources. According to Lorange and Roos (1992), project-based JVs are organisations to which the parents put in a minimum of strategic resources, entering an arrangement for jointly creating strategic value through a common, temporary organization. The resources generated do not get distributed to the parties except for the financial results (e.g. dividends, royalties, etc.). An example is the creation of an alliance in a certain country to facilitate entry into that country; each of the parties contributes resources only as required to perform the project, and the rewards are repatriated to each party as financial return (see Lorange and Roos 1992). Lynch (1993) compares project-based and traditional, more enduring, JVs in Table 1.

Area of comparison	Project-based JV	Traditional JV
Life span	Finite	Indefinite
Nature	Dissolving after project	On-going
Strategic planning	Short-term orientation	Long term orientation
Time to rectify default	Within contract period	On-going process
Decision making	Relatively fast	Relatively slow
Management style	Task oriented	Business oriented
Partner relationship	Short-term orientation	Long term orientation
Information flow	Must be Quick	On-going process
Product/Service improvement	Defined by contract	On-going process
Control	Hierarchy	Team work
Primary Objective	Completion of project on time	Business objective
Possible benefits	Possible win-lose situation	Win-win situation

(Source: adapted from Lynch, 1993:26)

Table 1: Comparison of project-based and traditional joint ventures.

Project-based JVs are characterized by pre-determined limited life spans and activities which are oriented towards well-defined objectives (Hung et al, 2002). In construction, this type of JV is usually formed when one partner is required to undertake a special project with high

technology and financial requirements and the other contractor has a market advantage. The JVs are terminated upon the completion of the given project. Such limitation in time usually leads to management problems – for instance, pressure for rapid decisions, or the selection of an inappropriate partner. Parent firms have less time to understand the local environment and to investigate their potential partner(s) thoroughly. Further, culture related conflict is almost inevitable in this type of JV if adequate planning and deliberation do not precede key partnership and venture formation decisions.

According to Lynch (1993), the differences of the project-based and traditional joint ventures are wide ranging, from the limited life span of the venture, the planning horizons, to the decision making and management styles, and the required information flows for yielding potential benefits for the two different types of JV. International construction projects are often project-based JVs.

Johnson, Cullen, Sakano and Bronson (2001) also state that parental control over a legal autonomous organisation may also result in an area of conflict unique to international JVs. The constant interference from parent organisations prevents an international JV from evolving into an integrated organisation. Therefore, conflict inevitably exists between parents and a newly formed, project-based international JV. According to Johnson et al (2001), the three conflict relationships which might appear in international JVs are (1) conflict between parents, (2) conflict within the JV between parents, and (3) conflict between parents and JV management. Since it has been alleged that the parent organisation has significant influence on the JV, the research questions in this paper are:

1. whether the organisational cultures of the parent companies are consistent with their own national cultural characteristics and, where more than one national culture is involved in the JV, whether the JV organisational culture is influenced by the dominant national culture of the management team,
2. whether the JV exhibits cultural characteristics which show a synergy of elements from the founding partners but with emphasis on the culture of the dominant partner in the JV.

RATIONALE FOR THE CASE STUDIES

Both mergers and construction JVs involve procedural integration as well as physical integration of resources to various extents – depending on the environmental/project specifics at the time. Whilst procedural integration, in mergers, involves the combination of systems procedures and rules, physical integration entails the consolidation of assets and equipment. However, in JVs, managerial and socio-cultural integration is more important (see Lynch, 1993; Hung et al, 2002; Das and Teng, 1999; Lorange and Roos, 1992), and relates to cultural integration, integration of management styles and changes in organisational structure.

Datta's (1991) findings indicate that one aspect of managerial integration in mergers, namely differences in management styles, has an important impact on post-acquisition performance while impediments to procedural integration in the form of differences in reward systems do not play an important role. Such findings may have implications for construction JVs. Thus, research is necessary to explore the importance of task forces in mediating problems and conflicts in construction JVs that emerge out of differences in terms of conflict management styles, cultures, and systems to provide insights.

A JV brings together the management groups of two or more organizations with styles which might be similar or very different. Significant differences can contribute to *cultural ambiguity* (Buono, Bowditch and Lewis 1985), a situation characterized by uncertainties concerning whose style or culture will dominate. Since Datta (1991) argues that compatibility in management styles facilitates post acquisition assimilation and construction project-based JVs are susceptible to *cultural ambiguity* because of different management styles from the parent organisations, it is postulated that major differences in management styles and philosophies can prove to be serious impediments to the achievement of success in construction JVs.

An organisation is made up of people and it is the beliefs and values of the leaders which shape the organisational culture. Organisational culture is manifested in company goals and strategy which are underpinned by the beliefs and values of those leading the organisation. Kotter (1996) examines the process of how managers in a young company (arguably similar to the 'temporary' construction JVs in this paper) develop and attempt to implement a vision/philosophy and/or a business strategy; when strategy implementation works, people behave in ways that are guided by the philosophy and strategy; the organisation then continues its success over a period of years; finally, a culture emerges that reflects the vision and strategy and the experiences people had in implementing them. Hence, organisational culture is highly influenced by, and dependent on, top management's strategy and philosophy. In the case of JV organisations, the dominant culture of the management team may influence the establishment of the organisational culture of the JV.

In this paper, two case studies are carried out to investigate the influence of the parent companies on the JV's culture.

ORGANISATIONAL CULTURE MEASUREMENT INSTRUMENT

Data on organisational culture profile are collected by means of the OCAI (organisational culture assessment instrument) developed by Cameron and Quinn (1999). It is a validated instrument used to identify the organisational culture of a company and classifies organizational culture into four main types: Clan, Adhocracy, Market and Hierarchy culture. OCAI is used to assess organisational culture by means of six key dimensions, namely, dominant characteristics, organisational leadership, management of employees, organisation glue, strategic emphases and criteria of success. There are four questions for each of these six dimensions, representing specific organisational culture of *clan*, *adhocracy*, *market* and *hierarchy*. The OCAI scoring method is modified in this paper to the Likert 5-point scale ranging from 'strongly disagree / never true' to 'strongly agree / completely true'.

It is hypothesised that the characteristics of organisational culture of the international construction joint venture is similar to those of

- (1) the organisational culture of the dominant parent company and,
- (2) organisational culture of the parent company from which the dominant manager in the project management team comes.

PROJECT CASE 1

Background

Project Case 1 discusses the case of a construction JV in Hong Kong involving a railway construction project of approximately HK\$ 1.3 billion and comprises a four year contract period in 15 working stages. There are four partners from three different cultural backgrounds in the construction JV but only three of them have assigned staff members to the management team of the project. The fourth partner is the financier and only sends a representative to the board.

Partner A is a company which has transformed itself from a large construction company in the UK to an international project management group employing approximately 44000 people in some 40 countries. Partner B is a well established Hong Kong construction company which participates in construction business, real estate development and infrastructure construction. Partner C is a large Chinese state-owned enterprise group with national Grade 1 qualification in (construction) main contracting and an overseas business licence approved by the Chinese government.

Data collection and results

Each respondent is to fill in two sets of OCAI, one for the JV organisation and the other for the parent company. The response rate is 19%, 30%, and 25% from Partners A, B and C respectively. The summary of the staff employment, secondment profile and mean cultures scores are given in Table 1 (details in Liu and Fellows, 2008).

Liu and Fellows (2008) found that although 65% of the JV employees in project case 1 are Chinese, the JV does not have a similar organisational culture profile to the Chinese Partners B or C. However, the JV has a similar organisational culture profile to Partner A which supplies the most number of management personnel that come from UK. Since organisational culture is highly influenced by and dependent on top management's strategy and philosophy, the dominant culture of the management team may influence the establishment of the organisational culture of the JV.

Organisation	No. of employees in JV				
	N	Chinese (Hong Kong)	Chinese (Mainland China)	UK	Others
JV	102	76	0	21	5
Partner A	16	3	0	13	0
Partner B	10	10	0	0	0
Partner C	8	0	8	0	0
Total	136	89	8	34	5
Organisation	No. of employees in management level				
	N	Chinese (Hong Kong)	Chinese (Mainland China)	UK	Others
JV	4	2	0	2	0
Partner A	5	0	0	5	0
Partner B	1	1	0	0	0
Partner C	0	0	0	0	0
Total	10	3	0	7	0
Mean culture score	Organisational culture types N = no. of respondents				
	Market	Hierarchy	Clan	Adhocracy	N
JV	3.42	3.21	2.79	2.65	8
Partner A	3.11	3.00	2.61	2.44	3
Partner B	3.33	3.67	3.45	3.00	3
Partner C	2.75	3.08	2.75	2.25	2
Total					16

Source: Adapted from Liu and Fellows, (2008)

Table 1 – Employees in JV and the organisational culture profiles – Project Case 1

PROJECT CASE 2

Background

Project case 2 is a JV in Hong Kong involving the construction of the superhighway commissioned by the Highways Department of the Government of the Hong Kong Special Administrative Region (HKSAR). Parent company A is the local partner and parent company B is the foreign partner. Parent company A was established in the 1970s and has grown to become one of the largest contractors in Hong Kong strong in civil engineering construction.

Parent company B is a Japanese company which has extensive JV experience in Hong Kong and provides expert advice and financial contribution to the project.

In this project, parent company A exercises operational control at the JV general management level and this is reflected in the appointment of the JV project director who is seconded from parent company A; he is appointed as the chief person-in-charge and exercises overall control of all aspects of the project administration and site construction activities.

Data collection and results

The OCAI questionnaire is administered to the following respondents of project case 2:

- (1) The JV project director (who is seconded from one of the parent companies and is the highest and final decision maker of the newly formed JV),
- (2) project staff from the parent company which second the JV project director, and
- (3) project site staff from the newly formed JV.

The JV project director is asked to identify (1) the organisational culture of the parent company from which he is seconded, and (2) the organisational culture of the JV. The project staff from the parent company (N=9) are asked to identify the organisational culture of the parent company and the project staff from the JV (N=11) are asked to identify the organisational culture of the JV.

One sample t-test at 95% confidence level is used to test the difference in perceptions on the organisational culture dimensions between the project director, the staff from the parent company and the staff from the JV. The null hypotheses for the t-test is:

Ho: $\mu = \mu_0$

i.e., there is NO significant difference between the sample means.

The organizational culture profiles of the JV and the parent company are quite similar (see Figure 1 and Table 2).

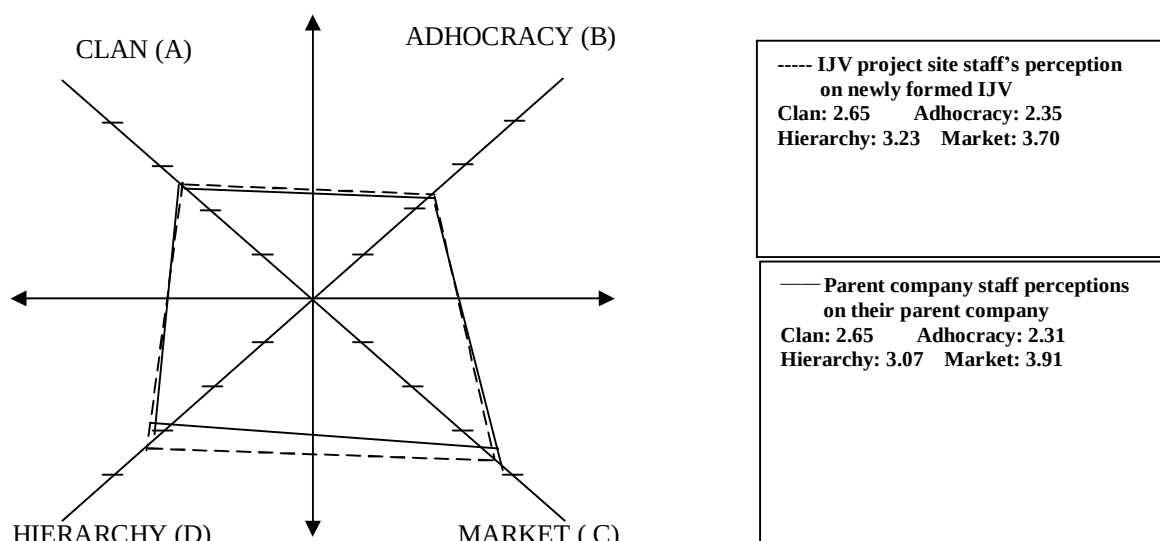


Figure 1: Organisational culture profiles of the JV and parent company

	JV (N=11)	Parent company (N=9)	t	Sig. (2-tailed)
Mean Scores				
Market	3.6964	3.9078	-2.157*	0.045
Hierarchy	3.2273	3.0744	1.858	0.084
Clan	2.6518	2.6478	0.031	0.976
Adhocracy	2.3473	2.3144	0.161	0.874

* significant difference

Table 2: Organisational Culture of JV and Parent Company – Project Case 2

The results in project case 2 are summarized as follows:

1. The JV staff perceives that the JV organisational culture profile is similar to the parent company except that the parent company scores significantly higher on the market culture dimension. (Table 2)
2. The project director perceives that the JV has the same organisational culture profile as the parent company. (Table 3)
3. (a) The project director perceives higher ratings both clan and adhocracy culture in his parent company and his JV than his JV staff. (Table 3)
(b) The project director perceives a higher market culture in the JV than his JV staff. (Table 3)

	JV				Parent Company			
	Staff (N=11)	Project Director	t	Sig.	Staff (N=9)	Project Director	T	Sig.
Mean Scores								
Market	3.6964	4.0000	-4.346*	0.001	3.9078	4.0000	-1.342	0.217
Hierarchy	3.2273	3.1666	1.244	0.242	3.0744	3.1666	-1.402	0.199
Clan	2.6518	2.3333	3.328*	0.008	2.6478	2.3333	3.554*	0.007
Adhocracy	2.3473	1.8333	4.050*	0.002	2.3144	1.8333	3.062*	0.016

* significant difference

Table 3: Project Director's perceived organizational culture of JV and parent company – Project Case 2

DISCUSSION

As Kamminga and Van Der Meer-Kooistra (2006:234) conclude, "case research was a very suitable method to study a complicated concept such as joint venture control" and furthermore, "the international aspect of the international joint ventures had a great impact on control". Substantial research has shown that managers in different countries make different strategic decision because they possess different cultural values (Schneider and De Meyer 1991, Hofstede 1980). For instance, Shane (1994) argues that national differences in levels of trust impact perceptions of transactions costs and, thereby, influence the desirability of internalization and the choice of foreign market entry mode.

Literature suggests strongly that parent firms do not (and perhaps should not) allow international JVs to function independently and form their own organisational culture and identities apart from the parent companies (Geringer and Herbert, 1989; Main 1990). Johnson et al (2001) review that international JV parents intervene directly or indirectly in their JVs to accomplish and maintain control over the JV. As a result, parental control inevitably exists in JVs as the parent companies may want to achieve their own objectives especially in the

project-based construction JV with finite life span.

Further, Geringer and Herbert (1989) state that a parent may be able to influence the relative allocation of control over an international JV by influencing staffing of the JV's top management positions. Although Cameron and Quinn (1999) emphasise that organisations may not exhibit a single, unitary culture, Schneider (2000) asserts that every successful organisation has a core culture (control; collaboration; competence; cultivation) which is central to its functioning and Weeks and Gulunic (2003) discuss the gradual, evolutionary nature of change in organisational cultures in path-dependent directions, which may be punctuated by periods of stability and others of rapid, step-type changes. Also, the dominant values of a national culture are usually reflected in the organisational culture (Hellriegel, Slocum and Woodman, 1998). In the case of an international construction joint venture, the national culture of the dominant partner is likely to influence the organisational culture of the JV.

In both case studies, it is found that the dominance of the management team influences the organisational culture of the JV; hence, if the project director is seconded from a particular parent company, the culture of that parent company is transposed to the JV – which is supported from both case studies' findings. In particular, project case 2 shows the following:

- *The project director perceives that the JV has the same organizational culture profile as the parent company*

As the highest level decision-maker is seconded from the dominant parent company, he brings with him the norms (of how things are done) and the values (in which are the more important matters) of the parent company. The project director probably does not wish to change any of these norms, has been carrying out the practices that he is used to (in the parent company) and sees himself being able to replicate the organizational culture of the parent company.

- *The JV staff perceive that the JV organisational culture profile is similar to the parent company*

There is only significant difference in one dimension, i.e. market culture, where the parent company scores higher than the JV. This is understandable as the parent company is expected to make the business decisions involved in the general construction market environment and the JV is more empowered in making the day-to-day operation decisions on a project basis.

- *The project director perceives higher ratings for clan and adhocracy culture in his parent company and his JV than his JV staff*

Both the project director and the JV staff have the same ranking of the organisational culture dimensions, i.e., market culture being ranked the highest to adhocracy culture being ranked the lowest. However, the project director has significant difference in perceptions of most of the JV organizational culture dimensions compared to that of his JV staff (see Table 3).

The project director perceives a higher rating for the market dimension and a lower rating in clan and adhocracy than the other project team members. Clan culture activities focus on empowerment, teambuilding, employee involvement, human resource development, and open communication. The clan culture (which is internal focus but wanting flexibility) emphasises loyalty and tradition where "commitment is high. ...The leaders are considered to be mentors and, perhaps, even parent figures" (Cameron and Quinn, 1999:87). Adhocracy culture includes such activities as surprising and delighting clients/customers, creating new standards of performance, anticipating client/customer needs, engaging in continuous improvement, and implementing creative solutions to problems. In the context of construction, it would mean that the construction companies are ready to be innovative and pioneer

initiatives that lead to new products and services, i.e. an emphasis on “creating a vision of the future organised anarchy and disciplined imagination” (Cameron and Quinn 1999:38).

It is suggested that the JV staff operate in a much more friendly and cooperative atmosphere (clan) and are much more resourceful, performance-focused and ready to innovate/improvised than the project director believes.

- *The project director perceives a higher market culture in the JV than his JV staff.*

Since the project director perceives the culture profile for his JV to be the same as his parent company, he is less aware of the power-based decisions being shifted, e.g. parent company makes strategic market-oriented decisions in a business context for the project and the project director is involved in these decisions. However, his staff are involved in daily project operational decisions and not empowered to the same extent by the parent company as the project director; hence, JV staff may perceive the JV being in a much less market-oriented position.

CONCLUSION

In project case 1, the organizational culture of the JV is compared with the parent companies from UK, Hong Kong and mainland China. The findings support hypothesis 1 which states that organisational culture of the JV is similar to that of the dominant parent company; and, more specifically, project case 1 reveals that it is the dominance of the company from which most of the JV management personnel come.

In project case 2, the JV project director's position, in particular, can affect the JV's operations since the project director is responsible for maintaining relationships with each of the parents as well as running the JV. The findings support hypothesis 2 which states that the JV organisational culture is similar to the organisational culture of the parent company from which the dominant manager in the project management team comes.

With respect to the research questions regarding the possible relationships of (1) national culture and organisational culture and (2) JV organisational culture and dominant parent company's organisational culture, this paper concludes the following:

- Project case 1 demonstrates that while there is a similarity between the organisational cultures of the JV and the UK parent company which dominates the management team, the organisational culture of the UK company is also in line with its national culture. It is most apparent that while partners B and C (Chinese companies) exhibit high ratings in clan and hierarchy culture, lower ratings in clan and hierarchy are exhibited by the UK partner A – which is expected of the characteristics in their national culture (see Hofstede, 1980, 2001). That is indicative that where more than one national culture is involved, the JV organizational culture is influenced by the dominant national culture of the management team. The relationship of the national and organisational culture is not directly tested in project case 2 where both partners (Japanese and Chinese) come from a similar eastern cultural background.
- Project case 1 supports the second research question that the JV organisational culture shows a synergy of the elements from the founding partners but with emphasis on the culture of the dominant partner in the JV. In project case 1, although the JV culture follows that of the dominant partner A, it also synergises the elements of partners B and C in that hierarchy and clan culture are rated highly (higher than Partner A's) and ranked in the same relative order (as partners B and C) to each other.
- Project case 2 further tests the dominance of the parent company (from which the JV project director is seconded) and shows supportive evidence that the JV is influenced by the organisational culture of the dominant parent company which supplies the key management personnel. The seconded project director closely adopts the culture of

his parent company and synergises those elements into the JV culture.

Further research should be conducted to examine (1) the possible relationship between national culture and organisational culture, and (2) the relative power of and how conflict is managed by the JV project director as important factors influencing the organizational culture and management style of the project-based construction JV.

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Cultural Aspects of Conflict Management in International Construction

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ABSTRACT

The study examined cultural aspects of conflict behavior via independent and interdependent self-construals within the context of international construction. This was achieved by a questionnaire survey. Questionnaire data obtained from 65 participants working in a multinational joint venture project have demonstrated that a person's self concept can explain certain types of conflict management behavior. In a conflict situation, independent persons tend to use avoiding and compromising, whereas interdependent persons tend to use integrating.

Keywords: conflict management, culture, international construction

1. INTRODUCTION

As the movement towards the globalization of the construction industry continues, many firms are increasingly expanding, merging and forming cross-cultural strategic alliances. Yet, doing business across national boundaries requires interaction with people and their organizations nurtured in different cultural environments. It is therefore important to acknowledge the impact of cultural differences on attitudes and behaviors of people, when companies are to collaborate in multi-national organizations. Such comparisons are critical because there is considerable evidence of increasing internationalization and globalization in construction business.

This paper reports an exploratory study on the impact of culture on conflict management. More specifically, the purpose of the study is to examine the relationship between culture and conflict management styles within the context of international construction, taking a culture comparative perspective.

2. THEORETICAL BACKGROUND

2.1 Culture and Self-Concept

Hofstede's (1980) culture dimensions are probably one of the best-known approaches to provide a set of measurable aspects of cultural diversity. Drawing on a large sample of 116,000 employees of IBM in 72 countries, he found five dimensions of culture to distinguish between these countries: individualism-collectivism (IC), power-distance (PD), masculinity-femininity (MF), uncertainty avoidance (UA), and long term orientation (LTO). (Hofstede, 1980, 2001). Among these dimensions, IC was described as perhaps the most important one and was used thereafter to explain a variety of differences between individuals (Triandis, 1995; Kapoor, S., Huhes P.C., Baldwin, J.R., Blue, J., 2003; Brew and Cairns, 2004, see among others). Through an examination of the literature, Markus' & Kitayama's (1991) independent and interdependent self-construals have been found to be better predictors of individual behavior than Hofstede's IC scores. (Gudykunst, W. B., Matsumoto, Y., Ting-Toomey, S., Nishida, T., Kim, K-S., & Heymen, S., 1996; Oetzel, 1998 see among others). Independent self-construal involves viewing oneself as a unique and independent person. The interdependent self-construal, on the other hand, involves the view of oneself as interrelated with other persons. In investigating the self-construals, independent self was found to correlate with cultural individualism, while interdependent self was found to relate to cultural collectivism (Gudykunst, W. B., Matsumoto, Y., Ting-Toomey, S., Nishida, T., Kim, K-S., & Heymen, S., 1996).

All persons are assumed to have independent and interdependent aspects of self, though differently weighted, depending on their cultural background (Gudykunst, W. B., Matsumoto, Y., Ting-Toomey, S., Nishida, T., Kim, K-S., & Heymen, S., 1996). This means that a person's self-concept is thus supposed to be a mediator for the cultural influences on conflict

management behavior.

2.2 Culture and Interpersonal Conflict Management Styles

Several studies have stated that a five style model of conflict management is a better and more appropriate conceptualization for explaining interpersonal conflict management phenomena (Rahim & Magner, 1994, 1995; Van de Vliert & Kabanoff, 1990). Henceforth, this study is also founded upon a five style typology of interpersonal conflict management styles.

Below the definitions of five interpersonal conflict management styles used in this research are provided. All of these definitions are based upon the dual concern model of Rahim & Bonoma (1979), which identifies interpersonal conflict management styles with respect to individuals' concerns for self and others.

Dominating: (high in self-concern, low in other-concern), which involves enforcing one's own interests, even at the expense of those of the other party;

Integrating: (high in both self-concern and other-concern), which involves the attempt to merge both parties' interests in order to reach a solution that satisfies both sides;

Compromising: (intermediate in both self-concern and other-concern), which involves a give and take approach in order to reach a midpoint agreement;

Avoiding: (low in both, self-concern and other-concern) which involves evading the conflict topic, the other conflict party or the situation altogether;

Obliging: (low in self-concern, high in other-concern) which involves an accommodation to the other's interest on the expense of one's own.

Investigating the relationship between self-construal and conflict management styles, Oetzel's (1998) survey data showed the independent self to be positively associated with dominating and the interdependent self with avoiding, obliging, integrating, and compromising styles. In addition, self was found to be a better predictor for conflict behavior than situation, which is in line with other findings (Oetzel, J., Ting-Toomey, S., Matsumoto, T., Yokochi, Y., Pan, X., Takai, J., Wilcox, R., 2000; Wolfradt, 1996 see among others).

To investigate the relationship between culture and conflict management styles, Ting-Toomey, S., Gao, G., Trubisky, P., Yang, Z., Kim, H. S., Lin, S. L., & Nishida, T., (1991) compared self-reports from Japanese, Chinese, South Korean, Taiwanese, and American students. Their findings show that American students used dominating behavior to a higher degree when compared to their predominantly collectivistic-oriented colleagues who employed more avoiding and obliging styles. The results concerning integrating and compromising were mixed.

Another research group studied the influence of IC on self-reported conflict management styles for

Anglo-American and Taiwanese students. Taiwanese subjects were found to use avoiding, obliging, integrating, and compromising styles more often than their American counterparts (Trubinsky, P., Ting-Toomey, S., & Lin, S. L., 1991).

To examine the relationship between culture and conflict management styles in an organizational setting, Elsayed-Ekhouly & Buda (1996) questioned employees in companies located in the Middle Eastern countries as well as in the United States. Their inventory data showed Middle Eastern executives to display more integrating and avoiding, while U.S. executives used more obliging, dominating and compromising styles.

Jordanian, Turkish and U.S. managers were interviewed by Kozan (1989) about their conflict behavior towards superiors, peers and subordinates. Regarding conflict management with peers, he found that managers of all three countries rather seem to avoid conflicts.

Wu, M. Y., Taylor, M., & Chen, M. J., (2001) has also demonstrated that IC tends to differentiate Americans from their Asian counterparts in their use of styles by comparing U.S. managers and managers from different Asian backgrounds, all working in Singapore.

In sum, a review of literature highlights that, individualists, or independent persons seem to prefer dominating style while collectivists or interdependent persons appear to use avoiding and obliging styles. Hamdorf (2002) argues that integrating and compromising are sources of various inconsistencies. The existing literature generates many inconsistent outcomes concerning integrating and compromising. Ting-Toomey & Kurogi (1998) suggest that a reconceptualization of these styles may be needed.

The present study will investigate cultural aspects of conflict management via independent and interdependent self-construals within the context of international construction. This was achieved by a questionnaire survey. It was hypothesized that the cultural variables of independent and interdependent self would have specific relationships with conflict behavior.

3. METHOD

3.1 Sample

The sample used in this study is composed of participants working in a multinational joint venture, which is carrying out the new international airport in the Libyan capital of Tripoli. The joint venture consists of Turkish TAV Airports Construction, Brazilian Odebrecht, and Jordanian Consolidated Contractors Company. The sample is identified through non-random methods and hence, is characteristically a convenience sample.

The sample in this study included 65 professionals from different countries. A complete list of the respondent's national backgrounds is shown in Table 1. Respondents in the sample ranged from managerial to non-managerial professionals. They were surveyed using the English version of the

questionnaire by the first author in Libya where the questionnaires were handled to all the respondents personally, and carried out face-to-face.

Table 1. Nationalities of the respondents in the sample

Countries	Citizens of this Country	
	N	%
Jordan	5	7.69
Libya	16	24.62
Egypt	3	4.62
Brazil	4	6.15
Portugal	6	9.23
Canada	1	1.54
Turkey	22	33.85
Azerbaijan	1	1.54
Venezuela	1	1.54
Spain	5	7.69
Germany	1	1.54

The sample group had a mean age of 32.34 years, and mean tenure at their present company was 2.14 years. In terms of gender, the population was made up primarily of men (71 percent male 29 percent female).

3.2 Research Variables

In order to measure independent and interdependent self-construal, a questionnaire by Gudykunst, W. B., Matsumoto, Y., Ting-Toomey, S., Nishida, T., Kim, K-S., & Heymen, S., (1996), consisting of twenty-nine items, was used:

- Independent self-construal was assessed by fifteen items, e.g., “I should decide my future on my own”.
- Interdependent self-construal was measured by fourteen items, e.g., “I consult with others before making important decisions”.

Items were assessed using a 5-point Likert scale ranging from “fully disagree” (1) to “fully agree” (5). Cronbach’s alpha for the entire scale was .70, with .75 for the sub-scale of independent self and .68 for the sub-scale of interdependent self.

To identify respondents’ conflict management styles, Rahim’s Organizational Conflict Inventory – II (ROCI-II) was used. Answers were obtained on a five-point Likert scale, ranging from (1)

strongly disagree to (5) strongly agree. The instrument is composed of seven items for integrating, four items for compromising, six items for avoiding, six items for obliging and five items for dominating style assessment. Individual responses to these items are averaged to create subscales for styles, where a higher score on a subscale refers to a greater use of that specific style by that specific respondent.

Several researches have reported satisfactory test-retest and internal consistency reliabilities for ROCI-II (Rahim, 1983; Weider-Hatfield, 1988), and convergent and discriminant validities for the style subscales (Rahim & Magner, 1994, 1995; Van de Vliert & Kabanoff, 1990). In this research. In this research, reliabilities of the scales, measured by Cronbach's alpha were reasonably good, ranging from 0.67 to 0.71.

Culture, gender, age, tenure, and position were used as control variables, because of their potential predicting power on conflicting behavior. Culture, gender and position were included in the analysis as dummy variables.

3.3 Findings and Discussion

Correlation coefficients were computed in order to explore the relationship among the research variables. A summary of the findings is reported in Table 2. As seen from the table, independent persons are more likely to adopt avoiding and compromising styles in the context of construction. Interdependent persons, on the other hand, appear to use predominantly integrating style. These research findings are, however, only partly in line with the studies conducted by Oetzel, J., Ting-Toomey, S., Matsumoto, T., Yokochi, Y., Pan, X., Takai, J., Wilcox, R., (2000) and Hamdorf (2002). In their studies, the authors found that independent persons tend to express direct styles as well as integrating, whereas interdependent persons seem to prefer indirect styles as well as integrating.

It is also interesting to note that none of the control variables correlates with conflict management behavior.

Table 2. Pearson Correlations between control variables, self-construals and conflict behavior (n=64)

	Avoiding	Obliging	Dominating	Compromising	Integrating
Age	.056	-.001	.125	-.031	.001
Tenure	-.060	-.218	.052	-.154	-.015
Culture ^a	-.070	.087	.198	-.207	.157
Gender ^b	-.066	-.166	.043	.027	.011
Position ^c	-.170	.050	-.032	.169	-.087
Independent	.335**	0.036	0.29	.410**	.059
Interdep.	.118	.183	.161	.187	.383**

Notes: ** correlation is significant at the 0.01level (2-tailed)

^a Culture: 0 = Individualism, 1 = Collectivism (countries were coded according to Hofstede ,1980).;

^b Gender: 0 = masculine, 1 = feminine; ^c Position: 1= Managerial personnel , 2=Non-managerial personnel

Multiple regression analyses were conducted to further investigate the nature of the relationship between self-construals and conflict management strategies. In addition, the contextual factors such as culture, age, tenure, gender and position were also incorporated into the analysis as a control set mainly due to their well known effects on conflict behavior. As the results in Table 3 show, independent self-construal emerges as significant predictor of the conflict management behaviors of avoiding ($\beta=0.35$; $R^2=0.11$, $F=7.976$, $p<0.006$,) and compromising ($\beta=.41$, $R^2=0.168$, $F=12.731$, $p<.001$). Interdependent self-construal, on the other hand, appears to be strongly associated with integrating ($\beta=0.383$, $R^2=0.146$, $F=10.803$, $p<0.002$). The low exploratory power of the models reported might be due to other factors, which have not been subjected to detailed analysis here – such as organizational culture, personality and alike.

Table 3. Results of Multiple Regression Analyses

Dependent Variables	Independent Variables	Beta	R ²	F	p
Avoiding	Independent self-construal	.350	.112	7.976	.006
Compromising	Independent self-construal	.410	.168	12.731	.001
Integrating	Interdependent self-construal	.383	.146	10.803	.002

Furthermore, it can be said that neither of control variables have been crucial factors in explaining the respondents' conflict management style selection within this specific research sample. This confirms the findings of Oetzel (1998), who found that self-construal is a better predictor of conflict styles than cultural background.

4. CONCLUDING REMARKS

This study investigated cultural aspect of conflict management in a sample of international construct joint venture. Altogether the research findings have demonstrated that a person's self concept can explain certain types of conflict management behavior.

Specifically, self-concept seems to be good predictor for avoiding, compromising and integrating conflict behaviors in the construction context. In a conflict situation, independent persons tend to use avoiding and compromising styles, whereas interdependent persons tend to use integrating.

Implications of these findings should be viewed in the light of several caveats. First, our conclusions are obviously limited by this sample and the study context. Second, this research was solely conducted in English. This may lead to a distortion of data in that not every one attaches the same meaning to the questionnaire statements. It should also be noted that the majority of the participants in this study were members of the collectivist countries. Despite these caveats, the present study can make contribution to a better understanding of cultural aspect of conflict management in the context of international construction. It is recommended that this study be replicated in other samples of construction environment.

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Culture Studies in International Construction Contracting: an Overview

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ABSTRACT

Cultural issues in international construction have drawn much attention from both practitioners and researchers, for culture has been identified as a variable to explain project performance. This paper reviews the trend of the studies in international construction from the cultural perspective, especially focusing on effect of culture on communication, dispute resolution, negotiation, and international construction joint ventures. The main findings are: (1) Cultural differences do contribute to adversarial attitudes and disputes in international construction projects; (2) Organizational culture of each participant in the global projects is always complicated by national culture distance and professional barriers; (3) Hofstede's work are still be most widely referred in the researches when it comes to the cross-cultural considerations. Based on the related references, this paper presents further research topics, which is to modify the existing culture measuring instruments for the particular context of international construction and to develop a culture regulator using the improved culture measuring instruments and information technology. Such a culture regulator is expected to enhance both normal communication and negotiating process once the conflicts or disputes arise.

Keywords: culture; international construction contracting; overview; culture regulator

1. INSTRUCTIONS

International construction can date back to military installations and public works undertaken by colonial governments even before the 20th century (Low, 2000). The fragmentation of the construction industry brings difficulties in managing a construction project. In addition, complexities in international construction manifest themselves in the execution of the contract, especially those that caused by the cross-cultural management. Since global projects involve interactions among individuals, organizations and agencies from diverse national backgrounds and cultural context, problems inevitably arise from the additional misunderstandings, increased transaction costs, friction between project participants and coordination and communication difficulties (Mahaligam, 2007). Consequently, the performance of the international projects declines.

Therefore, cultural issues in international construction have drawn much attention from both the practitioners and researchers. The studies in question entrench horizontally in two ways: one is observation and exploration of the impact that culture has on the project performance;

the other is development of solutions to manage the culture problems in international project. For the former stream, studies have been conducted from various perspectives. Normally, researchers don't head on to the impact of culture directly; instead, some mediate variables are introduced, such as partnering, performance of international joint venture, communication, conflicts and disputes, etc. Such variables are subject to the cultural factors and in turn pose impacts on the project performance. For the latter, team motivation techniques have been adopted in managing a multiethnic and multicultural project team (Miller, 2000). Vertically, culture studies in international contracting involve two levels, national culture and organization culture. When it comes to national culture, Hofstede's work are still widely referred (Phua, 2003; Chen, 2004; Chan, 2003; Ankarh, 2005). Organizational culture studies are not particular for the international construction, as the corporate culture plays a part in nearly all industries. However, the barriers among the project participants arising from the professional distance cannot be ignored (Ankarh, 2005).

The aim of this paper is to give a general picture of current culture studies in international construction and raise some further research topics. References of the overview cover updated papers published in the key journals or by the influential academic conferences of construction management worldwide, including ASCE journals (*Journal of Management in Engineering*, *Journal of Construction Engineering and Management*), *Academy of Management Journal*, *Construction Management and Economics*, *International Journal of Project Management*, *Construction Innovation*, Engineering Management Conference by IEEE, etc. It is expected that a better understanding of the status of culture studies in international construction could be acquired and ideas for future research could be generated.

The paper is organized as follows. Section 2 gives a description of methods employed, including paper collection and selection, and delineation of scope of the overview. Section 3 presents general findings from the analysis of the materials selected with regard to the culture impact on the project performance. Section 4 addresses some issues for current research methodologies. In Section 5, the main findings from the overview are discussed and topics for future research are put forward. The conclusion is drawn in the last Section.

2. METHODOLOGY AND PAPER SELECTION

The literature on culture studies on international construction is expanding. For the present overview, we selected 7 journals/conference collected by the eminent database of "Ei Village", which can be considered as a source of major academic journals in the field of construction management, as well as echoes the "ranking of construction management journals" (Chau, 1997). From the database, we identify all the papers from the year 2000 onwards with the key words of "culture, international project, construction management" in the abstract/subject/title. From the retrieved titles, we initially select a subset of only 7 papers available. Some papers are rejected in that they only reflect a little about the culture but not significant enough as a factor (Shen, 2001); others are rejected in that culture serves as the context instead of research focus, such as safety issues (Mahalingam, 2007), or knowledge management (Teerajetgul, 2006; Brochner, 2004).

In view of the small number of papers, we turn to earlier valuable works according to the selected paper's reference. As a result, another 4 papers from the 1990 onwards are collected in this way, which are also sourced from the key journals.

Considering that studies on the organization culture in construction industry may not necessarily relate to international context, we temporally cancel the limit of "international project". From the retrieved results, we identify the papers focused on the diverse organization culture resulting from the different professions among the project participants. 3 representative papers are pre-qualified. Besides we selected another 5 appropriate papers generally related to the cross-cultural impact in this stage.

After the initial selection, all collected papers were examined in greater detail. The hypothesis, the variables considered, the sample, the case studies and the results are summarized in

order to sort them into subgroups. All the papers can be generally classified into three categories: (1) cultural impact on communication, conflicts and dispute resolution within a project; (2) organizational culture profile of particular type of participants in international construction project; (3) cultural impact on international joint venture. Obviously, cross-cultural effects on the joint venture have been an increasingly interesting research topic. To make a full understanding of such a trend, the scope is expanded to papers with regard to joint ventures. Another one paper was identified on the final selection. A subset of 20 papers was prepared for further analysis. Table 1 shows the distribution of the selected papers across the 7 journals/conference.

Journal	Number of papers
<i>Academy of Management Journal</i>	1
<i>International Journal of Project Management</i>	5
<i>Journal of Management in Engineering</i>	3
<i>Journal of Construction Engineering and Management</i>	3
<i>Construction Management and Economics</i>	5
<i>Construction Innovation</i>	1
<i>IEEE conference</i>	2
Total	20

Table 1 Overview of journals and selected papers

More generally, in this paper, we have restricted the discussion to impact of cultural difference on the performance of international construction projects. As a consequence, we don't consider factors other than the culture, although some of the selected papers have a broader exploration of other factors (Ozorhon B, 2007; Ozorhon B, 2008).

3. GENERAL DESCRIPTION AND FINDINGS

3.1 General Description

All papers fall into three general categories as listed in Section 2. As an independent variable, culture difference cross the nationality and professions pose impacts to various extents on the mediate variables, such as communication, conflicts and disputes, team motivation, performance of international joint venture, etc. The main findings from the overview of the selected paper will be concluded in terms of the "mediate variables".

3.2 Effect of Culture on Communication, Conflicts and Disputes Resolution within a Project

As is expected, culture is often associated with language and communication (Tso, 1999). Cross-cultural management frequently encounter the barriers on communication and mutual understanding, as is illustrated by Low S P(2000) and Loosemore M (1999). Low draw lessons from the case of APC-TRTSB that failure to appreciate the different style of communication in cross-cultural business may lead to misunderstanding. The consequence may be work scope creeping, overestimate or underestimate of demand of the clients, etc. Finally, it may influence the project performance in an undesirable way.

According to the key observations of research results by Chan Edwin H W (2003), the most significant factors contributing to disputes in international projects are: inappropriate contractual arrangements and cultural clashes. Using social identity theory, Phua F T T(2003) attempt to explain how construction industry developed in such fragmented and adversarial manner. On three propositions, the author calls for further accurate and comprehensive empirical investigations. With institutional theory as a framework, Mahaligam (2007) identified the conflicts on global projects systematically. A hierarchy of categories of cross-national conflicts on a specific global projects executed by a certain firm was established. Among the six sub-categories, three fall into the broad concept of cross-cultural issues, including aesthetic conflicts, differences in building codes and difference in regulations, for "culture " has been said to be "collective programming of the minds of the entire society"; or "the

personality of society”; or “patterned ways of thinking, feeling and reacting”(Kumaraswamy, 1995), in which sense aesthetic views, building codes and regulations can be seen as the channel to express the culture value of a society.

Due to the nature of national culture, the studies on its influence on communication, conflicts and dispute resolutions cannot be accomplished in a general sense; instead, specific countries or areas are inevitably involved. This gives us profiles of national cultures as shown in Table 2.

Country/ Area	National Culture Profile	Professional Group Involved	Source
China	Strong personal relationship; high social conscience, more to collectivism; social status focus; polychronic culture;	Owner(Chinese); Contractor(American)	Low S P, 2000
Persian Gulf	Language of Arabic and religion of Islam prevails; High-contact cultures; High levels of silence and cognitive loops; Polychronic culture; Compared with UK, based on Hofstede's dimesions: higher power distance and uncertainty avoidance, lower individualism and masculinity	Owner(Persian Gulf) Contractor(British)	Loosemore M, 1999
Japan	Paying more attention to defining success measures; Emphasizing more the achievement of schedule and cost targets; The communication System in Japan uses both intensive formal and informal communications among project stakeholders;	Project manager	Zwikaël O, 2005
Israel	Preferring some vagueness regarding the outcomes of the project; More impacted by superior technical performance; Communications is typically verbal and hardly formulated, neither by the project manager, nor by management.	Project manager	Zwikaël O, 2005
Indian	Informal discussion preference; Strong sense of environment protection	Owner(India); Architecture, engineering and construction firms(India)	Ling F Y Y,2006

Table 2 National culture profiles of the typical countries or areas in selected papers

3.3 Organizational Culture Profile of the Particular Type of Participants

Literature review on organizational culture was thoroughly done by Zhang (2004), regarding to the origin of the study, the definition, the conceptual framework, the research methodology and the measuring instruments of organization culture. This paper focuses on the new findings on the culture profile of the typical participant of the construction project. Most of relevant researches are not initiated by the international contracting practice in that not only international project are influenced by the culture profile of the participants. However, McSweeney(2002) argues that because organizations often consist of multiple cultures that exist within and between units of the same organization, it is likely that, in addition to national culture, organizations may reflect other types of sub-cultures that interact at more micro level.

Accepting the fact that conflicts between project participants have been identified in various construction industry reports as being one of the principal causes of poor performance on construction projects, Ankrah(2005) conducts a comparative study of organizational culture between architects and contractors in order to explore the cultural clash at the inter-organization level. Architects are found to be largely informal organizations in which control and coordination are achieved through empathy between organizational members and through direct personal contract, while the contractors are largely formal organizations in which control and coordination are achieved through formal methods and procedures. The comparison of orientations between the two main players in construction project is displayed in dimensions selected from the literature review. As of enhancement of project performance, Igo (2006) diagnoses the organizational culture of an Australian engineering, procurement and construction management consultancy, using the competitive values framework. The company in question was found to be dominantly market-oriented in contrast of the employee's focus culture which would be much more appreciated in terms of quality outcomes.

3.4 Effect of Culture on the International Joint Ventures

As a conceived variable explainable to performance of the international construction joint venture (ICJV), culture has been researched extensively in the literature related to the ICJVs. Park S H (1997) examined the effect of national culture, together with the other two factors organizational complementarity and economic motivation, on joint venture dissolution. The test rejects the hypothesis that culture distance has an effect on dissolution but confirms that opportunities threat and rivalry appeared to be a stronger indication of the dissolution of joint ventures than organizational variables. It corresponds with the research conducted by Ozorhon Beliz (2008), in which the direct influence of the cultural fit on the ICJV performance on interpartner relationships was not verified. However, inconsistent findings appeared in his earlier paper published in 2007, in which cultural fit was found to be the most important fit that should be attained between the partners (Ozorhon , 2007).

4. METHODOLOGIES ADOPTED IN REVIEWED PAPERS

Like most of the researches on social science, survey-based approaches are the dominant information collecting techniques. Questionnaire is a basic form in such surveys, whether it be communicating through face-to-face interview or via e-mails. Likert Scale is widely used in cloze choice. Besides, Phenomenograhly serves as an effective interpretive approach in open-ended interview (Chen, 2005).

As the traditional technique of data analysis, statistical tools are still popular (Chan, 2003; Chua, 2003; Phua, 2004). The alternative data analysis techniques are also employed to examine the relationship between the variables, such as Structural Equation Modeling (SEM) (Ozorhon,2008).

Case study plays an important part in illustrating the cross-cultural management executed in specific countries or areas (Low, 2000; Mahaligam, 2007).

Whatever the data analysis technique the researchers resort to, dimensions of the analysis framework is indispensable. In this sense, Hofstede's work are still widely referred (Fisher, 2001; Chan, 2003; Phua, 2003;Chen,2004; Phua, 2004) as the basic dimensions, although it has been criticized as value-laden(Ankarh, 2005) . Meanwhile, some researchers prefer to adopt more comprehensive dimensions summarized from a number of literatures and tailored to the particular field (Ankarh, 2005).

5. DISCUSSION

As is observed from the survey by Chan Edwin H W (2003), the most significant factors contributing to disputes in international projects are: inappropriate contractual arrangements and cultural clashes. Cultural clash may pose some influence on the contractual arrangements. Cultural clashes are inevitable to some sense; however, contract strategy is a pure artifact. In another word, we have an absolute control on it. Considering the incompleteness of the contract, we always try to make contractual arrangements on basis of as much information as possible. Information about the culture difference can be valuable to the design of the contract strategy. For example, higher uncertainty avoidance may call for more conservative risks schemes. Thus the impact of culture difference on the contract arrangements is well worth of further investigation. It may be a shortcut to handle the two primary contributors to the disputes in international projects.

From the cases and samples cited in the selected papers, we can conclude that culture clash between the participants in the global projects is always complicated by both national culture distance and professional barriers. Though the current studies address the issues from one of the perspective either national culture or organizational culture, their intricately interwoven existence cannot be ignored. In this sense, Hofstede's dimensions don't work well, let alone the existing defects (Ankarh, 2005). There is an adequate need to improve the culture measuring instruments for the particular context of international construction.

Among the problems caused by the culture clash, communication barriers can be seen as the starting point, for the conflicts and disputes can be attributed to poor communication. Therefore, enhancement of communication in the cross-cultural context comes first. It is recommended that a culture regulator based on the improved culture measuring instruments and information technology can be developed. Such a culture regulator is expected to enhance both normal communication and negotiating process once the conflicts or disputes arise. As a precondition, database of the national culture profiles and organizational profiles in terms of their business type should be established. It calls for the international cooperation within and out of the construction industry. The information of the typical countries or areas shown in Table 2 can be seen as the primary prototype of the unit of database.

Although cultural studies are seen as divergent; however it is generally recognized that culture can be a variable to explain the project performance whether directly or indirectly. Problems encountered in the practice of international construction, especially those at the interface level, can be attributed to culture difference to some extent. In this overview, focus was put on three aspects- (1) Effect of culture on the communication, conflicts and disputes resolution within a project, (2) Organizational culture profile of the particular type of participants, and (3) Effect of culture on the international joint ventures, for ease of discussion. The three aspects are neither exhaustive nor independent from each other. The materials used in this paper were sourced mainly from top-class research publications. Some other publications in this field may well be important and influential; however, they were not overviewed because of the availability of the sources. It is hoped that they could be expanded into in further study.

6. CONCLUSIONS

The paper combs the recent researches on culture studies in international construction published in the key journals or by the influential international conference. The main findings are as follows:

1. Cultural differences contribute to adversarial attitudes and disputes in international construction projects, ranked as one of the primary factors.
2. Investigation on the degree of cultural sensitivity from one nationality towards another within the construction industry has been conducted in specific areas, such as Eastern Asia, China, Persian Gulf, Japan and Israel etc.
3. Organizational culture of each participant in the global projects is always complicated by national culture distance and professional barriers.
4. Cross-cultural effects on the joint venture have been an increasingly interesting

research topic.

5. Though some researchers try to give a more comprehensive analytic framework to understand the cross-national issues on global projects, Hofstede's work are still be most widely referred in the researches when it comes to the cross-cultural considerations.

In addition to analysis of findings from the overview, some future research topics are raised in this paper, which may act as a guide for further studies in this field, such as (1) Inappropriate contractual arrangements and cultural clashes could be consolidated to handle; (2) There is an adequate need to improve the culture measuring instruments for the particular context of international construction; (3) A culture regulator based on the improved culture measuring instruments and information technology could be developed

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CULTURAL VARIABLES AND THE LINK BETWEEN MANAGERIAL CHARACTERISTICS IN CONSTRUCTION INDUSTRY: REFLECTIONS FROM TURKISH AND DUTCH EXAMPLES

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ABSTRACT

In the last two decades, the universality of organizational behaviour and the impact of managerial characteristics in construction industry and multinational environment, mainly developed in western countries, have been more broadly and almost routinely challenged by growing cross-national research evidence. International construction projects involve multinational participants from different political, legal, economic, and cultural backgrounds. As one of the major issues affecting the management of international construction projects, culture deserves wide research. The aim of this paper is to examine the managerial characteristics of Turkish and Dutch Construction industry and the changes required to solve recent organizational problems and difficulties in those industries. The paper reviews the characteristics of (international) construction projects and discusses the cultural context. In order to analyze the problems which are unique in construction industry, this study will begin with a broad view of characteristics of Turkish and Dutch business-culture through the differences of culture’s dimensions like power distance, uncertainty avoidance, and individualism / collectivism. Furthermore, it sets a comparison of construction-management approaches from viewpoints of five functional components of management: planning, organizing, staffing, leading, and controlling through the cultural impacts.

Keywords: Construction Industry, Culture, Characteristics of Turkish and Dutch Business-culture, Management Functions.

INTRODUCTION

The human dimension in technological development has been an enigma for many years. Despite the fact that the technological developments make life easier, as long as the human factor is ignored, the full benefits of technology applications will be rarely encountered. Construction is an important part of global economy with its unique characteristics affected by and affecting all parts of the world. The construction industry has changed significantly within recent years. Increased competition created by issues such as globalization and rapid developments in construction technologies have led many organizations to seek innovative solutions to decrease cost, improve schedule, keep current on technological developments

and ensure market share in their dynamic business environment. World is becoming “small global village” because of increasing multinational companies and innovative ICTs (Information & Communication Technologies). Hofstede (2001) stated that there is no global solution for organization and management problems. Many researchers agree that there is a correlation between cultural values and management applications (Rose et al. 2008; Schein, 2004, 1999, 1997; Cameron and Quinn, 1999; Seihl and Martin, 1998; Petty, Beadles and Lowery, 1995; Lim, 1995; Denison, 1990; Deal and Kennedy, 1982).

Cross-cultural comparisons are critical, because there is a considerable evidence of increasing internationalization and globalization of firms having operations in multinational environment in construction. In this regard, attention should be given to the recognition and understanding of cultural differences in the context of the construction industry and the cultural impacts for the construction management.

Culture is important because “it is a powerful, latent, and often unconscious set of forces, that determine both our individual and collective behaviour, ways of perceiving, thought patterns, and values” (Schein E. H., 1999). Decisions made without awareness of these ‘operative culture forces’, may result in unanticipated and undesirable consequences. Culture needs to be taken seriously to help anticipate consequences and make choices about their desirability. One of the last available ‘mechanisms’ left for organizations to improve their competitive position within the construction industry is by considering its people (culture) along with its technology (Schein E. H., 2004, 1997). In other words, if one wants to make construction industry organizations, groups and project teams more efficient and effective, then one must better understand the role that culture plays within them. Culture is identified as one of the most difficult and complex approaches to understand. This is mainly due to culture being defined in so many different and sometimes conflicting ways (Pepper G. L. 1995). More than 300 definitions of culture available in different research fields (in cross-cultural or cross-national studies from the disciplines of psychology, sociology, anthropology, political science, economics, geography, history, comparative law, comparative medicine, and international market research) which have changed over the past two generations (Barthorpe et al., 2000).

Kroeber & Kluckhohn (1952), American anthropologists, assembled more than 160 definitions but it is difficult to find the best definition. The word ‘culture’ stems from the word ‘cultivate’ (the cultivation of soil) – i.e.: the way in which people act on nature and it was only in the eighteenth century that it became synonymous with the ‘educated’ person. Bodley (1994) culled a simple version that stated that culture involves what people think, what they do, and what they produce. Culture has several properties: it is social heritage or tradition; it is shared, learned human behavior; and it is symbolic, and based on shared, assigned meanings of the members of a group (Kwan, and Ofori, 2001). Culture is commonly identified as “a set of mores, values, attitudes, beliefs, and meanings that are shared by the members of a group or organization”, and is often the primary way in which one ‘group’ (organization, team, etc) differentiates itself from others (Hofstede, 2001, Duarte and Snyder 2001, Williams et al. 1993) This study focuses on the analysis of the nature of Turkish construction industry through comparison with the Dutch construction industry. Hofstede’s famous cultural world map and the cultural dimensions were used to express the differences between Turkish and Dutch construction managerial characteristics. Results attempts to provide some insights into the national culture and how it might assist in managerial characteristics through the functional components of management in construction industry. The necessary data to fulfill the research objective were obtained from four vital areas following Hofstede’s (2001, 1980) cultural dimensions.

CONSTRUCTION INDUSTRY PRACTICES IN TURKEY AND THE NETHERLANDS

Construction Projects in Turkey

Turkish construction industry has been accelerated in the last 30 years with economic growth aspects of scale and quantity. Turkish Construction and Architectural Services serve several benefits such as “low-priced labour force” and “geographical position” close to the Middle East and Russia. As a result; by using these advantages, Turkish construction industry became

competitive on the construction sector especially in the Middle East and Russia after 1980s. Over 10 billion USD income; in other words, the relative importance of construction industry in the Gross National Product increased about % 5 -10 GNP interest per annum (Turkish Statistical Institute, 2007). Construction industry in Turkish domestic industry has the big weight in addition to the manufacturing industry and the service industry.

Accordingly, while considering positive contributions on the image of the country, a question regarding the improvement of the companies' performance becomes extremely important. However, sector has some critical problems. Beside traditional problems regarding the project finance and technology, another problem negatively affects the performance of the firms is happened in cultural area. As seen on news media frequently, difficulties on the understanding of the cultural properties and backgrounds in the countries where the firms have construction projects cause the conflict with the local authority's labours. Results of researches done in many countries show that both national culture and the culture of country which carry on business have to be understood properly. The firms which are succeeded in this understanding can increase and sustain the performance and competitive advantage.

Many researchers point out an array of problems associated with the Turkish construction sector (e.g. Sorguc, 1996; Toklu, 1996; Ozturan, 1996; Ozcan, 1997). Some of these problems range from government policy and restrictions imposed on public construction projects and bureaucratic procedures to contractual clauses advocating unfair risk sharing and inadequacies in control mechanisms. Some of the other problems can be attributed to inadequate technological know-how, lack of education and training in new technologies and management approaches (Bayramoglu, S., 2000).

Construction Projects in The Netherlands

In the construction industry in the Netherlands there is a strong re-structuring going on, started jointly by governmental bodies and the construction-industry boards, especially due to two main events during the past few years: (1) A discovery of a large collusion-case in about 2001, and (2) an increasing influence of environmental issues e.g. recent cradle-to-cradle concepts.

Ad (1): The discovery of several collusion cases in the tendering of public infrastructure projects was quite an eye-opener for the Dutch government bodies. This large case, in which the investigations were led by the so called Commission Vos (Vos et al, 2002) was the start for a serious refocusing of governmental policy regarding competition-regulations, tendering and contract-policy etc. In the meantime it has led to several improvement-programmes, e.g. from transparency and trust-issues to innovation of technologies used.

Ad (2):

Also in the Dutch situation, the environment is quite a sensitive issue; especially due to the fact that the coastal defence infrastructure plays a vital role in the existence of the Netherlands, the impact of the heating of the planet, and re-designing of the product-life-cycles, etc. (McDonough & Braungart, 2007) have signalled extra the need for improvements regarding environmental policy. And because construction industry plays an important role in the 'shaping' of the (Dutch) environment, this sector has to take this into account seriously, as promoted now by the Dutch government.

These two main influences have created a new 'wave' of re-thinking and approaching the construction issues from a new perspective: i.e. more focus on clients and added values, etc. Although of course these kind of movements can quite easily tend to be like certain trends, being ending somehow, they nevertheless seem to become still some 'anchors' for a thorough sound and innovative climate in the Dutch construction industry.

COMPARISON OF CHARACTERISTICS AND DIFFERENCES IN CONSTRUCTION MANAGEMENT THROUGH THE CULTURAL IMPACTS BETWEEN TURKEY AND THE NETHERLANDS

Although many studies have been undertaken in the area of management styles, they have generally tended to be among manufacturing industries characterized by permanent organization structures. There are few published works that are directly concerned with the construction industry (Langford et al., 1995). Construction industry has characteristics that separate it from all other industries. These characteristics which may have an impact on leadership styles in construction are: (a) project characteristics, (b) contractual arrangements, (c) project life-cycle and (d) environmental factors (Harvey and Ashworth, 1993).

Project-based nature of construction industry with its temporary multi-organizations (TMO) will almost certainly have an important influence on the managerial leadership styles of professionals working in the industry. Although, in most project environments, there is a strong preference for a democratic participative style, it may not be the most effective for all situations. Cleland (1995) argues that project leadership should be appropriate to the project situation because leadership is a continuous and flexible process. Furthermore, construction professionals need different leadership styles in different phases of the project life cycle. Bresnen et al. (1986) mentioned that the temporariness of project cycles may have a bearing upon an understanding of leadership in construction work and its effects. The style of leadership changes as the project progresses through its life cycle. During the different phases of the design process, styles may need to allow for more debates, fine-tuning and deliberation (Hopper, 1990). Tijhuis (2006) described different approaches of leadership in construction, in which a difference between opportunism and anti-cyclic approaches play an important role, leading to three main issues for successful leadership: (a) the right timing, (b) a strong focus and (c) the right people (Tijhuis, 2006).

Functional components of construction management are planning, organizing, leading, and controlling through the cultural impacts. Planning bridges the gap from where we are to where we want to be in a desired future. It strongly implies not only the production of new things, but also sensible and workable innovation. Organizing is part of managing that involves establishing an international structure of roles for people in an enterprise to fill. It is international in the sense of making sure that all the tasks necessary to accomplish goals are assigned and, it is hoped, they are assigned to people who can do them best. Staffing involves filling, and keeping filled, the positions provided for by the organization structure. It involves setting requirements for the job to be done, and it includes inventorying, appraising, and selecting candidates for positions; compensating; and training or otherwise developing both candidates and current jobholders to accomplish their tasks effectively. Regarding the Leading, all managers would agree that their most important problems arise from people, their desires and attitudes, their behaviors as individuals and in groups, and the need for effective managers also to be effective leaders. Controlling is the measuring and correcting of activities of subordinates to assure that events conform to plans. Thus it measures performance against goals and plans, shows where negative deviations exist, and, by putting in motion actions to correct deviations, helps ensure accomplishment of plans. Hence, each component has an impact on each others directly through the cultural context (Ricky, 1990). Technology, legislation, politics and strategy are directly resulting from different levels of cultures. All these sources are originating from the national culture and organizational culture. There is little doubt that cultural background will affect the way managers carry out their managerial function and activities. Most of the scholars working on cultural issues emphasize the impact of individual characteristics like cultural background on organizational and group behaviour. Figure 1. shows the link between managerial characteristics and cultural values.

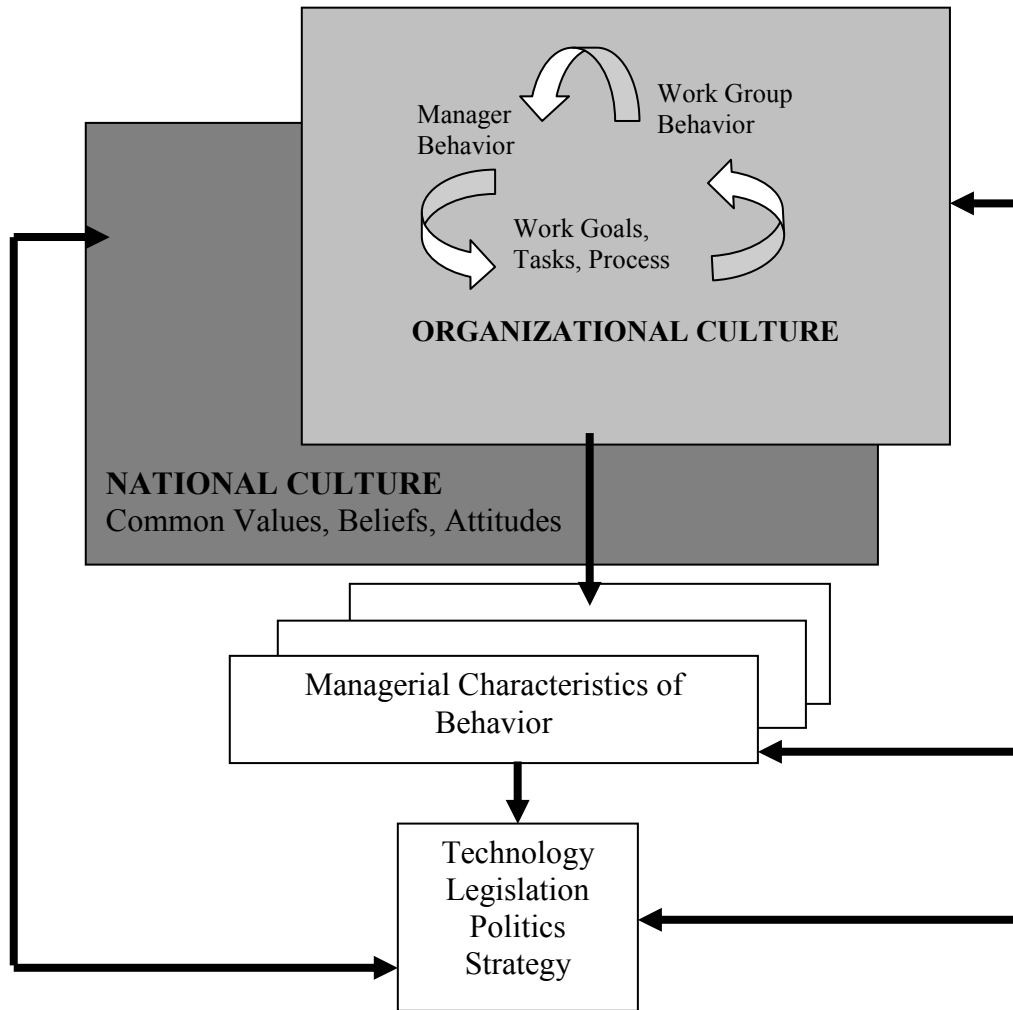


Figure 1. The link between cultural values and managerial characteristics.

Each country has their traditional culture and reflects their culture on management. So management style of each country differs on managerial style to compete with foreign companies they have to concern. Table 1, summarizes the comparison between management approaches of Turkey and the Netherlands in particular through the five components of management. Turkish management depends on the group, long-term orientation, and ambiguity of responsibility, while the Dutch management is based on the individual, short-term orientation, individual responsibility, and professionalism, and is controlled by logic and reason. These results are derived and adopted from the research results of Hofstede (2001) regarding the world cultural map. And although the authors are aware of the recent discussions on how the work of Hofstede can be used or not as a mapping-tool for 'the' differences between cultures, it still provides a useful tool for discussion and handling these cultural differences. Nevertheless, it should at least be considered positively, because - together with other theories and methods- it's still usable in further developing of culture-'tools', so that culture-issues in construction can transform from a 'black box' into a serious 'part of the deal', as described in earlier and recent works of CIB Commission W112 'Culture in Construction' (Tijhuis et al, 2001).

An ideal leader in the Turkish culture is described by Pasa et.al.(2001) as a decisive, ambitious, assertive person who is somewhat aggressive but controlled at the same time, and has a hands-on approach to problems. This image of an ideal leader is in line with high power distance and highly assertive characteristics of Turkish society.

Table 1. Differences by each country's culture.

	Netherlands	Turkey
Planning	Individual decision making;	Collective decision making relying on consensus;
Organizing	Individual responsibility; clarity and specificity of responsibility for decision	Collective responsibility; ambiguity of decision responsibility
Staffing	Short-term Employment; promotion based on primarily on individual performance Employees perform best as individuals	Long-term employment common; promotion based on multiple criteria Employees perform best in in-groups
Leading	Leader as a social facilitator; leader is part of the group; Consultative leadership leads to satisfaction, performance, and productivity	Leader as a decision maker; leader heads the group; directive style; top-down communication; Autocratic or Paternalistic style; Authoritative leadership and close supervision lead to satisfaction, performance, and productivity
Controlling	Control focuses on individual performance, Superiors optimistic about employees' ambition and leadership capacities	Control focuses on group performance, Superiors pessimistic about employees' ambition and leadership capacities

Source: Hofstede, 2001

IMPACT OF HOFSTEDE'S CULTURAL DIMENSIONS ON CONSTRUCTION MANAGEMENT OF TURKEY AND THE NETHERLANDS

In 1968 Dutch scholar Geert Hofstede conducted what is still today considered to be the largest empirical and most influential cross-cultural value study in the field of different cultures and their approach to management. Data was collected across 72 countries on 116,000 employees' work experience from IBM world-wide company. Hofstede (2001) discovered four large independent dimensions accounted for almost half of the variance in country mean scores on thirty-three questions on values and perceptions. Hofstede studied common cultural factors included in each country for expression of a national culture, which is not generalized to all people in their country. According to Hofstede (2001,1980), countries can be categorized along four dimensions of work-related value differences are power distance, uncertainty avoidance, individualism/collectivism and masculinity/femininity (Hofstede, 2001). However, investigating in culture-issues is in fact comparable with corporate-anthropological research practice (Olila, 1995), in which it needs strongly to be investigated and analyzed 'on the work floor' within organizations; Sanders described this, as he pointed at the importance of 'being a third-culture man', e.g. being able to participate within organizations at one hand, but on the other hand also step outside and see what happens to learn from it (Sanders, 1995).

Hofstede's concept of power distance provides some insight to the type of management style that would be fostered within a particular culture. Power distance refers to the inequality between superiors and sub-ordinates. High power distance may lead to a very autocratic, controlling type of leadership, whereas a low power distance may give rise to a more democratic approach and place more emphasis on the empowerment of the subordinates etc. Hofstede (2001) found that in countries with high power distance, employees preferred autocratic, persuasive, or democratic majority-vote manager, whereas in countries with low power distance, individuals preferred a consultative manager.

High uncertainty avoidance may lead to a more bureaucratic and controlling management, whereas low uncertainty may lead to a more laissez-faire management. The individualism/collectivism dimension is often explicitly linked to the individual's relationship with his or her employer organization. Members of collectivist societies would tend to have a greater emotional dependence on their organizations and the organizations would be more likely to assume greater responsibility for its members (Hofstede, 2001). On the contrary, employed people in an individualist culture are expected to remain independent from groups, organizations, and all other collectivities. They are concerned primarily about themselves and their immediate families. This dimension suggests that high individualism may lead to a more competitive type of management, whereas high collectivism may give rise to a more consultative style. Hofstede suggests that the masculinity/femininity dimension affects the meaning of work in people's lives. This dimension concerns the extent to which individuals tend to support male or female favoured goals. High masculinity may give rise to a fairly macho type of management, whereas high femininity may lead to a more empathetic consideration type of leadership. Masculine culture has a higher emphasis on assertiveness and the acquisition of money and other material things. Feminine cultures stress relationships among people, concern for others, and interest in the quality of work environment.

Power distance

Power distance can be defined as the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally. 'Institutions' are the basic elements of society like the family, school, and the community; 'organizations' are the places where people work (Hofstede, 1991). Table 2, presents the score ranks of power distance index values. Turkish culture has been described as being high on the collectivism and power distance value dimensions (Hofstede, 2001). Turkey is ranked at 18/19, the Netherlands is at 40. It means that power distance in Turkey is stronger than the Netherlands. The high power distance prevalent in the Turkish society makes democratic leadership a rare practice. Due to the huge inequality between managers and subordinates, most people do not even expect their managers to have a democratic style (Pasha, 2000).

Table 2. Power distance index (PDI) value for Turkey and the Netherlands.

Score Rank	Country	PDI Score
18/19	Turkey	66 (High)
40	Netherlands	38 (Low)

Source: Hofstede, 1991, 2001

As a part of a large cross-cultural study, Kabasakal and Bodur (1998) found Turkey to be higher than the world average in collectivism (fourth) and power distance (tenth) among 62 countries. In their investigation of how Turkish middle level managers saw their society, the highest mean response for societal culture was attributed to collectivism and the second highest to high power distance (Kabasakal and Bodur, 1998). In the high power distance, the ideal boss, in the eyes of subordinates, is a benevolent autocrat or 'paternalistic' (Hofstede, 2001). Relationships between subordinates and superiors in a large power distance organization are frequently loaded with emotions. In the low power distance, organizations are fairly decentralized, with flat hierarchical pyramids and limited numbers of supervisory personnel. Superiors should be accessible for subordinates, and the ideal boss is a resourceful (and therefore respected) democrat. Subordinates expect to be consulted before a decision is made that affects their work, but they accept that the boss is the one who finally decides (Hofstede, 1991). Table 3. shows up key differences between small and large power distance societies.

Table 3. Key differences between small and large power distance societies.

Low power distance	High power distance
Decentralized decision structures; less concentration of authority	Centralized decision structures; more concentration of authority
Flat organization pyramids	Tall organization pyramids
The ideal boss is a resourceful democrat; sees self as practical, orderly, and relying on support	The ideal boss is a well-meaning autocrat or good father; sees self as benevolent decision maker
Subordinates expect to be consulted	Subordinates expect to be told what to do

Source: Hofstede, 1991, 2001

Uncertainty avoidance

Members of high uncertainty avoidance cultures placed a premium on job security, career patterns, retirement benefits, and so on. They also had a strong need for rules and regulations; the manager was expected to issue clear instructions, and subordinates' initiatives were tightly controlled. Lower uncertainty avoidance cultures were characterized by a greater readiness to take risks and less emotional resistance to change. Turkish society culture is characterized by strong uncertainty avoidance, in other words a strong need for rules and regulations; employee preference for clear and unambiguous instruction from management involving less risk-taking; and less individual initiative and responsibility in the workplace (Hofstede, 1980, 2001). This means that subordinates of such cultures would most likely prefer to defer to the certainty of rules, procedures and leader directives, rather than make key decisions themselves and accept responsibility (Giritli and Topcu-Oraz, 2004). Giritli and Topcu-Oraz (2004) assert that there appears to be an alignment between the observed leadership behaviour of managerial personnel in the Turkish construction industry and the Turkish societal values of high-power distance and high-uncertainty avoidance. In Table 4, Turkey shows high, however, the Netherlands shows low score in the uncertainty avoidance. Table 5, also shows the differences between weak and strong uncertainty avoidance societies.

Table 4. Uncertainty avoidance index (UAI) values for Turkey and the Netherlands.

Score Rank	Country	UAI Score
16/17	Turkey	85 (High or Strong)
35	Netherlands	53 (Low or Weak)

Source: Hofstede, 1991, 2001

Table 5. Key differences between weak and strong uncertainty avoidance societies.

Weak uncertainty avoidance	Strong uncertainty avoidance
Appeal to transformational leader role	Appeal of hierarchical control role
Comfortable feeling when lazy; hardworking only when needed	Emotional need to be busy; inner urge to work hard
Tolerance of deviant and innovative ideas and behavior	Suppression of deviant ideas and behavior; resistance to innovation
Motivation by achievement and esteem or Belongingness	Motivation by security and esteem or belongingness
Weak loyalty to employer; short average duration of employment	Strong loyalty to employer; long average duration of employment
Top managers involved in strategy	Top managers involved in operations

Source: Hofstede, 1991,2001

Individualism and Collectivism

Most comparative analyses of conflict management behaviour contrasted groups such as Turkey-collectivists- and Netherlands-individualists. In Table 6, it is confirmed that Turkey and the Netherlands are ranked to 28, 4/5. Turkey has been considered collectivistic in its social behaviours, in comparison to the Netherlands. Table 7, summarizes key differences between collectivist and individualist societies. Collectivists, in contrast to individual goals to collective goals, possess a sense of harmony, interdependence, and concern for others (Hui and Triandis, 1986). In collectivist cultures group decisions are favoured over individual ones, and individual initiative is frowned upon. Furthermore, one's identity in collectivist cultures is based on the relations within groups, thus, emphasizing a strong 'we' consciousness (Hofstede, 1980). Hofstede (1980, 2001) wrote that in most collectivist cultures, the word 'no' is seldom used, because saying no is a confrontation; 'you may be right' or 'we will think about it' are examples of polite ways of turning down a request. Similarly, the word 'yes' should not necessarily be seen as an approval, but as maintenance of the communication line. Individuals in a high context culture are more likely to assume a non-confrontational, indirect attitude toward conflicts.

Table 6. Individualism index (IDV) value for the Netherlands and Turkey.

Score Rank	Country	IDV Score
4/5	Netherlands	80 (High)
28	Turkey	37 (Low)

Source: Hofstede, 1991,2001

Table 7. Key differences between collectivist and individualist societies.

Collectivist	Individualist
Diplomas provide entry to higher status Groups	Diplomas increase economic worth and/or self-respect
Managers chose duty, expertness, and prestige as life goals	Managers chose pleasure, affection, and security as life goals
Employer-employee relationship is basically moral, like a family link	Employer-employee relationship is a business deal in a "labor market"
Employees and managers report teamwork, personal contacts, and discrimination at work	Employees and managers report working individually
Hiring and promotion decisions take employees' in-group into account	Hiring and promotion decisions are supposed to be based on skills and rules only
Management is management of groups	Management is management of individuals

Source: Hofstede, 1991,2001

Characteristics of the companies in the Netherlands in terms of management patterns or management skills have shown common points; autonomy and entrepreneurship, productivity through people, hands-on/value-driven, stick to the knitting, simple form/learn staff, and loose-tight control, autonomy management, business development on imaginative power. About the economic growth in Turkey it can be said that the main cause was organizational operation by human resources and technology. The characteristic of human resources management is that lifetime employment, promotion system by long-term evaluation and collective decision making. Lifetime employment, promotion system by long-term evaluation and the seniority system between organization and member have relation to Turkish traditional culture. According to Pasa et. al. (2001) collectivism seems to be an important characteristic of the Turkish culture.

CONCLUSIONS

In the construction context, cultural influences on managerial characteristic need to be addressed since a growing number of contractor firms initiate or expand cross-border activities. There is a growing awareness that success in the global construction marketplace calls for the knowledge and sensitivity of managers to cultural differences in leadership behaviour. This study has been initiated to examine the relationship between national culture and the managerial characteristics of Turkey and the Netherlands. Nevertheless, the paper analyses the main situations reflecting on both countries as a “small start-up” for larger investigations in the near future. Therefore the main goal of the paper is a kind of ‘test’ for future case-analyses on cultural differences on joint construction projects between Turkey and the Netherlands. This is seen as the limitation of the study. Culture is not irrevocable but it’s difficult to manage, as it essentially represents the accumulative values, beliefs, attitudes of individuals within a nation, organization, occupational group or project based team possess.

Due to the nature of construction industry, the successful changing of a culture or working with another national culture requires clear management and commitment throughout the all levels of organizations in the construction industry. The literature review provided a basis for the identification of managerial characteristics. Although there are discussions going on about its present representation of ‘the’ cultural differences, Hofstede’s cultural dimension results received from the world-wide IBM companies are still usable as they probably changed only slightly in the last three decades. Together with other theories and method for developing further culture ‘tools’, they lead to improvements in handling the ‘black box’ of culture in construction. However, the results of this research attempts to provide some insights into the national cultural variables influence and the link between managerial characteristics of both countries for further researches. The results reported in this study are tentative but promising.

Results show that there is a correlation between cultural dimensions with managerial characteristics in both countries Turkey and The Netherlands. This seems to be possible even though the expatriate managers maybe influenced by their own national culture. So managers or executives from Turkish and Dutch construction industry, who want to work together within joint construction-projects, must be aware of the cultural impacts and implications as an origin of differences on their strategies. And that may lead to important lessons in the near future, when investigating more into detail such experiences and practices. A thorough setting and analyzing of (future) national and international case-studies is then one of the strategies the authors are working on within their research programmes.

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INTERNATIONAL CONFERENCE ON MULTI-NATIONAL CONSTRUCTION PROJECTS
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INTERNATIONALISATION PROCESS FOR CONSTRUCTION DESIGN SERVICE SMES ON MULTI NATIONAL PROJECTS

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ABSTRACT

The internationalisation process has four key factors including market selection, decision to enter, entry modes and factors affecting entry modes. Small and medium sized enterprises (SMEs) in the architectural engineering construction design services sector have demonstrated an increasing involvement in international markets. Consequently, activities and processes involved in internationalisation of these SME types present important issues for understanding from entrepreneurial, managerial and research perspectives. A research gap exists, however, through emphasis in past research having been given to large firms, and in particular those within manufacturing. This investigation identified similarities and differences between two construction design service SMEs who have been exporting to various localities including Eastern Europe, Africa, Middle East, UK, Asia and South America for typically more than two decades. Similarities and differences were identified within eight major constructs including: purpose, firm type, market image and design philosophy, entry mode strategy, institutional arrangement, factors affecting mode of entry, market selection and firm strategy in relation to project selection. The primary reasons for firms in both cases working in international markets were associated with the firms' motivations related to growth and enhancement of financial viability. Both firms were categorized as client following. This paper discusses the various internationalization processes and explains the reasons intrinsic to each case study. The two firms have been highly successful in the internationalization process on multi-national projects due to a reflexive capability philosophy which incorporates continuous analysis and alignment between firm and locality characteristic to transform traditional barriers into enablers of success.

Keywords: internationalization, institutional arrangements, reflexivity

INTRODUCTION

SMEs are one of the principal driving forces in economic development (UN/ECE Secretariat, 2008). The significance of SMEs in market economies is global for example:

- I In the European Economic Area (EEA) and Switzerland there are more than 16 million enterprises. Less than 1 per cent are large enterprises; the rest are SMEs.
- I SMEs constitute the backbone of the Asia Pacific region, accounting for 90 per cent of enterprises, and between 80 and 60 per cent of gross domestic product in individual Asia Pacific economies.
- I The strong performance of the United States economy in recent years has been driven largely by the creation of SMEs (UN/ECE Secretariat, 2008).

SMEs are critical to strategic initiatives in an economy however, their contribution to foreign trade is not as significant. Despite the large proportion of local and regional business accounted for by SMEs, most are not involved in international trade and investment. However, those SMEs that are involved in foreign trade are very dynamic. For example, SMEs in OECD member States produce about 26 % of OECD countries' exports, and about 35% of Asian exports.

Services trade is an important component of Australia's total international trade, with exports of services comprising 21.4 % of Australia's total exports of goods and services in 2006-07. (ABS, 2008) Services exports rose 10.5% to \$46.2 billion following 5.4% growth in 2005-06 and 5.2% in 2004-05. .

The internationalisation of architectural, engineering and construction (AEC) management design firms in Australia has become increasingly significant in the last decade. Australia's export of AEC services as well as construction services was \$604m in 2004-05. (ABS, 2008) It is important to note whilst the export of AEC and other technical services have undergone growth, there is still significant opportunity for further growth in the export of these particular services. The majority of AEC firms are SMEs.

Notwithstanding assistance provided for these firms through international trade missions, organised export firm support networks and information packages by a burgeoning number of government agencies, anecdotal evidence suggests that there are still perceived barriers to market entry and long term economic sustainability for small to medium sized firms. There are a number of problems faced by SMEs acting in foreign trade. The **main internal barriers** are: lack of information; lack of capital (export crediting); difficulty of building an international market position and maintaining international business relations; increased costs of longer credit lines, capability to bear possible losses in entry phases; insufficient management skills; and the lack of managers with international experience and foreign language skills. The **main external barriers** are: technical trade restrictions (like standardization, quality requirements, conformity assessment, differences in packaging and labelling, different ecology requirements, etc.); protracted bureaucratic procedures; lack of risk assurance; and in the more distant countries, high transportation costs and communication problems. (UN/ECE Secretariat, 2008).

A variety of international markets are penetrated with a variety of entry strategies with increasing success. However, less is known about the appropriate entry mode and management of the export of construction design services by those that have achieved long term economic success. A study was funded by the Australian national consortium of industry, government and academic institutions known as the Cooperative Research Centre for Construction Innovation aimed at exploring the general research question; "How do construction sector design firms internationalise and develop sustainable business models?"

This paper presents partial results of this study related to the firm's purpose and the internationalisation processes.

INTERNATIONALISATION PROCESS

The internationalisation process has been well established within research literature. SMEs have demonstrated an increasing involvement in international markets (Haahti, Hall and Donckels, 1998; Erramilli and D'Souza, 1993; Bonaccorsi, 1992). Greater emphasis in research in the past has been given to large firms, and in particular those within manufacturing (Coviello and Martin, 1999). Consequently there is little known regarding the internationalisation of SMEs which provide a service such as design firms.

There are differences between SMEs and larger firms as well as those between services and products (Zeithaml, Parasuraman and Berry, 1985; Buckley, Pass and Prescott, 1992). SMEs differ from larger firms in:

- I managerial style,
- I ownership,
- I independence, and
- I scale and scope of operations. (O'Farrell and Hitchins, 1988)

The internationalisation process is typically described in the literature across four key dimensions Decision to enter, market selection, entry modes and factors affecting entry modes and we know very little about the SME design service internationalisation process.

Decision to enter, Market selection, entry modes and factors affecting entry modes

International market selection is a pivotal aspect of international business and involves a firm deciding which country or regions will constitute target markets. A number of factors contribute to international market selection including: *Business factors* such as sales potential (size and growth), openness of markets and risk (Agarwal and Ramaswami, 1992; Terpstra and Yu, 1988, Crosthwaite, 1998); *Chance* where there is evidence of enquiries by foreign customers or encouragement by a financial institution (Hoang, 1998); *Psychic distance* where firms tend to internationalise into foreign markets where information flows are relatively unimpeded as these countries are more easily understood by managers (Johanson and Wiedersheim-Paul, 1975); and *Political stability* where firms favour internationalising into 'safer' developed countries (Crosthwaite, 1998)

After reaching the decision to enter a particular market a firm determines a mode of entry. Mode of entry has been described as utilizing an institutional arrangement for organizing and conducting international business transactions (Erramilli and Rao, 1993; Root, 1987). There are two key dimensions including; resources required for commitment to the market and market specificity of commitment. Various entry modes include wholly owned subsidiaries, acquired subsidiaries, various joint venture arrangements, and various agent/distributor exports and each of these have varying degrees of resource requirements and market specificity.

While the majority of literature has concentrated on manufacturing enterprises (Erramilli and Rao, 1993), there has been a small amount of research that provides increasing evidence that service firms demonstrate a number of important differences from manufacturing enterprises (Erramilli and Rao, 1993; Chase and Tansik, 1989) and confront distinctive challenges in market entry and expansion processes (Carmen and Langard, 1980).

The tremendous heterogeneity which characterises the service sector, leads to widely differing international trade and investment patterns in the service sector (Erramilli and Rao, 1990). This poses a major challenge for researchers trying to study behaviour of diverse firms, for example, software companies and advertising agencies, in one common conceptual framework. The problem of heterogeneity could be, to some extent, circumvented by performing industry-specific studies. Such an approach fails to provide insights on issues that extend across industry boundaries. Erramilli and Rao (1990) proposed all service firms could be classified into:

- I *soft-service firms* with services for which it is extremely difficult or even impossible to decouple production and consumption (such as car rentals, restaurants, and healthcare) or

- I *hard-service firms* with services for which it is eminently feasible to separate production and consumption (such as architectural firms, engineering designers, consultants and software firms).

Such a classification begins to provide insights into the variation of entry mode choice. Soft-service firms cannot export (since exporting necessarily requires a separation of producer and consumer) and have to rely on contractual methods (licensing or franchising) or foreign direct investment (joint ventures or wholly owned subsidiaries) to affect foreign market entry. On the other hand, hard service firms can and often do export. The relationship to project clients is necessary however can be decoupled and it is the ways in which this is done in order to still maintain close designer-client relationships that is worthy of attention. Contractors would be classified as soft-service firms.

In attempting to understand the variation in entry mode choice among service firms, it pays to examine another phenomenon characteristic of the service sector. A large number of service firms enter foreign markets primarily to serve the foreign subsidiaries of their domestic clients (Terpstra and Yu, 1988). For example, Australian architectural firms designing high-rise office buildings could follow their financial institution clients to international markets. This phenomenon of *client following* while not unheard of in the manufacturing sector, is nevertheless a unique characteristic of service firms in terms of its occurrence and importance. In summary, there are two types of foreign market entry situations among service firms; *client following* (CF) and *market seeking* (MS). This second entry situation refers to the case where a service firm enters foreign markets primarily to serve foreign customers, i.e. customers in that particular overseas market. It basically encompasses all non-CF entries.

A firm can be expected to be more knowledgeable about its market when it goes abroad to serve its current domestic clients (CF entry), than when it enters a foreign market to serve foreign customers (MS entry). This means firms in MS entries can be expected to perceive relatively higher levels of uncertainty and risk. Therefore relative to firms in CF entries they would be more inclined to scale back their resource commitment and show a greater willingness to team up with external entities during foreign market entry. This explains why firms in CF entries could be expected to be more aggressive in their choice of entry modes when entering foreign markets.

It is useful to conceptualise firms as seeking entry modes that allow them to exercise maximum possible control over their foreign operations. Entry modes differ in the amount of control they provide the firm (Erramilli and Rao, 1990; Root, 1987). Typically the amount of control increases as a firm's resource commitment and hence level of involvement increase. This means firms preferring to maintain control over their foreign operations may have to choose entry modes with high involvement levels. When faced with 'unacceptable' levels of uncertainty and risk (Mascarenhas, 1982) decision-makers try to reduce their involvement by cutting back on the amount of resources and/or by teaming up with outside agents, distributors, and partners, especially in the host market. AEC firms are not well regarded as having high levels of in house financial resourcing and are typically risk averse; in particular architectural firms have typically quite low profitability. Consistent with the above arguments were the actions of Peddle Thorp architects (Centre for Corporate Change, 1995) now known as Peddle Thorp and Walker. This firm demonstrated a general conservatism in entering foreign markets through client following practices into foreign markets in the 1970's. Further underscoring this conservative approach was the development of a representative office in Jakarta in the early 1980's. Thus, the approach has been one of client following, in the form of firstly exporting skills, and then opening of representative offices demonstrating a low level of involvement with a high level of control.

Research to date on the Australian architecture profession has been by the profession, namely the Royal Australian Institute of Architects (RAIA) rather than academia. The RAIA study in 1998 involved 1,893 responses to a questionnaire, and a series of 22 case study interviews. The study indicates that about 23% of Australian architects have made efforts to export their services from the mid to late 1980's onwards.

According to the RAIA (1998) an architectural firms' decision to export services includes both proactive (looking to grow, national boundaries – market seeking) and reactive (asked to by

client / consortium – client following) approaches and is distributed in percentage terms rather evenly.

The following were identified by the RAIA (1998) as key operating methods in overseas markets:

- I local participation / partnership (long / short term)
- I agents (local agents / Australian consultants)
- I consortia and turnkey contracts
- I joint ventures (mixed experiences – may not work due to dissimilar business interests)

A majority of these exporting firms have established overseas registered offices (usually formed after an initial project in export destination) as most firms agree that it is preferable to obtain a high level of control if a firm is keen on sustaining future opportunities. Whilst affiliations are seen to be of lower risk, they are deemed unsuitable for long-term business as 'they do not show commitment to the country and may cause payment issues'.

Traditionally services have been considered a locally produced solution and service firms have been considered local establishments. In recent times however services have become more internationalised and the growth in the export of services is expanding. Irrespective of this, in spite of the improved trade conditions and enabling IT the growth has been relatively slow. Many barriers are identified in a general sense and key obstacles include: prohibitive costs, lack of awareness, lack of overseas networks, lack of resources, difficulty in compliance with overseas regulatory requirements, too little knowledge about exporting and a belief that linguistic and lack of understanding of cultural differences. .

While a number of barriers were identified factors perceived important to successful export of construction design services were also determined (RAIA, 1998), as illustrated in Table 4.

Table 1 Factors contributing to exporting success (Source: A Guide to Export Markets for Architectural Services, 1998)

Factor	Exporting architects (%)
Establishing overseas networks / contacts	76.6
Understanding cultural / regional differences	45.1
Awareness of export market opportunities	38.3
Financial assistance	26.8
Obtaining export information / advice	19.2
Complying with overseas regulatory requirements	16.0
Other	12.3

The RAIA study was an important contribution to our understanding of barriers and success factors in the internationalisation process of Australian architectural design firms. However, as with all surveys it provides surface level understanding of the issues across a large number of cases. The survey does not provide an in-depth examination of the experiences that firms and their staff have on projects nor offer any insights into the complexities that need to be overcome in relation to the specific barriers that have been identified.

In a more in depth study on the internationalisation of Danish architectural firms Skaates et al (2002) saw national construction industries as milieus or groups characterised by geographical areas which had a network of actors with a set of 'rules and norms regulating the interactions between these actors' (Cova and Ghauri, 1996). Skaates et al (2002) defined this as social capital and that it is critical for success as it was recognition by other actors within the construction industry that the firm is a member of 'their inner circle due to one's dispositions...or one's way of working and 'tacit knowledge'.

METHODOLOGY

The research is **exploratory** and **inductive** research because although there have been numerous international business empirical studies there have been few studies that explore those firms in the construction industry who are involved in a design process. There is also little theory related specifically to design management and internationalisation and this study aims to investigate **in- depth the phenomenon of design firm internationalisation** and seeks to **describe** and **explain** how successful design firms internationalise and create sustainable business models. The empirical work in the specific area of design firm internationalisation has implicitly indicated that social, cultural and intellectual capital are all important factors related to successful market entry and long term sustainability; however it has not been investigated to the extent where it can **explicitly provide rich descriptions** of such situations. The purpose of the study is to investigate **selective examples** of the phenomenon where the firms have been successful in entering and achieving some measure of sustainability in international markets; it is suspected that there are only a limited number of examples that reflect this and will be able to provide descriptions of the phenomenon and explain “how” and “why” firms achieve long term sustainability

Consequently, the case study methodology was considered an appropriate choice for this research because it is generally acknowledged that case study research:

- I is focused on studying a setting or phenomenon embedded in its real-life context and it encourages in-depth investigation;
- I investigates a research problem which is based on interpretation; ‘how’ and ‘why’ questions (Yin, 1994).
- I Allows for the selection of cases which are exemplars of the phenomenon which is under exploration

Data collection and analysis

This section describes the actual processes undertaken in this research study. The major constructs that were explored in relation to the internationalisation process of Australian AEC design related firms are:

- organisational goals
- market entry strategies and selection
- factors affecting entry strategies

The single most important source of data for this research was in-depth, personal interviews with Senior Managers. Interviews will be conducted for approximately 60-90 minutes with 1-2 managers per firm. The results presented in this paper are partial results of a larger. There were 3 case study firms; an SME architectural firm, an SME design and construct contractor and a large architectural firm and only case 1 and 2 are presented in this paper. Coupled with this in each firm 4-6 Design Team staff were also interviewed in each firm and constructs related to design management were canvassed across all research participants. The Senior Managers have the greatest knowledge on internationalisation process constructs and so this paper only reports the results from these interviews.

An interview instrument was developed. All interviews were taped and transcribed by the research team. After descriptions of the case studies a thematic analysis of each construct was conducted followed by a cross case comparison.

Interview Questions	Concepts
T1. Is internationalisation part of the organisation's objectives? – Why internationalise?	Firm type: Client following (CF) / Market seeking (MS)
T2. Can you tell me which countries you work in and how you came to work in these countries? Has this changed since you began working internationally?	Entry mode
T2. How do you decide on which market to approach? How do you approach new markets? What is the	Entry mode, Market selection, CF/MS, firm philosophy

relationship between your image and target markets?	
T3. Is your organisation a member of any international/exporting networks? How do you gain a new client contact?	Social capital
T3. What do you think has worked well in the past? What do you think are the best ways to approach new markets?	Successful strategies
T3. Why do you think you don't do as well in some markets as others?	Inhibitors to success, factors affecting performance

Table 2 Senior Managers Trigger Interview Questions in relation to concepts within the Construct: Internationalisation

CASE FIRMS INTERNATIONAL MODELS

The results are presented in two parts; first an overview of each firm and the general description of their international business model followed by a discussion on the themes identified in relation to the internationalisation process.

Case 1

Case study 1 involved conducting four interviews with Senior Staff. It is an architectural firm with approximately 75 staff. It has one office located in an Australian capital city and has been exporting primarily to China over the last 10 years. It has 3 main divisions; urban design, landscape design and architectural design. Typically the firm operates internationally through third party relationships with another firm situated in Australia. Partners from this other Australian firm originate from the international market in which they carry out work and therefore increase the firm's capacity to win projects as well as achieve deeper local engagement. Likewise, this third party relies on the design firm to win projects locally as the following quote highlights:

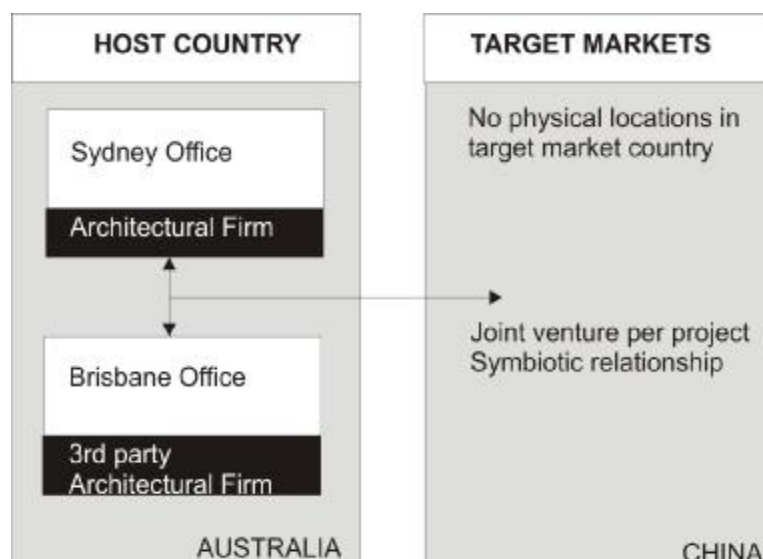
'They're kind of super proxies in a sense that they're not just our representatives but they're also using us in a parasitic relationship. They use us to get jobs and we use them to get jobs. So they not only trust us to work, I guess it's not just trust it's mutual obligation' (Senior Partner).

The firm operates within the client following typology, and as such readily identifies and acknowledges the importance of professional and social networks in facilitating sustainable business practice within international markets. For this particular design firm,

'Network is the only way we tend to do things...all of our work in China has been through relationships that we already have' (Senior Partner).

For a medium-sized firm, Client Following as a mode of engaging the market is recognised as providing significant benefits. These include financial advantages in terms of less investment of resources in marketing in order to attract clients, and an advantage in terms of accumulating social capital in the extension and consolidation of social networks.

Figure 1 -



ternationalisation organisational business model for achieving 'international reputation'

For this firm, the decision to enter a particular market is largely reactive, in response to opportunities derived through already existing social networks. Decisions to enter particular markets are primarily based around 'market forces' and individual projects are considered on their merits. Potential gains and benefits to the firm are considered alongside requirements in terms of time, capital and resource investment, *'to ensure the risk profile matches what people can live with and that the resources do exist to support the project'* (Senior Partner). The firm's status as international is recognised as presenting an added dimension to projects in terms of both increased levels of risk and differentiated types of risks, and also potentially greater benefits. The desire to minimise these risks explains to a large extent the firm's organisational structure as Client Following and its dependency on social networks.

The firm's primary mode of entry into international markets has been joint ventures, where this involves a dynamic and shifting relationship between the Australian based design firm and a local partner on the ground in the international market. The firm recognises the need for a 'deep local engagement' with the market that incorporates the contexts of the site locality, the local culture and its values, and the corporate business culture of the foreign market or region. These joint ventures are dynamic in the sense of being reflexively structured according to the needs of the project, with the workload shifting from one partner to another as projects near completion. This type of joint venture is seen as presenting certain positive financial and practical outcomes in overcoming previously mentioned difficulties in gaining a 'deep local engagement' by structuring a relationship with a local partner that seeks to address the issues of geographic and cultural distance from the market and project site.

For this firm, difficulties surrounding cross cultural communication are also partly addressed through organisational dependency on joint ventures but through a consistent third party. This third party is used specifically for their niche expertise and skills related to cultural understanding and a bi-lingual capacity – and therefore provide another means to acquire the 'deep local engagement' understood as necessary for international projects.

The dependency of this firm on joint ventures as a mode of entry facilitates solutions to some of the problems posed by internationalisation. It utilises and consolidates the social networks the firm relies on to acquire business. It addresses issues arising from geographical and cultural distance from project sites by having local engagement, and also difficulties surrounding cross cultural communication. Alongside these solutions however, as an organisational structure, it allows the firm other advantages related to the maintenance of an image and reputation as an international firm.

The most significant finding related to the firm's strategic and organisational approach to internationalisation was centred on recognising the desire by specific Chinese clients for *international* design firms, and the need to construct and present an image capable of taking advantage of that desire within the market. Internationality becomes a marker of status and quality, and also provides a level of product differentiation through the introduction to the market of external influences and design styles and techniques that are instrumental in providing an advantage in design competition. At the same time the market is becoming more discerning towards the quality of international firms – therefore competition between international architectural firms increases. As the firm relies primarily on social networks rather than marketing strategies for attracting clients, for this firm in particular, reputation becomes increasingly important.

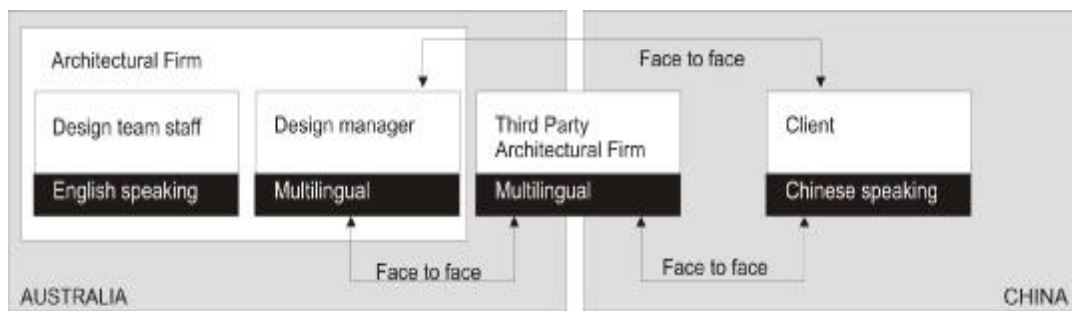


Figure 2 - Firm 1 Project organisational structure: operating from one single office in Australia

The organisation of the firm as international – operating through joint ventures with local partners and third parties rather than a local office - is crucial in developing the required reputation as international. In the absence of marketing campaigns, it is the actual experience of clients in dealing with the firm which is then passed on through the social networks and becomes the basis for recommendations and referrals central to the client following mode. In this sense, barriers presented by cross cultural communication and geographic distance between clients and designers can become positives, in that they are the experiential evidence for the client that they are indeed engaged with a firm that is International. These elements that demonstrate the internationality of a design firm to a client cannot therefore be eliminated from the process, they are essential to the firm's ability to represent itself as international, and therefore directly related to its reputation circling through social networks of potential clients. Accordingly it is centrally important the issues involved with cross cultural communication be efficiently managed. At the end of the day they impact upon the financial operations of the firm, and hence its capacity for sustainable business in international contexts.

Case 2

Case study 2 involved three interviews with senior staff. Described as a turn-key operation, the firm in case 2 is a design and construction based enterprise premised on delivering design solutions and products that take a project from start to finish. This aspect of case 2 is a significant point of difference from the other two architectural design orientated enterprises and affects many of the processes and practices through which this firm internationalises. The firm specialises in steel-based design and construction for primarily industrial projects but has also successfully completed design and construction work in civil, commercial and occasionally residential projects. This firm operates out of an Australian capital city and has three regional offices located in China – two in major capital cities, and one office in central China. This firm has been carrying out international work primarily in China for the past 30 years. Despite this market being its primary focus, the firm exports to many other international markets including Asia (India, Sri Lanka, Vietnam), Eastern Europe (Russia, Yugoslavia) some South American markets (Uruguay) and some South Pacific markets (Papua New Guinea). Typically the firm operates as a design-construct contractor for joint ventures between an international and local client.

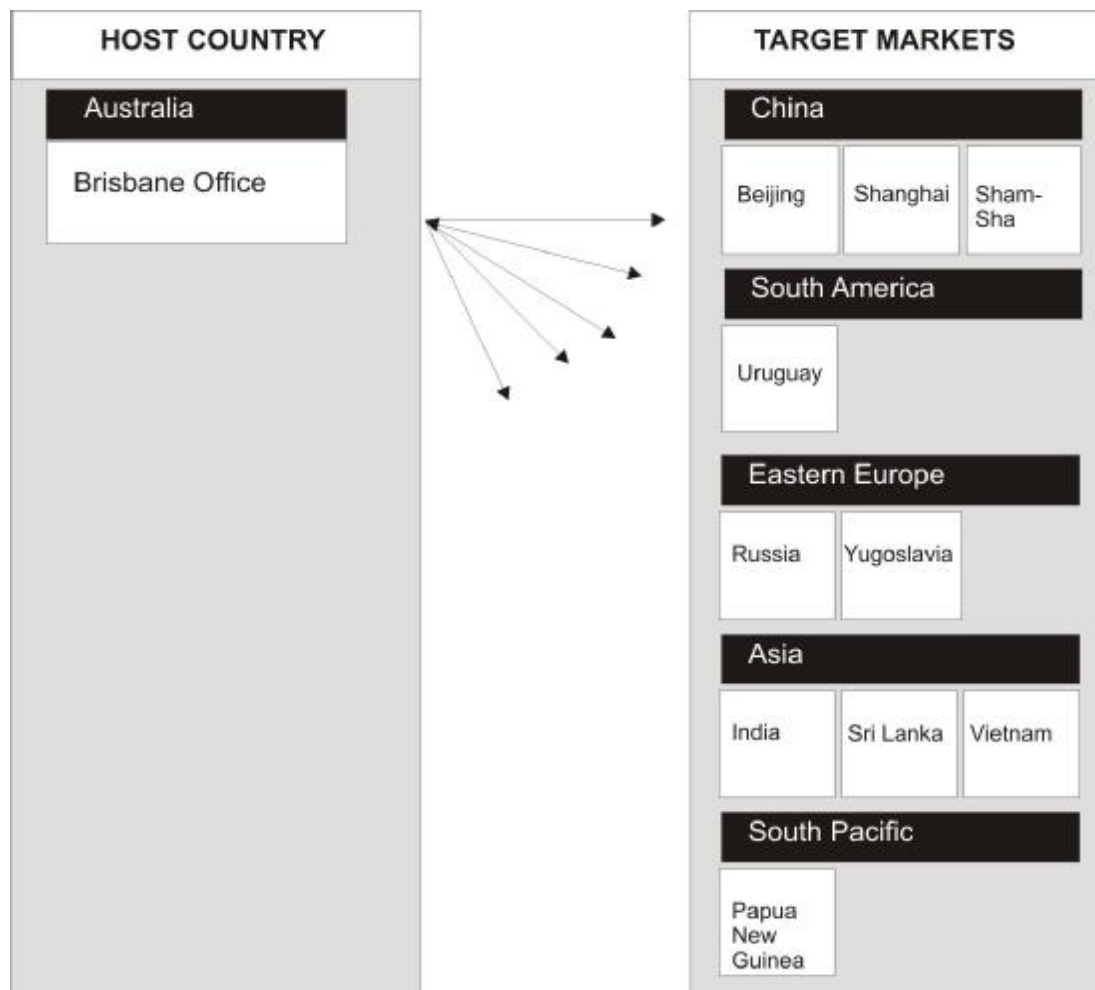


Figure 3 - Firm 2s Internationalisation organisational business model for achieving 'product differentiation'

This firm typically operates within a client following typology and recognises the importance of developing social networks and maximising social capital within this process. For this firm the inter relationship of developing national connections to developing networks in international contexts has been important to their internationalisation process. Significantly affecting market selection and market entry for the firm has been the influence of 'expatriates that move from country to country' (Senior Partner), as the basis for an international social network founded in shared national and business cultures. On more than one occasion these contacts provided points of entry to the major international markets of Hong Kong-China and Russia. Entry into other international markets was consistent with the client following entry mode and typology, where design was conducted in Australia and the required staff and resources were exported to fulfil the requirements of the project. A large percentage of these projects were the result of repeat clients and referrals, and therefore the firm's experiences of internationalisation were fairly straightforward. However entering the China market was not so easy.

'In other countries we didn't have any other pressures there other than we got the job, we sent people from here to erect it and build it' (Senior Partner).

This firm recognises the potential need to enter an international market in the absence of an established social or professional network to take advantage of the specific situation in that market at the time. Being prepared to make a minimal profit or loss initially before experiencing financial returns on the investment of capital and resources is perceived as a necessary capacity, particularly in relation to the firm's primary market of China. Rather than

reflecting a market seeking ideology, this in fact relates to the vital strategic importance of social networks in China for facilitating professional and business contacts.

'It takes a long time to get into China and to make money...We probably didn't make any money for about four years, didn't lose a lot of money either but we didn't make any. Because you've got to establish contacts, you've got to establish a sort of network' (Senior Partner).

Establishing networks was therefore related to the desire for a permanent presence in China established through the local offices, in order to take full advantage of China's rapidly developing status as a market, and also to maximise the firm's advantage in product differentiation as a steel-based construction outfit.

The firm attributes much of its success to leveraging the intellectual and cultural advantages of Australian business culture and practice compared to many international markets. This is particularly the case when those markets are newly opened and/or developing. In particular in relation to China this resulted in product and process differentiation that provided a marketable variation from local construction enterprises. The capacity of the firm to do both design and construction provides greater control over the process of project development, design and construction, and minimises many communication difficulties associated with internationalisation by reducing the amount of information needing to be passed between entities in order to complete the project. This advantage was combined with the product differentiation of being steel-based construction in a market used to concrete-based. The completion of projects once the market had been entered in turn provided cultural capital and market recognition which attracted more clients and ultimately the creation of the necessary client networks.

'[We do] quicker and bigger spans and bigger base, and when we put one up in three months whereas the bloke next door doing concrete took 12 months, that in itself generated work for us' (Senior Partner)

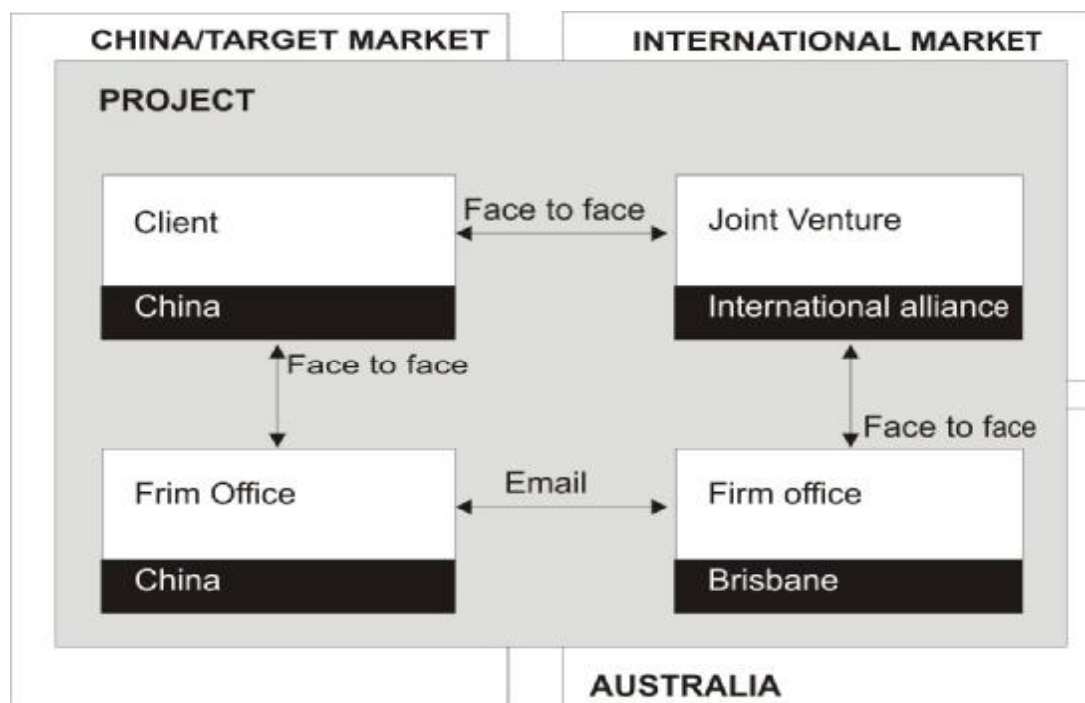


Figure 4- Firm 2 Project Organisational Structure: operating as 'one' local office

The majority of international projects undertaken by the firm in case 2 are minority joint ventures – the firm operates as a design or construction contractor for a joint venture

composed of 'somebody in Europe or here and a Chinese company who want to build a facility' (Senior Partner). The underlying strategy behind the preference for this entry mode strategy and particular level of involvement is to simultaneously develop the professional and client networks and also manage some of the risks associated with international markets such as minimising the risk of not getting paid. Likewise the selection of projects is aimed at medium to smaller scale projects that are less risky and potentially consumptive of resources and time in red tape and regulation,

'[Our] philosophy all the way through we've never gone for the big prestige jobs...its always been the smaller jobs but there's some money in it'. (Senior Partner).

'You're generally on a fairly tight sort of programme, and you've got to make sure that you meet that programme otherwise unless you perform on time and with good quality you just don't last, it doesn't matter where you are.' (Senior Partner).

The smaller scale of project means they are finished more rapidly and therefore more frequently. While the other case study firm focused on high-end 'prestige jobs', case 2 has developed its international reputation based on delivering quality in a quicker time frame.

INTERNATIONALISATION PROCESS

The following discussion describes and compares the various themes/concept indicators within the construct of Internationalisation process in relation to the experiences of the two firms analysed. The significant characteristics of each firm will be discussed to illuminate the key point of difference between the two firms. Table 3 summarises and provides detail on key quotes that illustrated each subtheme identified from the case studies within the following themes ; purpose for internationalisation; firm type; market image and design philosophy; entry mode strategy and factors affecting mode of entry.

Purpose for internationalisation

The primary reasons for firms in both cases working in international markets were associated with the firms' motivations related to growth and enhancement of financial viability. Both firms also acknowledged opportunities presented by working on international projects as having a higher level of diversity and complexity, which also tended to be of a significantly larger scale than the projects in their own country. The value in such work was the opportunity to develop conceptual skills of a nature not readily available in domestic projects, which was particularly valuable to design team staff in both firms. The critical element was the excitement and challenge to extend the design thinking within the firm that was presented by the experience of working on international projects.

Firm type, Entry mode strategies and Image

Both firms operate within the Client Following typology. Being smaller firms the client following mode is less risky than the market seeking mode. These firms are comparatively small in size and with less resources than large firms. Client Following as a mode of internationalising was seen to provide significant benefits in terms of minimising financial risks. As such, these two firms were highly dependent on social networks and joint ventures to gain entry into markets. For firm 1, the primary mode of entry was the utilisation of third party relationships with another Australian design firm to form a larger joint venture with local partners in the international market. This choice of entry was determined by the firms medium sized scale and therefore joint ventures as the primary mode of entry provided the firm not only an increased ability to win projects and minimise financial risks, it also provided solutions to issues of geographic and cultural distance.

For firm 2, minority joint venture was the primary mode of entry whereby design work was largely conducted in Australia and the required staff and resources were exported to fulfil other requirements of the project. A large percentage of these projects were the result of repeat clients and referrals. Establishing networks was therefore related to the desire for a permanent presence in China conducted through the local offices, in order to take full advantage of China's rapidly developing status as a market.

Perhaps the most significant point of difference between all both firms was the market image or design philosophy that the firms portrayed as their key organisational strategy. Whilst both

firms operate within the client following typology, the organisational approaches undertaken by the firms somewhat differed. Firm 1's strategic and organisational approach to internationalisation centred on the maintenance of an image and reputation as an international firm, hence the conscious decision not to set up any local offices in any international market. For firm 2, its market image related to an emphasis on product and process differentiation as a steel-based construction outfit that provided a marketable variation from local construction enterprises.

The differences in organisational approaches thus affected upon the individual firms strategies in terms of market and project type selection. Both firms' market selection revolved around the sales potential of specific markets both indicating that internationalising into developing markets were preferred as it was seen to provide potential opportunities for being involved in larger scale projects. For firm 1, market selection was also guided by the market's cultural and conceptual continuity in that much emphasis was placed on 'the way people do business in the other country' or the business culture. While firm 1 aimed at highend prestige jobs, firm 2's choice of projects were largely determined by its desire to repute the firm as one based on delivering quality in a quicker time frame and therefore preferred smaller scale projects that were less risky that were consumptive of resources and time.

THEMES	FIRM 1	FIRM 2
Purpose	Growth & Diversification '*** as a company, I think it would be motivated by diversification of urban design projects and the ability to engage in more significant projects than there would be otherwise'.	Growth & Diversification 'I like to do it over there because over there we build larger buildings you never design here and more'
Firm Type	Client Following 'Network is the only way we tend to do things. The fact that it grows is because the network grows as you're working up there and it's been quite an interesting experience'	Client Following 'Its all context you know, you meet a lot of expatriates that move from country to country...one of those guys got us started in Hong Kong...another guy I knew, a Polish guy, he had some contacts in Russia and we got into Russia through him'
Market Image & Design Philosophy	Design competitions International reputation 'Most of these projects are won through design competitions. Its interesting that even the American firms that have offices in China, although they've got the American name, the graphics, the look, even the ideas are all very similar. Then there's this one that stands out, which is the Australian one and it looks all quite different because the influences are different. It's a different slant on the way that you're approaching the project. That is the reason we're winning because they see it as different. If we had our office up there I think the people start to become localised and blend in'	Product differentiation 'You've got to sell know how. You've got to say to people it doesn't matter what market you're on that our product is better than anybody else's. Its quicker to put up, saves you time, it gets you in a factory quicker and you can generate cash flow quicker and I think that's fairly standard, it doesn't matter where you go right.

THEMES	FIRM 1	FIRM 2
Entry Mode Strategy	Joint Ventures 'In most of these projects we'll usually have a third party that helps with that so it's like a smaller entity and we have a particular person who's out of Brisbane that we use a lot and we actually form like a joint venture so that then forms the bigger joint venture with the local area'	Minority Joint Venture 'Most of them are joint ventures, that's our market. The joint venture is between somebody in Europe or here and the Chinese company who wants to build a facility. So we build a facility for them' Local offices (single market) 'We've got an office in Shanghai and one in Beijing now and one in Shamsa which is sort of in the middle of the central part of China. But at the moment all the extra efforts are all in China, we get into New Guinea and the Solomon Islands we do a little bit but the majority's China'
Factors Affecting mode of entry	Size & Resources 'We see that we actually control things and do a better job by being a smaller outfit out of one place so that's a decision we've made deliberately is to actually bring everything back to one headquarters if you like and work from there' Geographic & cultural distance 'It is necessary to have local participants to act on your behalf and certainly it's more practical and financially rewarding if they actually do a lot of the local framework. The reason we do that is that this particular group originated from China themselves and came here and worked for many years in Australia. They understand the culture of the Australians and they understand the culture of their home country' Mutual obligation to form trust 'They're kind of super proxies in a sense that they're not just our representatives but they're also using us in a parasitic relationship. They use us to get jobs and we use them to get jobs. So they not only trust us to work, I guess it's not just trust it's mutual obligation'	Size & Resources Minimising Financial risk 'We're fairly selective on what we do now. We don't work for straight Chinese companies, we do mainly work for joint ventures and that way at least you're fairly certain you're going to get paid'

THEMES	FIRM 1	FIRM 2
Market Selection	Sales Potential Developing markets Conceptual & Cultural Continuity 'It is very much derived by market forces...so the way we look at whether we go into a particular market is first of all what do we personally get out of it, the issues of protecting the company is very, very important. What we would look at is based on experience of the culture and how people do business'	Sales Potential & Openness of markets 'Because here you're probably struggling with client that's going to give you to design five hundred square metres building. Over there five thousand is nothing, huge buildings' Developing markets '*** has grown from very small beginnings to a group of turnover of *** million a year of which is now at the moment is probably *** million of China as a turnover. We've done a lot of work in Russia, done a lot of work in Sri Lanka, Laos, Vietnam, Uruguay, India, bits on a couple of jobs in Yugoslavia'
Firm strategy in relation to project selection	Large scale projects 'The fantastic thing about doing some of these projects is that they're such a large scale of work and you very rarely get that size work here and involved in that large scale of work is you know thinking sort of in a different manner and thinking of really broad scale design principles and that's fantastic'	Small scale 'We've never gone for big prestige jobs; we've always gone for some big jobs but not the Eiffel Tower or something. Its always been the smaller jobs but there's some money in it' Fast turnover 'You've generally on a fairly tight programme and you've got to make sure that you meet that programme. Unless you perform on time and with good quality you just don't last, it doesn't matter where you are. I mean that's one thing we do up there, we do it on time, we do it on good quality and we don't do advertising in China but people are coming to us', and purpose and project scoping aligned to deliverables.

Table 3 Cross comparison of Internationalisation process between case study firms

CONCLUSION

Purpose for internationalisation

The primary reasons for both cases working in international markets were associated with the firms' motivations related to growth and enhancement of financial viability. For senior partners, international markets, particularly growing and developing markets, present an opportunity for growth and these opportunities affected business decisions concerning market selection and entry. Both firms also acknowledged opportunities presented by working on international projects as having a higher level of diversity and complexity, which also tended to be of a significantly larger scale than the projects in their own country. The value in such work was the opportunity to develop conceptual skills of a nature not readily available in domestic projects, which was particularly valuable to design team staff in all three firms. The critical element was the excitement and challenge to extend the design thinking within the firm that was presented by the experience of working on international projects. This opportunity was not readily available in domestic or smaller scaled projects.

Firm type, Entry mode strategies and Image

The firms operate within the Client Following typology because they are SMEs with less resources and this strategy minimises financial risks. As such, these two firms were highly dependent on social networks and joint ventures to gain entry into markets. For firm 1, the primary mode of entry was the utilisation of third party relationships with another Australian

design firm to form a larger joint venture with local partners in the international market. This choice of entry was determined by the firm's medium sized scale and therefore joint ventures as the primary mode of entry provided the firm not only an increased ability to win projects and minimise financial risks, it also provided solutions to issues of geographic and cultural distance.

For firm 2, minority joint venture was the primary mode of entry whereby design work was largely conducted in Australia and the required staff and resources were exported to fulfil other requirements of the project. A large percentage of these projects were the result of repeat clients and referrals. Establishing networks was therefore related to the desire for a permanent presence in China conducted through the local offices, in order to take full advantage of China's rapidly developing status as a market.

Perhaps the most significant point of difference between the firms was the market image or design philosophy that the firms portrayed as their key organisational strategy. Whilst both firms operate within the client following typology, the organisational approaches undertaken by the firms differed. Firm 1's strategic and organisational approach to internationalisation centred on the maintenance of an image and reputation as an *international* firm, hence the conscious decision not to set up any local offices in any international market. For firm 2, its market image related to an emphasis on product and process differentiation as a steel-based construction outfit that provided a marketable variation from local construction enterprises.

The differences in organisational approaches thus affected the individual firms' strategies in terms of market and project type selection. Both firms' market selection revolved around the sales potential of specific markets whereby internationalising into developing markets were preferred as it was seen to provide potential opportunities for being involved in larger scale projects. For firm 1, market selection was also guided by the market's cultural and conceptual continuity in that much emphasis was placed on '*the way people do business in the other country*' or the business culture. While firm 1 aimed at high end prestige jobs, firm 2's choice of projects were largely determined by its desire to repute the firm as one based on delivering quality in a quicker time frame and therefore preferred smaller scale projects that were less risky that were consumptive of resources and time.

The results of this study have implications for our understanding of the importance of the client following typology for the entry mode and internationalisation process. The organisational modes to support these key strategies were varied but a common underlying theme was the need to adapt to suit local geographical contexts including specific business cultures as well as the development of a culture to support operating practice and firm design philosophy. However some assumptions are challenged. It is not such a simple matter of replicating the host country client's cultural context – what appears to be important is that the international firms need to maintain a clear international identity [however that may be defined] because that is one of the key competitive advantages which the client's are seeking. The role of social, cultural and intellectual capital in relation to the internationalisation process and internationalisation knowledge management of experiential and market information knowledge has been critical to the success of these firms and this is worthy of further studies.

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**KNOWLEDGE SHARING IN HONG KONG CONSTRUCTION JOINT VENTURES –
EXPLORATORY STUDY OF CRITICAL SUCCESS FACTORS**

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ABSTRACT

Knowledge sharing is an important element in the knowledge manipulation process of construction joint ventures (CJV). This is because the knowledge contributed to CJV by partners needs to be jointly interpreted and leveraged in order to be applicable in new projects and to create new insights. This paper explores the critical success factors of knowledge sharing within CJV infrastructure projects in Hong Kong. More specifically, it focuses on the knowledge sharing between individuals of the management board of CJV as they represent different partners with specific knowledge. The critical factors affecting knowledge sharing will be analyzed at the individual level as well as the organizational level. This research is an exploratory study of the critical factors, and the suggested model will be tested in future by questionnaire survey.

Keywords: Knowledge sharing; Construction; Joint Ventures; Infrastructure projects; Hong Kong

1. INTRODUCTION

Construction joint venture (CJV) is a jointly owned entity formed by firms to achieve common objectives by utilizing complementary resources and competencies. It is a popular alliance form adopted by organizations to undertake infrastructure projects in Hong Kong. Infrastructure projects in Hong Kong usually require huge amount of resources, skills, knowledge and capabilities that one single organization usually is not able to provide (Walker & Johannes, 2003b). Moreover, construction companies adopt joint ventures in large-scale construction infrastructure projects can offer a customer focused service package, bridge knowledge and expertise gap, share risk and explore opportunities to add value to the joint venture (JV) organizations through collaboration (Walker & Johannes, 2003a).

Knowledge is recognized by many authors as an important asset to increase organizations' competitive advantage and new knowledge also provides the capacity for organizational renewal (Inkpen, 1998). JVs create opportunities for partners to access and share each other's complementary knowledge and the new knowledge acquired can be incorporated into their own systems. Effective knowledge sharing is an important element in the knowledge manipulation process in CJV. Factors affecting the effectiveness of knowledge sharing include personal relationships, trust, organizational culture, etc. Though many studies have been conducted on knowledge sharing and organizational learning issues in JV business, few researches focus on the context of construction joint ventures, especially project-based horizontal JVs between contractors in the supply chain. This research will bridge this gap by providing an insight into the critical success factors of knowledge sharing within CJV infrastructure projects in Hong Kong. More specifically, this paper will study the knowledge sharing between individuals of the management board of CJV as they represent different partners with specific knowledge. When this group of people enters into CJV, they are in the core of the CJV organization. Thus, the critical success factors for knowledge sharing in CJV will be analyzed at the individual level as well as the organizational level.

2. CONCEPTUAL FRAMEWORK

2.1 Knowledge

A large number of definitions are found in modern KM literatures, yet no one would declare that it is absolute precise. This is because researchers define knowledge from different perspectives. One perspective regards knowledge as important and valuable commodity for an organization and knowledge can be manipulated internally (e.g. create within organization) or

externally (e.g. buy from outside) in commercial marketplace (Baskerville & Dulipovici, 2006). Another perspective regards knowledge as a set of shared beliefs which are constructed through social interactions and embedded within the social contexts where knowledge is created (Fong, 2003). These two perspectives are opposite in implication as one implies that knowledge is context-independent while another implies knowledge is context-dependent. Besides, Alavi and Leidner (2001) summarize previous study and point out that knowledge can also be regarded as a state of mind, a process, access to information, or capability. In this research, Nonaka & Takeuchi's (1995) definition of knowledge is adopted: knowledge is regarded as *dynamic human process of justifying personal belief toward the truth*. This definition stresses the relationship between knowledge and human action. "Dynamic human process" indicates that people apply what they know and gain continual knowing in practice.

Regarding the classification of knowledge, the most well-known one is explicit-tacit classification (Nonaka & Takeuchi, 1995). Explicit knowledge is defined as those can be *"expressed in words and numbers, and easily communicated and shared in the form of data, scientific formulae, codified procedures, or universal principles"* (Nonaka & Takeuchi, 1995). On the contrary, tacit knowledge is *"highly personal and hard to formulize"* (Nonaka & Takeuchi, 1995). It is difficult to communicate or share tacit knowledge with others. Tacit knowledge is rooted in an individual's action, experience and ideals, e.g. subjective insights, intuitions, and hunches, thus it is quite context embedded. Walker and Johannes (2003b) use this knowledge classification to identify four knowledge assets may be sought by partners in JVs: experiential knowledge assets, conceptual knowledge assets, routine knowledge assets and systemic knowledge assets as shown in figure 1.

Another important concept is organizational knowledge. A company's stock of knowledge broadly ranges from technological knowledge to knowledge about functioning in global markets, working with local laws, protecting intellectual property and operating successfully in various forms of partnerships (Berdrow & Lane, 2003). However, organization can not create knowledge itself and organization knowledge is created in the process where the individual knowledge is amplified and internalized as part of an organization's knowledge base (Inkpen & Dinur, 1998). This process is also applicable in the knowledge flow in joint ventures which will be discussed in detail later. When organizations adopt JV as a tool to acquire external knowledge, they send employees to collaborate with employees from partner companies in JV. The knowledge acquired and learned by employees can then be transformed and internalized in the parent companies.

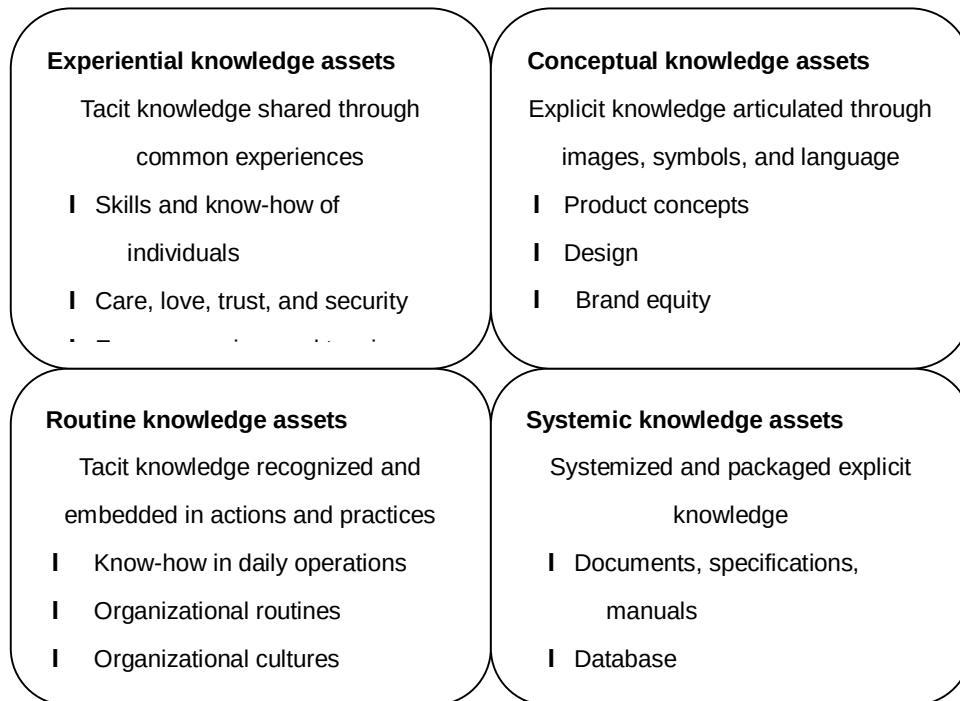


Figure 1 knowledge assets. Adapted from Walker and Johannes (2003b, p. 109)

2.2 Construction Joint Venture

Joint venture is one type of organizational arrangements of strategic alliance (Inkpen, 1998; Ozorhon et al., 2008). Joint venture can be considered as commercial agreement between organizations with the purpose of easing works and achieving common goals through manipulating appropriate resources (Norwood & Mansfield, 1999). It is sometimes referred to a new, separate business entity which is created by cooperated companies in order to reach mutually compatible goals (Walker and Johannes, 2003b). In this study, joint venture is defined as a jointly owned organizational entity created by partnering firms to achieve common objectives by utilizing complementary resources and competencies.

In respect of the arrangement of management in CJV, there are dominant parent ventures, shared management ventures and independent ventures (Chung, 1993). The levels of involvement of parent companies in these three types of joint ventures are different. Shared management is called for when joint efforts are required to achieve the intended goals. In shared joint venture, frequent negotiation and agreement between partners happen at all levels and aspects of the management of the business. Besides, Chung (1993) mentions that the standard joint venture organization consists two components – the management board and the operation organization. The management board is the highest authority of the joint venture. It is related to how partners are represented in the board and what matters need to be referred

to the board for final decision. CJV in this study refers to the horizontal construction joint venture which is established by partners at the same level of the supply chain. More specifically, this study looks at on CJV set up by two or more contractors. This paper will focus on management board of shared management joint ventures where frequent negotiations occur between partners

2.3 Knowledge Sharing in Construction Joint Ventures

Knowledge sharing is defined as the process by which individuals mutually exchange their knowledge or ideals and collaboratively generate new knowledge (Magnini, 2008). In order to explain the knowledge manipulation process in CJV, Berdrow and Lane's (2003, p. 17) framework of knowledge flows within IJV network shown in figure 3 is employed in this study. Three interrelated paths of knowledge flow are defined in the IJV network. The first path is named *transfer* which means managing the flow of existing knowledge between parents and from the parents to the IJV (Berdrow and Lane, 2003). In construction joint venture, it is not a common practice that a parent company transfers knowledge/technology directly to another partner company. Instead the parent company transfers knowledge to the CJV first, and then the partner company learns the transferred knowledge in the CJV and later internalizes the knowledge learned into its own organization systems.

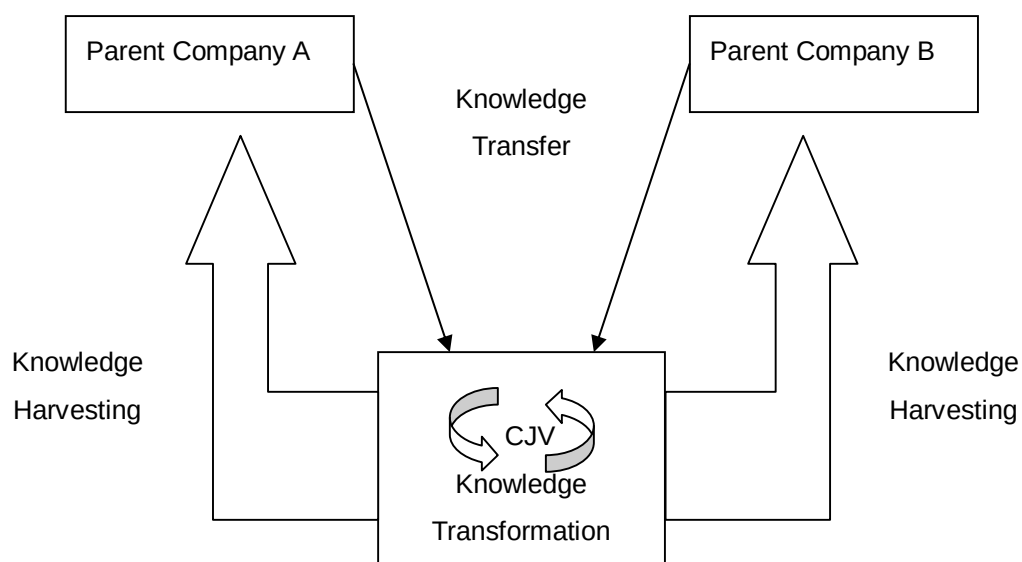


Figure 2 Knowledge sharing framework in CJV, adapted from Berdrow and Lane (2003, p. 17)

The second path of knowledge flow in a CJV is *transformation*. *Transformation* is defined as

the integration, application and leveraging of contributed knowledge and the creation of new knowledge as a result of the joint activities (Berdrow and Lane, 2003). Transformation may occur when individuals are placed in new circumstances or are faced with new challenges and new ideas, or existing knowledge is challenged by new contexts (Berdrow and Lane, 2003). Any insight or new knowledge created can be regarded as *transformation*.

The third path for the flow of knowledge in CJV is called *harvesting* and it involves the flow of knowledge from the IJV to the parent company where it can be applied to other internal activities (Berdrow and Lane, 2003).

Knowledge transformation is critical in the process of knowledge flow in CJV, as it leads to knowledge creation and innovation. However, it is obvious that an important antecedent of knowledge transformation is knowledge sharing. When knowledge is contributed to the CJV from separate parent companies, it should be integrated and adapted in order to be applicable in new projects. In order to create any new insight, knowledge should be jointly shared and interpreted by individuals in the CJV through knowledge sharing. Knowledge sharing is the trigger of knowledge transformation. In order to add more value to CJV, knowledge sharing should be promoted to enhance knowledge transformation. Thus, this paper aims to explore the critical factors that affect knowledge sharing in CJV. More specifically, the study focuses on the individual knowledge sharing activities between managers in CJV management board. The staff in the management board is from different parent companies and they need to jointly make decisions and solve problems in CJV by mutually sharing their own knowledge. As mentioned above, the CJV is mainly project-based in Hong Kong which indicates that CJV may be dissolved when the project is completed. Thus people in the management board may be transferred back to their parent company after the project is completed which facilitates the process of knowledge harvesting.

3. CRITICAL SUCCESS FACTORS OF KNOWLEDGE SHARING IN CJV

Effectiveness of knowledge sharing is affected by peoples' own characteristics. On the other hand, people's performance in knowledge sharing may be influenced by the CJV organization. Given that a company is learning cultivated, people may be active in knowledge sharing activities. Besides, as people in CJV management board come from different companies and represent different parent companies, the existing relationship between parent companies may also affect individuals' relationship. This study will analyze the factors affecting the effectiveness of knowledge sharing in the context of CJV management board from perspectives of: 1) Individual factors 2) Organizational factors and 3) Relationship between

parent companies as shown in figure 4. All the factors identified in the following section are identified from previous literatures. Those factors are frequently examined in researchers' studies and proved to have influence on knowledge sharing in different contexts. Author summarizes those frequently appeared factors and intent to test the validity in the context of CJV.

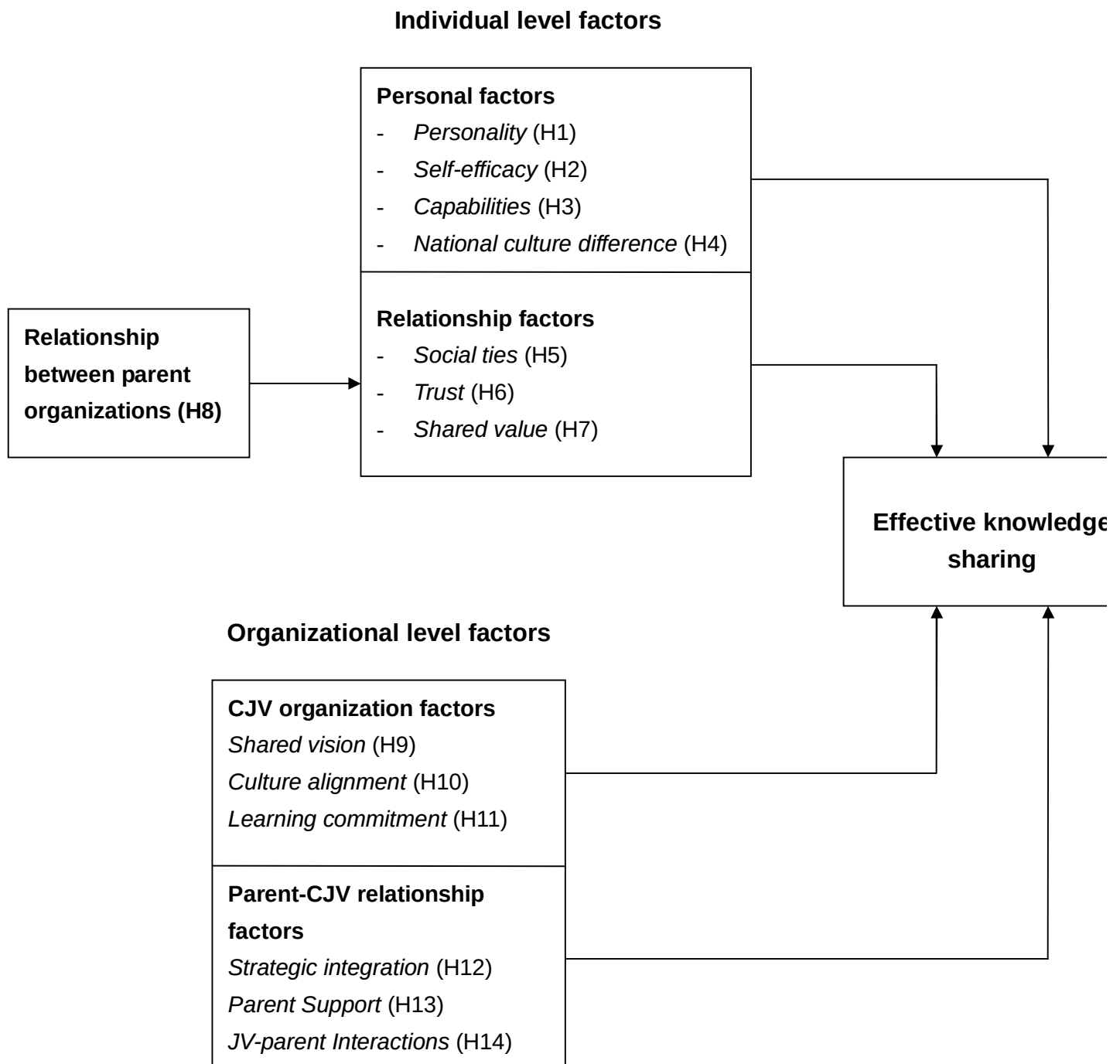


Figure 3 Proposed research model for this study

3.1 Individual Level Factors - Personal Factors

3.1.1 Personality

As people are the actors in the knowledge sharing process, their behaviors can be influenced by their personalities. Cabrera et al (2006) employ a five factor model of personality (FFM) to examine people's behavior in knowledge sharing and reported that three dimensions of the five personality taxonomies were related to knowledge sharing behavior: *agreeable*, *conscientiousness* and *openness to experience*. Agreeable individuals are perceived to be cooperative, cheerful and supportive by others, so they are expected to be more inclined to respond to requests for knowledge and even volunteer their ideas to others. Conscientious individuals are defined as reliable, dependable, achievement oriented and organized people. They are more related to volunteering and seeking other people's knowledge and they perceive these behaviors as an important part of their duties. Lastly, openness to experience is related to traits such as curiosity, artistic sensitivity and originality. Individuals with openness to experience could be a predictor of seeking other people's insights. These three personality dimensions will be adopted in this study to examine whether individual's personality will have any influence on the knowledge sharing behavior in CJV. So the first hypothesis is that:

Hypothesis 1: Personality of people in the CJV will have an impact on effective knowledge sharing.

3.1.2 Self-efficacy

The concept of self-efficacy is defined as the individuals' judgments regarding their capabilities to organize and execute courses of action required to achieve specific level of performance (Lin, 2007). Cabrera et al (2006) point out that many researches have illustrated that a person's intention to engage in a specific course of action is heavily influenced by the person's sense of self-efficacy. This phenomenon is explained by Lin (2007) who advocates that people's behavior is evoked by their need to feel competence and self-determination in dealing with their environment. Knowledge self-efficacy is usually manifested in people who believe that their knowledge can help to solve job-related problems and improve work efficacy (Luthans, 2002). So people with self-efficacy are supposed to be more willing to share their knowledge with others and find solutions when any problems occurred. Thus:

Hypothesis 2: Self-efficacy of people in the CJV will have impact on effective knowledge sharing.

3.1.3 Capabilities

People's ability to share knowledge depends on their communication skills. Effective communication, both verbal (the most common vehicle of sharing tacit knowledge), and written, is fundamental to effective knowledge sharing (Riege, 2005). Besides, Khamseh and Dominique (2008) point out that individuals' absorptive capability can affect knowledge sharing. This may be due to individuals' insufficient expertise and limited working experience that would weaken their understanding and digestion of knowledge. Furthermore, differences in educational level of individuals also can reduce the effectiveness of knowledge sharing (Riege, 2005). Thus:

Hypothesis 3: Capabilities of people in CJV will have an impact on effective knowledge sharing.

3.1.4 National Culture Distance

Many authors argued that national culture difference within JVs is a barrier for effective knowledge sharing (Dulaimi, 2007; Moller & Svahn, 2004). Partners forming CJV to undertake large infrastructure in Hong Kong are usually from diverse countries so that people working in the CJV may have diverse national culture background. National culture is the collective programming of the mind based on values which distinguishes the members of one human group from another (Ford & Chan, 2003). It has the shaping force to shape people's habits and styles and direct how to behave in certain situation (Moller & Svahn, 2004). National culture distance which is the resulting vector of culture-based factors (i.e. language, values, norms, or meaning) can impede the flow of knowledge between partners (Hau & Evangelista, 2007). This is because individual's values are influenced by their national culture and differences in values making it difficult for people to reach common agreements and to solve problems. People who come from different countries also have different mother tongues, and this may cause communication difficulties (Hennart & Zeng, 2002; Riege, 2005). According to Ford and Chan (2003), through bilingual individuals, a lot of knowledge was lost in translation or due to the inability to articulate the knowledge in a second language. Thus:

Hypothesis 4: National culture distance of people in CJV will have an impact on effective knowledge sharing.

3.2 Individual Level Factors – Relationship Factors

Dhanaraj et al (2004) use the term "relational embeddedness" to indicate the relationship

between foreign parent and IJV and characterized the relationship in elements of the *social ties, shared values and trust*. It is claimed that the relational embeddedness between foreign parent and the IJV managers can significantly influence the knowledge transfer from parent to the IJV (Dhanaraj et al., 2004). Actually, this relationship can also be applied to different kinds of actors. In the context of knowledge sharing in CJV, the relational embeddedness is applied to explain the relationship between individuals working in the CJV as well.

3.2.1 Social Ties

Social ties can be regarded as connections established by social interactions between individuals. According to Connelly and Kelloway (2003), people are more likely to ask each other questions and offer assistance through face-to-face interactions in an informal atmosphere such as tea time and coffee break. Even though people working together talk to each other in an informal way, the subject of their conversation will invariably return to their work to which they have most in common. Dyer and Singh (1998) further point out that extensive personal interactions can help to the transfer and share know-how knowledge which is more likely to result in sustainable advantage. Furthermore, when individual within CJV get to know each other well enough to know who knows what and where critical expertise reside in CJV (Dyer and Singh, 1998), the knowledge manipulation process will be quicker. When a problem occurs, it would be quicker to access the knowledge required. Thus:

Hypothesis 5: Social ties between people in CJV will have an impact on effective knowledge sharing.

3.2.2 Trust

The trust discussed here is interpersonal trust in the CJV. Interpersonal trust has been defined as people maintaining reciprocal faith in each other in terms of intention and behaviors (Lin, 2006). It is claimed that interpersonal trust inserts a significant effect in facilitating knowledge sharing (Lin, 2006; Sharkie, 2005). Basically, trust is an important determinant of willingness of individuals to enter into conversations with each other which in turn is the prerequisite for sharing of knowledge (Sharkie, 2005). When trust as a kind of goodwill developed between individuals, people will feel more comfortable to exchange the knowledge they owned. Thus:

Hypothesis 6: Trust between people of CJV will have an impact on effective knowledge sharing.

3.2.3 Shared Value

Shared value is created through a process of socialization, whereby a common identity and collective interpretations of reality are formed (Dhanaraj et al., 2004). The common identity in the management board of CJV refers to the identity of the CJV organization. Though people in the CJV management board are from different parent companies, they need to be aware that they also work for the CJV organization together in order to successfully achieve the pre-described objectives. The collective interpretation is related to community model (Bresnen et al., 2003) which focuses on tacit dimension of knowledge and in particular the embeddedness or stickiness within particular social groupings. Collective interpretation requires people to have a shared mental model or system of meaning that enable each other to understand and absorb the knowledge shared. Thus:

Hypothesis 7: Shared value between people of CJV will have an impact on effective knowledge sharing.

3.3 The Relationship between Parent Companies

It is assumed that good relationship between parent companies will facilitate good relationship of individuals in the management board of CJV. According to Berdrow and Lane (2003), the good relationship in the JV depends on the close, personal bond that developed early on and was maintained within key people of parents and also the JV. The relationship between parent companies can also be explained in the dimensions of trust, social ties and shared value. When trust has been established between parent companies, social ties are strong within key people of parent companies and shared strategic objectives and value exist between parent companies, people in CJV will feel comfortable to collaborate with each other and perceive that this collaboration is supported by the parent companies. Thus:

Hypothesis 8: Relationship between parent companies will have an impact on individual relationship within CJV.

3.4 Organizational Level Factors – CJV Organization Factors

3.4.1 Shared Vision

Shared vision is defined as an agreement on the business unit's vision cross all levels, functions, and divisions (Sinkula et al., 1997). A shared vision is much more than a list of goals. It is something that inspires people and gets them to pull together for cooperative action.

People really get energized by what their group is trying to accomplish. They pull together to accomplish something worthwhile. Soekijad and Andriessen (2003) observe that parties involved in knowledge sharing should have a shared vision. It involves the feeling of “us against a third party” or “together for another party”. Parties will be more apt to share knowledge in new situations if a shared version exists across the JV (Magnini, 2008). Whereas conflict of interests between organizations can be a barrier for co-operation and knowledge sharing. Thus:

Hypothesis 9: Shared vision within the CJV organization will have an impact on effective knowledge sharing.

3.4.2 Culture Alignment

Culture alignment means to align different organizational cultures in the CJV. Every organization has its own culture of shared systems and meanings that differentiate its members from other organization members (Ozorhon et al., 2008). People in the management board of CJV are from different organizations with different organizational cultures. Peoples' behaviors and perceptions can be affected by their own organizational cultures. When they enter into CJV, if the organizational culture is not aligned, they may have different assumptions on the individual relationships within CJV, the objectives and performance of CJV. The difference in assumptions may lead to conflict in the project process which blocks the knowledge sharing between individuals. Thus:

Hypothesis 10: Culture alignment within the CJV organization will have an impact on effective knowledge sharing.

3.4.3 Learning Commitment

High learning commitment means that a company puts high value on learning and promotes a learning culture (Sinkula et al., 1997). A learning organization put emphasis on creating, acquiring, and sharing knowledge, and at modifying its behavior to reflect new knowledge and insight (Kandemir & Hult, 2005). People in the management board of CJV are the top executives of CJV organization. If they have reached the agreement of establishing the learning philosophy within the CJV organization, they would be the pioneers to involve in knowledge sharing activities in the organizations. Promotion of knowledge sharing culture within whole organization would be easier if the top management have common vision on knowledge sharing. This is proved by Connelly and Kelloway (2003) who mention that perceptions about management's support for knowledge sharing are potentially necessary for

the creation and maintenance of a positive knowledge sharing culture in an organization. Thus:

Hypothesis 11: Learning commitment within the CJV organization will have an impact on effective knowledge sharing.

3.5 Organizational Factors - Parent-CJV Relationship Factor

3.5.1 Strategic Integration

According to Inkpen and Dinur (1998), strategic integration have two dimensions in JVs. Firstly, it refers to the partner interface which is crucial to the parent's appreciation of the differences between the partners. Secondly, it is the process by which a JV strategy is linked with a parent strategy. The strategy integration refers to the integration between CJV and parent company. Strategic integration is important in CJV. If the CJV strategy is weakly linked to the parent company, people may feel that they are less supported by parent and will lack the motivation to actively participate in knowledge sharing with people from other parent companies. Thus:

Hypothesis 12: Strategic integration between parent and CJV will have an impact on effective knowledge sharing.

3.5.2 Parent Support

Knowledge sharing within CJV also depends on parent companies' support. Parent company's support is regarded as the degree of encouragement and resource capability regarding the work environment of CJV (Lin, 2006). That is to say, the parent company provides support by encouraging knowledge sharing culture in CJV and contributing necessary knowledge/ capital to CJV for business purpose. People will be motivated to share knowledge with partners when they are fully supported by their parents. Thus:

Hypothesis 13: Parent support on knowledge sharing within CJV will have an impact on effective knowledge sharing.

3.5.3 JV-parent Interactions

The interaction mentioned here mainly refers to the social interactions. As mentioned above, frequent social interactions can help to establish social ties between individuals. If the key people in the parent companies have frequent interactions with managers in CJV, those managers may feel that they are recognized by parent company and would be more willing to

keep commitment to the strategic goals of CJV. So they will have incentives to seek and share knowledge with partners in order to make a good decision and successfully complete the project. Thus:

Hypothesis 14: JV-parent interactions will have an impact on effective knowledge sharing.

4. RESEARCH METHODS

4.1 Methods Used for Data Collection

Factors affecting individual knowledge sharing in the management board of CJV in the proposed research model are identified from previous literatures. Actually, most of those factors were identified in other contexts instead of CJV. Whether those identified factors are applicable in the context of CJV or whether there are additional factors affecting knowledge sharing needs to be explored. Thus, in-depth interviews will be carried out in the first stage to find out the valid constructs and variables. The interview questions will be open-ended in order to obtain more details about knowledge sharing in CJV.

After the in-depth interview, a questionnaire would be designed for quantitative survey to identify critical factors among various factors identified. The questionnaire technique is selected as the method of collecting data because a large sample size is required to find the critical factors among various possible factors. The questionnaires will be distributed by mail with stamped return envelop to increase the respond rate. Compared to face-to-face survey, mailed questionnaire method may be more time-efficient but it is likely to have a lower response rates and possibly poorer answers (Blaxter et al., 2001). Thus certain controls will be required to minimize the problems. For example, language used should be precise; the questions should be objective without any presumption; too many open-ended questions should be avoided etc (Blaxter et al., 2001).

4.2 Sampling

People who have experience or currently involve in infrastructure CJV projects in Hong Kong and have been positioned in the management board are the target population of this survey. However, there is not a list containing the names of all people who have ever participated in CJV projects. Thus, the information of survey targets will have to be collected from various sources, such as List of Approved Contractors for Public Works, China Building and Construction Company Directory and so on.

5. CONCLUSION

This exploratory study aims to establish a research model for finding the critical factors affecting effective knowledge sharing within the management board of CJV. Frequently appeared factors affecting knowledge sharing in previous research are identified and a research model is proposed with 14 hypotheses. Those factors are analyzed from both individual and organizational level. In individual level, there are two categories of factors need to be considered:

- I Personal factors (e.g. Personality, self-efficacy, capabilities, national culture difference)
- I Relationship factors (i.e. social ties, trust, shared value, relationship between parent organizations)

In organizational level, another two categories of factors are supposed to be influential to effective knowledge sharing.

- I CJV organization factors (i.e. shared vision, culture alignment, learning commitment)
- I Parent – CJV relationship factors (Strategic integration, parent support, JV – parent interactions)

In future study, validity of variables will be assessed through in-depth interviews with people with experience in the management board of CJV infrastructure projects in Hong Kong. Then questionnaire survey will be employed to examine the critical factors affecting knowledge sharing in construction joint venture infrastructure projects in Hong Kong.

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An Analysis of Decision-Making Factors in Rebar Fabrication Method Selection

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ABSTRACT

As construction projects require increasingly more various designs rather than standard ones, re-bar work requires more complex and diverse processing configurations. Accordingly, it is necessary to adopt more of rebar fabrication in factory where rebars are cut and bent by automated machines before they are moved to construction site. Rebar fabrication in factory offers such advantages as higher precision level in fabrication and reduction of rebar material loss in relative terms. However, its downside involves constraints in prompt communication with site manager, which may hamper prompt response to contingency, resulting in schedule delay and cost overrun. Rebar fabrication in factory or on site has clearly distinctive merits and demerits and it is necessary to develop a selection guideline to enable site managers to select a rebar fabrication approach most optimum to their site needs in rebar fabrication planning stage. Therefore, this research aims to determine criticality of major decision-making factors that affect selection of rebar fabrication method and provide underlying inputs for comparative analysis of "on-site" rebar fabrication versus "in-factory" rebar fabrication.

Keywords: Analysis of Hierarchical Process (AHP), Decision-making factors, In-factory rebar fabrication, Pairwise comparison, Rebar fabrication

1. INSTRUCTIONS

1.1 Background & Purpose

Structural work in a construction project involves formwork, rebar work and concrete work in broad terms and rebar work affects structural safety and durability significantly. Furthermore, although it accounts for less quantity than concrete, rebar is very significant in terms of cost (Salim, 1995), accounting for about 30% of total reinforced concrete work costs (Cho, Hoon-Hee, 1996).

Rebar work consists of 3 phases including preparation of rebar fabrication/assembly drawing (shop drawing)¹, rebar fabrication and rebar assembly, preparation of rebar fabrication/assembly drawing and rebar fabrication are precursors to rebar assembly and

¹ Rebar fabrication/assembly drawing (shop drawing) : a drawing describing rebar layout customized to a given structure from standard layout defined by standard specification of each construction contractor

accuracy in fabrication affects productivity and precision in rebar assembly, which ultimately impacts schedule and cost of structural work.

On-site rebar fabrication involves installation of rebar fabrication shop on site and is the most preferred approach in Korea, as site managers are quite familiar with such approach and it also ensures prompt response to fabrication error which is unavoidable in rebar fabrication. However, on-site rebar fabrication approach depends largely on rebar worker's experience for quantity estimation in relation to shop drawing preparation and is open to frequent errors in rebar shaping because of dependence on manual shop drawing preparation, which leads to excessive rebar waste and administrative overhead.

On the other hand, in-factory rebar fabrication approach ensures that rebars are cut and bent by automated machines in factory and moved to construction site. Such approach usually ensures high quality of fabricated rebar and better precision in shop drawing preparation due to use of SW program, reducing construction schedule and site labor requirements by requiring less amount of site work. However, blind implementation of in-factory fabrication approach without due consideration of compatibility with site conditions can lead to schedule or cost overrun, depending on the size or location of construction site.²

As described above, both approaches have distinctive merits and demerits respectively and it is necessary to develop a selection guideline to enable site managers to select a rebar fabrication approach most optimum to their site needs in rebar fabrication planning stage. Therefore, this research aims to determine criticality of major decision-making factors that affect selection of rebar fabrication method and provide underlying inputs for comparative analysis of "on-site" rebar fabrication versus "in-factory" rebar fabrication.

1.2 Research Scope & Method

The scope of this research is limited to on-site and in-factory rebar fabrication as a part of rebar work and a research process as shown in Figure 1 is implemented.

First, Korean research trends regarding rebar work were studied by means of literature analysis in two categories: rebar work improvement proposal and in-factory fabrication promotion.

Second, work processes and procedures involved on-site and in-factory fabrication approaches were analyzed comparatively to identify decision-making factors attributable to differences in work processes.

Third, survey and pairwise comparison by means of AHP technique³ were conducted based on decision-making factors derived from process comparison and expert interview and, as a result, criticality and weight of each major decision-making factor in selection of on-site and in-factory fabrication approaches were established and suggestions for subsequent researches were presented.



Figure 1. Research Flow

2. Analyzing recent preceding studies

With this research focusing on identifying decision-making factors in selection of rebar fabrication approach in Korea, Korean research trends regarding rebar work were studied by means of literature analysis in two categories: rebar work improvement proposal and in-factory fabrication promotion.

² Jin, Eui-Jae & 3 others, A Study of Decision-Making Model Applicable to Factory Fabrication Approach for Construction Structure

³ AHP(Analytic Hierarchy Process) (Pairwise Comparison Matrix)

Category	Author	Major contents
Rebar work improvement	Kim, Beom-Jung et al(2006)	■ Identified issues in conventional rebar work by worksampling, crew balance study techniques and proposed pre rebar fabrication to improve rebar work efficiency
	Cho, Hoon-Hee et al(1996)	■ Studied rebar loss ratio of on-site and in-factory fabrication in Korea
	Park, Woo-Yeol et al (2005)	■ Identified issues in terms of rebar loss and management ■ Proposed an approach to reduce rebar loss and improve management efficiency across full work cycle involving rebar quantity estimation, order placement, fabrication/assembly and construction management
	Kim, Seon-Kook et al (1991)	■ Implemented an algorithm to minimize rebar loss by static optimization methodology
	Park, Woo-Yeol et al (2004)	■ Proposed an improvement to standardize rebar layout details
In-factory fabrication promotion	Jin, Eui-Jae et al (2004)	■ Proposed an approach to implement factory fabrication method common to manufacturing industry for construction projects ■ Identified decision-making factors necessary for implementation of factory fabrication method and proposed a decision-making model relating to such implementation
	Kim, Dong-Jin et al (2004)	■ Studied correlations among shop drawing preparation, rebar fabrication and on-site assembly, analyzed status and issues of in-factory fabrication and proposed an improvement
	Cho, Hoon-Hee et al(2007)	■ Proposed standardization of rebar fabrication configuration, incorporation of constructability in shop drawing and utilization of SW application in rebar configuration development, standardization of rebar assembly and development of ADC-based rebar material tracking system

Table 1. Analysis of Preceding Studies

First, researches on rebar work improvement focused mostly on rebar material and assembly targeting minimization of rebar loss (Kim, Seon-Kook 1991), improvement of management efficiency (Park, Woo-Yeol 2006) and standardization of shop drawing (Park, Woo-Yeol 2005).

Second, studies on In-factory fabrication promotion underscored improvement resulting from analysis of status and issues in factory fabrication (Kim, Dong-Jin 2004) and standardization of rebar fabrication configuration, utilization of SW application in rebar configuration development and standardization of rebar assembly work (Cho, Hoon-Hee 2007).

However, little has been done yet as to preparation of selection guideline for in-factory versus on-site rebar fabrication. The study of decision-making factors necessary for implementation of factory fabrication approach by Jin, Eui-Jae (2004) concerned construction industry in general, failing to address the specific features of rebar fabrication work.

3. Identifying decision-making factors in selection of rebar fabrication approach

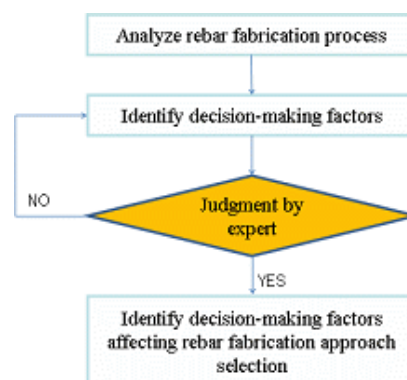


Figure 2. Flow of Identifying Decision-Making Factors in Rebar Fabrication Approach Selection

This section analyzes work processes and procedures of on-site and in-factory rebar fabrication approaches and identifies decision-making factors resulting from differences in rebar fabrication process as described in Figure 2.

3.1 Analyzing rebar fabrication work process

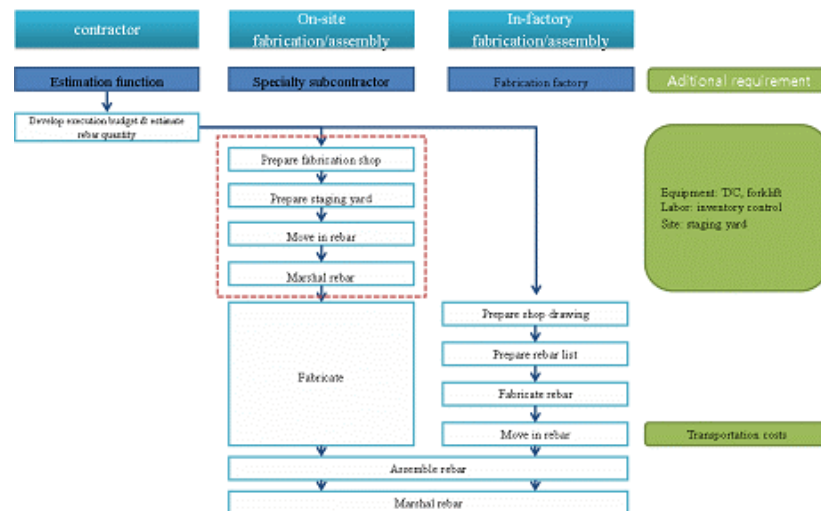


Figure 3. Comparison of On-Site with In-Factory Processes

Figure 3 shows the comparison of typical work processes in Korea between on-site and in-factory rebar fabrication approaches. After contract award, construction contractor develops execution budget, estimates rebar quantity and awards rebar work contract to specialty subcontractor. If construction contractor selects on-site fabrication approach as in Figure 3, fabrication shop needs to be prepared, staging yard secured, rebar moved in and marshaled unlike in-factory fabrication, resulting in additional demands for tower crane and forklift as well as additional labor for inventory control and area for rebar staging. In-factory fabrication incurs additional transportation costs for delivering rebar to construction site.

3.1.1 On-site fabrication

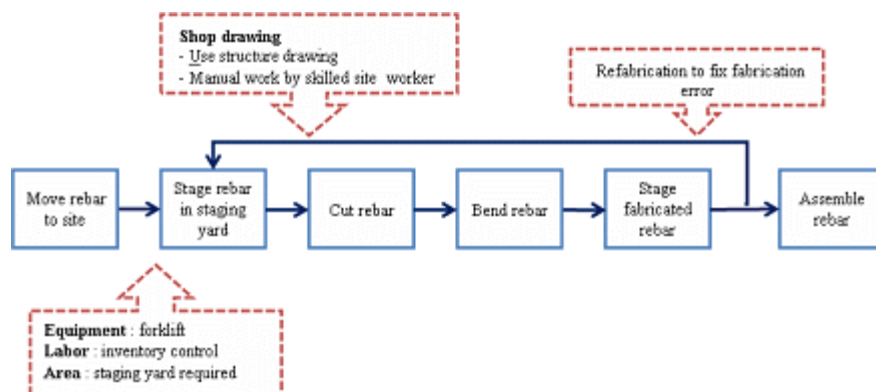


Figure 4. On-site rebar fabrication process

As for on-site fabrication approach, site manager requests prime contractor to order required rebar quantity estimated based on design and structure drawings and in consideration of construction schedule. As rebar is delivered to site, it is fabricated by fabricating machines located on site⁴. Detail process is as shown in Figure 4. Since shop drawing and rebar list

⁴ Cho, Hoon-Hee & the other, A Study of Rebar Fabrication Status in Korea

necessary for rebar fabrication are prepared manually by skilled site worker, rebar loss and work volume are largely dependent on the proficiency and experience of site worker.

3.1.2 In-factory fabrication

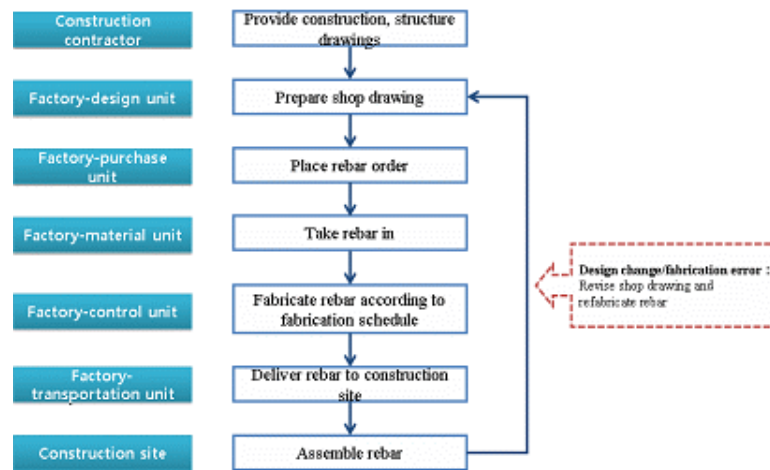


Figure 5. In-factory rebar fabrication process

In case of in-factory fabrication, rebars are cut and bend by automated machines in factory and moved to construction site as described in Figure 5. As prime construction contractor furnishes fabrication factory with construction and structure drawings, design unit of fabrication factory prepares shop drawings out of them using SW application program and rebar is fabricated in accordance with shop drawing and fabrication schedule and delivered to construction site. Using SW application in shop drawing preparation improves precision in fabrication and reduces loss of rebar. In addition, fabrication productivity is enhanced by use of automated machines. However, additional cost is required by delivery process and prompt response to design change and fabrication error may be compromised.

3.2 Identifying decision-making factors in selection of rebar fabrication approach

Decision-making factors in selection of rebar fabrication approach derived from literature study and fabrication process analysis are as shown in Figure 6. Differences between on-site and in-factory rebar fabrication approaches are derived in terms of cost, construction progress, constructability and site features. Such differences are factored into selection between on-site and in-factory rebar fabrication approaches during rebar work planning stage. Factors identified herein are incorporated into the questions of the survey described in Section 4.



Figure 6. Decision-making factors in selection of rebar fabrication approach

4. Decision-making factors in selection of rebar fabrication approach by AHP

Since it is difficult to determine the importance of each decision-making factor by simple thought process, it requires one, even though complicated, to understand the effect of selecting the rebar work process in an organized frame, admitting interaction and dependency between factors. What provide this frame is AHP. AHP is the method to segment problems that are complicated and unorganized according to the constituent factors. That is, you can do analysis qualitatively when determining the problem and the class, while quantitative analysis is possible when giving accurate description of the decision or preference. AHP can be designed to integrate these two sides.

4.1 AHP (Analytic Hierarchy Process)

AHP proposed by Saaty(1980) is a very flexible and easy-to-understand decision-making technique based on intuition rather than mathematical theory with the following key features. (Park, No-Kook, 1993)

First, AHP involves easy-to-understand factors and clear structure as it attempts to interpret a problem quantitatively.

Second, AHP makes a subjective judgment by system approach and draws conclusion on it to reflect experience in decision-making process.

Third, AHP discerns complex and unclear issue into multiple layers and makes one-on-one comparison between partial relations to analyze criticality.

Fourth, AHP approaches intention of each stakeholder on an one-on-one basis in regard to decision making, aggregates 1:1 comparisons and applies geometric mean to ensure objective decision-making.

Fifth, AHP reviews consistency to verify errors in expert judgment, as even experts make mistake relative criticality of each factor belonging to different layers.

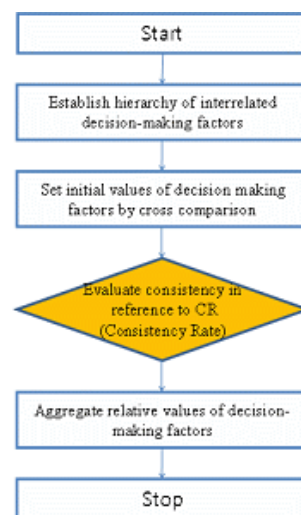


Figure 7. Application of AHP Technique

AHP technique is applied in following steps as Figure 7: (Zahedi, 1986)

- Step 1 : establish decision-making hierarchy
- Step 2 : compare decision-making factors in pairs and collect initial data
- Step 3 : estimate relative value of decision-making factor using Eigen Value technique: evaluate consistency in reference to CR(Consistency Rate)($CR \leq 10\%$ valid)
- Step 4 : aggregate relative values of decision-making factors.

4.2 Survey overview

The survey contains questions based on specific decision-making factors derived from literature study and expert input as described in Section 3.

Duration	2008.4.28~2008.5.16
Survey target	Cost estimators and construction engineers of construction contractors
No. of responses	53 out of 70 copies (response rate : 75.7%)
Analysis method	AHP technique
Analysis description	Analysis of criticality of decision-making factors in selection of rebar fabrication approach

Table 2. Survey Target & Duration

Survey duration was 3 weeks from April 28, 2008 to May 16 and the targets were cost estimators and construction engineers of construction contractors in Korea. 5-step scale was offered as response to each question and 53 questionnaires were collected out of 70 copies and criticality was derived by AHP technique. Figure 8 shows service duration of respondents to demonstrate their credential. Figure 9 illustrates the ratio between rebar fabrication approaches used by respondents on site. As the graph indicates, on-site fabrication approach which accounts for 76.2% of the surveyed sites is preferred over in-factory fabrication approach in Korea.

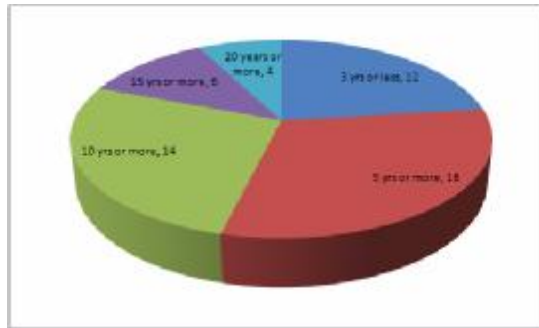


Figure 8. Service duration of respondents

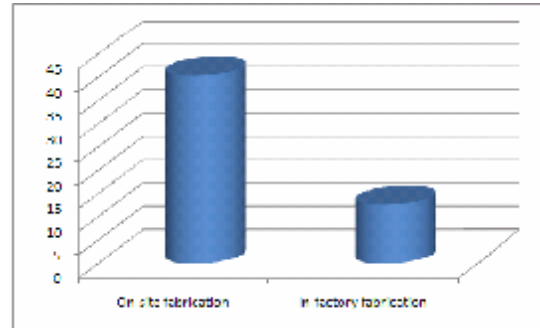


Figure 9. Rebar fabrication approaches used in sites of respondents

4.3 Deriving criticality of key decision-making factors in selection of rebar fabrication approach

In this research, AHP analysis layers are configured based on Figure 6 to estimate criticality of key decision-making factors in selection of rebar fabrication approach. Layer 1 involves decision-making factors from such perspectives as cost, constructability, construction progress and site features while Layer 2 includes detail factors relating to Layer 1 factors. Matrix items are selected based on the breakdown structures in Layer 1 and 2 and respondent is allowed to enter relative value in the cross-comparison items of each layer as shown in Table 3. For example, the cell in the 3rd row and the 4th column in Table 3 indicates "Constructability affects selection of rebar fabrication approach 0.8 times more than construction progress."

	Factor from cost perspective	Factor from constructability perspective	Factor from construction progress perspective	Factor from site features perspective	Criticality	Priority
Factor from cost perspective	1.0	2.2	1.8	1.3	0.361	1
Factor from constructability perspective	0.5	1.0	0.8	0.6	0.164	4
Factor from construction progress perspective	0.6	1.3	1.0	0.8	0.207	3
Factor from site features perspective	0.8	1.7	1.3	1.0	0.269	2

Table 3. Pairwise Matrix of Layer 1

Criticality of the factors in Layer 1 was 0.361 for Factor from cost perspective, 0.269 for Factor from site features perspective, 0.207 for Factor from construction progress perspective and 0.164 for Factor from constructability perspective, indicating that cost and site features affect rebar fabrication approach selection more than construction progress and constructability.

Table 4 consolidates criticality values estimated for Layer 1 and 2 and prioritizes factors as per such values.

Layer 1 factor	CR	Criticality	Layer 2 factor	CR	Criticality	Aggregate criticality	Priority
Cost	0.0003	0.361	Shop drawing cost	0.0018	0.166	0.060	6
			Fabrication cost		0.397	0.143	1
			Rebar loss rate		0.298	0.108	3
			Transportation cost		0.138	0.050	10
Constructability		0.164	Fabrication productivity	0.0012	0.190	0.031	14
			Impact of fabrication approach on rebar assembly		0.341	0.056	8
			Precision		0.197	0.032	13
			Work area availability		0.272	0.044	11
Construction progress		0.207	Work continuity	0.0003	0.506	0.105	4
			Weather		0.206	0.043	12
			Work proficiency		0.288	0.059	7
Site features		0.269	Site area	0.0018	0.505	0.136	2
	Accessibility		0.298		0.080	5	
	Weather		0.198		0.053	9	

· ※ CR : Consistency Rate

Table 4. Aggregate Criticality of Key Decision-Making Factor in Rebar Fabrication Approach Selection

As Table 4 indicates, fabrication cost which accounts for the biggest share from cost perspective in Layer 1 tops in terms of aggregate criticality as well at 0.143. Site area follows fabrication cost at 0.136, as construction site where conditions do not allow for rebar fabrication shop and staging yard has no other choice but to select in-factory fabrication.

Figure 10 is a chart providing at-a-glance visibility into criticality of decision-making factors.

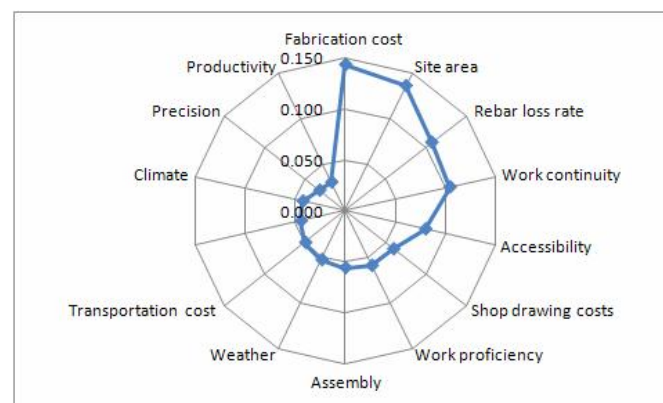


Figure 10. Criticality Analysis

Consistency evaluation was performed to establish consistency of findings from pairwise matrix responses. Consistency was evaluated in reference to CR (Consistency Rate) which is calculated by dividing CI (Consistency Index) with RI (Random Index) derived from experience. If CR is equal to or less than 10%, reliability of result is validated.⁵

⁵ Lee, Sang-Hyo & 5 others, A Study of Factors Impacting Low Penetration of 3D CAD by AHP

As Table 4 shows, the CR values in the pairwise comparison matrix herein were all within significant range as less than 10%. Therefore, results drawn herein are deemed to be reliable.

5. Conclusions and Recommendations

This research is intended to determine criticality of major decision-making factors that affect selection of rebar fabrication method in initial planning stage of rebar work accounting for significant portion of structure work and provide underlying inputs for comparative analysis of "on-site" rebar fabrication versus "in-factory" rebar fabrication.

Decision-making factors affecting rebar fabrication approach selection were derived from literature study and expert interview and their priorities and criticalities were determined by AHP pairwise comparison matrix. Criticality in Layer 1 was in the order of cost, site features, construction progress and constructability and aggregate criticality was in the sequence of fabrication cost, site area, rebar loss rate, work continuity, accessibility, shop drawing cost, work proficiency, impact of fabrication on assembly, weather, transportation cost, work area availability, precision in fabrication. Priorities and criticalities derived herein indicate factors that warrant consideration in relation to rebar fabrication approach selection in rebar work planning stage.

This study analyzed the factors that affect selection of the rebar work process. Insufficient, however, is the study on the decision-making model for selection methods on the basis of these affecting factors. Therefore, the future study requires researching the decision-making model for selection of the rebar work process based on the affecting factors of more importance, which are derived from this study. The result of this study is expected to help decision-makers determine the selection method in a more effective and appropriate way depending on the on-site conditions.

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Supervision Engineer versus Building Surveyor – the way forward

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ABSTRACT

Building Surveyors in Australia play an important role in the construction industry by ensuring that both the design and the construction of projects conform to the building regulations.

In China, these functions are provided by different organizations ranging from government authorities through to private firms. As an independent third party, a Supervision Engineer is responsible for supervising the project design and construction from the design phase to completion. The scope of supervision involves quality, cost, schedule, safety and environmental management.

Recently, a mutual recognition agreement was signed between the Hong Kong Institute of Surveyors (HKIS) and the China Association of Engineering Consultants (CAEC). Members of the HKIS are qualified to act as the Supervision Engineer in the construction industry in mainland China. The HKIS, being originally based on the British Building Control Surveying system is similar to that used in Australia and should, in time provide some insights for the Chinese system. It appears that there are opportunities for consultants from foreign countries to provide building surveying services in the Chinese construction industry.

The paper compares the Supervision Engineer in China and the Building Surveyor in Australia, from the professional development perspective. Items compared include: structure of the professional body; educational standards required to practice at the professional level; accreditation / registration of individual practitioners and the relationship with the Government.

The paper concludes that there are many similarities between Chinese Supervision Engineers and Australian Building Surveyors and that opportunities exist for these two professional groups to work interchangeably in each other's domain. Some factors will need further consideration for this to occur.

Keywords: Supervision Engineer, Building Surveyor, construction industry, Australia, China.

INTRODUCTION

The building and construction industry is a major driver of activity in the Australian economy. According to Australian Bureau of Statistics (ABS) data, the construction industry contributed 6.2% of Australia's gross domestic product in 2004-05 (ABS 2007). In dollar terms, total building and construction industry activity in Australia was valued at \$95.8 billion dollars for the year 2005-06. In an industry subject to cyclical swings, this represented an increase of 13% over the previous year.

The past three decades have witnessed the rapid development of China's economy. Since the 'open door policy' was implemented in 1978, ushering in a period of economic reform, China has achieved remarkable success in economic development. To accommodate the rapid expansion in demand for building and infrastructure, China's construction industry has achieved extraordinary growth and has formed the backbone in China's economy (Liu, Fellows & Fang 2003; Low & Jiang 2003).

The Chinese construction industry is one of the largest and fastest expanding construction markets in the world. China's construction market is forecast to grow at a rate of 15% to 30% over the next five years and by 2010 the market is expected to be worth \$US 1.7 trillion (TACO 2002).

Both Building Surveyors in Australia and Supervision Engineers in China play key roles in the construction industry. The paper compares these two professions from the professional development perspective.

SUPERVISION ENGINEER IN CHINA

Brief introduction of the profession

The position of a Supervision Engineer has been a legal requirement for all types of government-financed construction projects in China since the implementation of the Provisional Construction Supervision Ordinance in 1988. The project supervision system was initially implemented in China's hydropower construction field and has been gradually extended to the whole construction industry (Wang et al., 2007). Normally the Supervision Engineers are employed by construction supervision units.

The introduction of project supervision is a significant step towards independent professional construction management services. The functions of the Supervision Engineer cover the design stage (including investigation phase), tendering stage and the construction phase through to the defects liability period (Bajaj and Zhang, 2003). As an independent third party, a construction supervision unit is responsible for supervising the works of a construction project (for example, quality and schedule) during the construction period from the inception phase through to completion. By monitoring various aspects of construction works, a construction supervision unit is meant to bridge the gap between the functions provided by design institutes and contractors.

Presently the Supervision Engineers' functions are limited to the construction stage where their role is to ensure compliance with construction quality, cost, schedule, safety and environmental management (Wang 2007). It is not unusual for Supervision Engineers to not be involved in the design phase.

Currently there is an imbalance between the responsibility of the Supervision Engineer and his/her rights and benefits (Wang 2007). Similarly, the services provided by the Supervision Engineer sometimes overlap with those provided by the project management consultants which can result in confusion amongst the remainder of the project team.

Structure of the professional body

The China Association of Engineering Consultants (CAEC) is the professional body for Supervision Engineers in China.

The organizational structure of CAEC is:

- "The General Assembly is the highest authority body of the CAEC, and is convened every 4 years;
- The Board of Administration of the CAEC is an executive organ of the General Assembly, is responsible to the General Assembly and is convened once a year;
- The Standing Board of Administration of the CAEC exercises the rights of the Board of Administration while it is not in session and reports to the Board. It is convened half yearly. In special circumstances it can be convened by means of telecommunication.
- The Secretariat is a standing executive organ, responsible to the Standing Board of Administration of the CAEC." (CAEC 2008)

The subordinate departments of the Secretariat include:

- Administration department;
- Finance department;
- Communication department;
- Training department;
- Information department;
- Professional development department, and
- International department.

The CAEC has three categories of membership:

- Association membership: can include the branch of the CAEC in each province, autonomous regions and municipalities. Each branch consists of construction engineering supervision enterprises;
- Corporate membership: comprises those enterprises registered in the People's Republic of China (PRC) whose main business is construction engineering supervision, and
- Personal membership: comprises individuals who: 1) are qualified and registered as construction engineering Supervision Engineers, or 2) the academics in universities or academic institutions who are teaching or conducting research relative to construction supervision.

Educational standards required to practice at the professional level

Educational requirements for Supervision Engineers include:

- A three-year undergraduate degree or higher degree in construction management and /or construction economics before sitting for the National Registered Supervision Engineer Exam, and The registered Supervision Engineer must complete the relevant CPD courses:
 - o Compulsory: recently promulgated law, regulation, standards and policies relevant to Supervision Engineers; the advanced theory and methods of construction supervision and project management, and a case study or construction supervision and ethics, and
 - o Elective: local codes relevant to Supervision Engineers; advanced construction technology, materials and methods; a case study in a particular field, and other relevant subjects.

Accreditation / registration of individual practitioners

To register as a Supervision Engineer, the individual must:

- Have gained the qualification by means of passing the National Registered Supervision Engineer Exam;

- Be currently employed by a relevant employer e.g. surveying, design, construction, and supervision, and
- Satisfy the continuous professional education requirements (MoC 2006a)

The provisional Construction Commission is responsible for the assessment of the applications for registration. Ultimately the Ministry of Construction is responsible for the final approval of the application.

Once approved the registration is valid for three years after which it will need to be re-lodged for renewal

The application will not be approved if the applicant:

- Has had a criminal conviction in the last two years;
- Does not meet the CPD requirements;
- Has been registered as a practitioner by more than one employer. Is more than 65 years of age.

Relationship with the Government

As stated on the CAEC's official website, one of the key objectives of the CAEC is to execute related government policies, both general and specific, in accordance with the national constitution, laws, regulations and national policies. The Ministry of Construction of the PRC is in charge of its operation, while the Ministry of Civil Affairs is in charge of its registration.

The CAEC provides services:

- "to initiate investigation and research on construction engineering supervision, to provide related government institutions with findings and facts; and assist the Ministry of Construction in the formulation of engineering supervision laws and regulations and professional development programs, and
- to accomplish the related construction engineering supervision work entrusted to them by the Ministry of Construction." (CAEC 2008)

Therefore, the CAEC is a bridge linking the relevant authorities and practitioners. In addition, the government has a strong influence on the functioning of the CAEC.

Competencies

Liu et al. (2004) list the competencies of a Supervision Engineer in China as:

- General knowledge and regulation of construction supervision;
- Investment management;
- Time control;
- Cost control;
- Quality control;
- Information management, and
- Contract administration.

In addition, safety supervision was added to the scope of the work of the Supervision Engineer by the Ministry of Construction in 2006. Accordingly, the Supervision Engineer is also required to have safety management knowledge (MoC 2006b).

BUILDING SURVEYOR IN AUSTRALIA

Brief introduction of the profession

In Australia, the role of the Building Surveyor is to check the construction documentation independently to ensure that the documentation meets the requirements of the Building Code

of Australia (BCA) and the relevant governing legislation (AIBS 2005, as cited in Society of Fire Safety Engineers Australia 2006). Australia, comprised of 6 States and 2 Territories is divided into Local Government areas with more than 700 local governments across Australia in 2006 (Capetanakis 2004). Building laws can be developed at all three levels of government, however there is a national document that relates to the design and construction of buildings; the Building Code of Australia (BCA), produced and maintained by the Australian Building Codes Board (ABCB 2004).

The roles and responsibilities of Building Surveyors include (Victorian Auditor-General's Office of Australia, 2000; Reddaway, 2001):

- Construction of new buildings:
 - o Checking the documentation's compliance with the Building Act, Building Regulations, Codes and Standards;
 - o Issuing a building permit before construction can commence;
 - o Inspecting the construction works and give it a stamp of approval;
 - o Providing regulatory advice to the project team on construction issues;
 - o Advising on legislative issues, and
 - o Issuing an occupancy permit before the building can be occupied, and
- Existing buildings:
 - o Inspecting the existing condition of the building and its compliance with safety standards.

An example of a service provided by the Building Surveyor is where he/she requires proof that the builder has the appropriate level of insurance required to practice as a registered building practitioner. (Georgiou et al, 2000). The Certificate of Likely Compliance issued by the Building Surveyor is the prerequisite for the Permit Authority to issue a Building Permit to the builder (Tasmania Building Act 2000).

Originally the functions of the Building Surveyor were all provided by local government. Since the privatisation of building surveying, more and more Building Surveyors have moved into the private sector. The privatisation of building permits and approvals have improved the speed of the system leading to cost and time savings (Georgiou et al, 2000).

Structure of the professional body

The structure of the Australian Institute of Building Surveyors (AIBS), the professional body for Building Surveyors in Australia is shown in table 1.

ATTRIBUTES	AIBS
General Structure	Hierarchical and incorporated
Structure components	• Members of 2,500 • Board of 7 members • CEO • State Chapters
Membership	2 500
Degree qualified	Less than 500 (few of remainder studying for a degree) (25%)
CEO qualifications	Not necessary to be a Building Surveyor
Approval of major changes	Membership approval at Annual General Meeting (AGM)
Different Knowledge areas	No
Special Interest Groups	No
Voting Rights	• Only corporate members: - o includes paraprofessionals - o equates to approx 90% of the membership (given that

	student members and affiliates make up 10%)
National President	• Elected by the board ◦ Deputy is elected by the board • Two year term of office • Not eligible for re-election

Table 1: Structure of the AIBS

Educational standards required to practice at the professional level

The AIBS benchmarks that have been adopted and are being used to accredit university programs require the completion of a four year full time, or part time equivalent degree at the end of which the graduate needs to be competent in each of the following:

- Construction principles and practices;
- Law, statutes, codes and standards;
- Performance-based building regulatory systems and risk assessment and risk management principles;
- Building related science;
- Structural engineering principles;
- Building services and fire safety engineering principles;
- Professional ethics, management and communication practices;
- Problem solving skills, and
- Building management, development concepts and construction economics (AIBS & ABCB 2002).

Subsequent to the AIBS adopting the above benchmarks; the national education committee has recommended that two new benchmarks be added to the list; so that in addition to the abovementioned, upon completion of the degree the graduate should be able to:

- Conduct research into the various areas related to the construction industry, and
- Demonstrate appropriate experience in the industry (NEC 2006-2007).

Each of the benchmarks has a specific set of measurable criteria that are used by members of the accreditation panels when accrediting university programs.

Accreditation / registration of individual practitioners

The concept of accreditation is not always understood as it can be applied in various ways and to varying degrees. In an academic sense, accreditation can be for both a program of study or for the institution that delivers the program (Harvey 2004).

From a building surveying perspective, the two professional bodies that are most relevant in Australia are the Royal Institution of Chartered Surveyors and the Australian Institute of Building Surveyors. The RICS has had a direct involvement in accreditation since the proliferation of surveying courses in the UK during the 1960s and 1970s when courses were monitored and accredited by the RICS's surveying courses board (Plimmer 2003).

The AIBS on the other hand, did not become involved with accreditation until 1993 when it accredited its first university degree program at the University of South Australia¹. It has not had a properly documented program accreditation system and has relied on a somewhat ad-hoc education committee system to accredit programs throughout the country. It has never formally defined accreditation in terms of programs but rather has relied on one or two champions to further its cause². Initially the independent accreditation body established by the AIBS, the Building Surveyors and Allied Professions (BSAP) Accreditation Board carried out the accreditation function of the Institute, but this was never properly formalised and

¹ Author's personal experience as leader of that initial program in 1993

² Author's personal experience as member of the AIBS National Education Committee 1993-2007

eventually folded. Since 2000 the AIBS has been carrying out program accreditation jointly with the Australian Institute of Building (AIB) and the Australian Institute of Quantity Surveyors (AIQS) and has, to some degree relied on these two bodies in terms of procedures when carrying out accreditation. Furthermore, it has only carried out accreditation of building surveying focused programs.

The AIBS assess their relevant programs of study against a set of designated criteria in the form of benchmarks e.g. knowledge base, building surveying ability and professional attributes. The AIBS benchmarks appear to cover the broad professional knowledge required to function as a professional in the relevant field. The criteria relate to four year full time equivalent accredited university Bachelor degrees.

Competencies

The AIBS has a set of competencies for University Programs however, it refers to them as benchmarks. Unlike the RICS who relate their competencies to levels, the AIBS benchmarks use word descriptors such as: in depth knowledge, proficiency, understanding and so on to signify the level of knowledge expected by the benchmark (AIBS 2006). These benchmarks are extremely detailed and there are a total of 16 major headings as outlined in Table 2 below.

	BENCHMARKS
1	Construction practices & principles
2	Law & Statutes
3	Codes & Standards
4	Structural engineering principles
5	Building related science
6	Performance based building regulatory systems
7	Risk assessment & risk management principles
8	Professional ethics
9	Management practices
10	Communication practices
11	Problem solving skills
12	Building services
13	Fire safety engineering principles
14	Building management
15	Development concepts
16	Construction economics
	From 2007/2008
17	Ability to conduct independent research
18	Experiential learning

Table 2: AIBS Building Surveyor Benchmarks, Source: AIBS 2006

Relationship with the Government

The relationship with governments by the AIBS is a vexed issue. The AIBS has general statements about this function as part of the rules of operation, that is, in the Articles of Association for the AIBS. The AIBS makes claims about how it is consulted and the roles that it plays however the AIBS actually has no formally designated role (in statute) in any government organization and generally relies on invitation, either directly or indirectly before it takes part (Zillante 2007).

The AIBS makes submissions to the various governments on issues that affect building surveying albeit those submissions do not, because of the AIBS's uni-disciplinary nature, span the breadth of issues covered by other professional bodies, e.g. Engineers Australia. Similarly, the AIBS does not have an equivalent to Engineer Australia's strategic group within its structure to coordinate any submissions made and they often tend to be state based, ad-hoc and made more as a reactive response rather than as proactive initiatives (Zillante 2007).

This places the AIBS in a vulnerable position when compared with Engineers Australia and makes it easier for the government to impose a degree of 'control' over the organization by interfering in what most professional bodies would term, their professional domain area (Zillante 2007). This is consistent with the literature dealing with government interference in professional activities and indicates that the government may not regard the AIBS as a strong professional body (Graham 2007; Clementi 2004; Evetts 2003).

In summary, a comparison between the AIBS and the CAEC can be seen in Table 3.

CONCLUSIONS

The services provided by the Supervision Engineer in China are very similar with those provided by Building Surveyors in Australia (Zuo and Zillante 2007). A comparison between these two professional bodies from a professional development perspective found that the:

- AIBS has more structured educational standards in order to practice at the professional level;
- AIBS accredits university programs;
- CAEC has a universally (throughout China) accepted procedure to accredit and register individuals;
- CAEC has a more formal relationship with the government; and
- AIBS has a broader set of individual's competencies required to practice as a Building Surveyor.

Currently (2008) Australia is experiencing (and has been for some 7 years) a severe shortage of building surveying graduates and it is ironic that there are now only two building surveying programs in Australian Universities (Zillante 2007; AIBS 2002; AIBS 2003; AIBS 2004a; AIBS 2004b). Universities throughout Australia have closed down building surveying programs. One main reason is the lack of interest from students. This reason is somewhat surprising given the demand for Building Surveyors across Australia and the good rates of pay. This may indicate a lack of marketing that has left students without enough information about building surveying as a career thereby not enabling them to make informed choices (Hornlund, Mehrtens & Pullen 2006).

To date, the AIBS has not had the opportunity to accredit programs outside of Australia. It has only recently developed its benchmark system and is concentrating on Australia before it moves offshore.

Therefore, opportunities exist for the AIBS and the CAEC to recognize each other's members and academic programs. The mutual recognition agreement signed between the HKIS and the CAEC provides an opportunity for this collaboration.

Whilst it is recognized that Hong Kong is once again part of China it must be remembered that it has developed under a different system (British) during the last century and, in 2004 the HKIS actually reached a formal reciprocal membership agreement with the AIBS (Capetanakis 2008). In recent years, with the reunification with China, the HKIS and the CAEC have reached an agreement to recognize each other's professional standing. Given that the AIBS and the HKIS agreement is still in place it stands to reason that the AIBS is in a good position to achieve a similar agreement with the CAEC thereby forming a triumvirate consisting of the CAEC, the HKIS and the AIBS.

It is recommended that a case study be conducted in the future to provide more detailed comparative (empirical) data for the professions of Supervision Engineer and Building Surveyor.

RESEARCH ISSUES	Building Surveyor (AIBS)	Supervision Engineer (CAEC)
Structure	▪ Hierarchical and incorporated ▪ State chapters	▪ Hierarchical ▪ Branch in each of the provinces, autonomous regions and municipalities
Education	▪ Professional Building Surveyor - o < 25% of members - o 4 year degree ▪ Assistant Building Surveyor - o 17% of members - o TAFE Advanced Diploma ▪ Building Surveying Technician - o 4% of members - o TAFE Diploma ▪ Non practicing (Student etc.) - o 8% ▪ Other - o 46% of members not accredited by the AIBS scheme	▪ Three-year undergraduate degree or higher degree in construction management and /or construction economics ▪ Sit the National Registered Supervision Engineer Exam ▪ Complete CPD courses: - o Compulsory: recent promulgated law, regulations, standards and policies relevant to Supervision Engineers; advanced theory and methods of construction supervision and project management, a case study or construction supervision and ethics. - o Elective: local codes relevant to Supervision Engineers; advanced construction technology, materials and methods; a case study in a particular field, and other relevant subjects.
Accreditation of the education program	▪ Inexperienced (1993 start) ▪ Joint documentation (2007) - o with AIB & AIQS ▪ Ad-hoc documentation - o In house ▪ Program based ▪ Relies on individuals ▪ Graduates assured of membership at relevant career grade ▪ Uni-disciplinary - o Specialist designation category not used ▪ Benchmarks / Competencies - o Building Surveyors Benchmarks - o ABS Competencies - o BST Competencies	China has no university accreditation for this profession.

RESEARCH ISSUES	Building Surveyor (AIBS)	Supervision Engineer (CAEC)
Accreditation or Registration of Individuals	- Accreditation - AIBS Board - Internal - Not Independent - NAP - Not accepted by all states - Distinction in some states between government Building Surveyor & private practitioner Building Surveyor - No chartered route	- Pass the National Registered Supervision Engineer Exam; - Is currently employed by a relevant employer (e.g. surveying, design, construction, supervision); - Satisfy the continuous professional education requirements Not able to be registered if: - Has been criminally convicted in last two years - Does not meet the CPD requirements - Registered to practice by more than one employer. Is more than 65 years of age
Role of Government	- Generally have an informal relationship - AIBS has a non strategic reactive relationship in its relationship with Government - Ad hoc submissions to government - Accreditation - Not universally accepted	- Generally have a formal relationship - Execution of related government policies in accordance with national constitution, laws, regulations and national policies - Conduct research and provide suggestions to the government
Competencies	- Legal aspects - Structural engineering principles - Building related Science - Risk management - Professional ethics - Management practices and communication practices - Problem solving skills - Building services - Fire safety engineering principles - Building management - Development concepts - Construction economics - Ability to conduct independent research - Experiential learning	- General knowledge and regulation of construction supervision - Investment management - Time control - Cost control - Quality control - Information management - Contract administration

Table 3: Comparison between the AIBS and CAEC.

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WOMEN IN SOUTH AFRICAN CONSTRUCTION

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ABSTRACT

The construction industry is still mainly dominated by men as men ultimately decide what positions of power and leadership women occupy. The struggle for gender equality and women's empowerment is central to transformation. The South African construction industry continues to seize with all forms of gender discrimination, sexism and patriarchy. The primary aim of the study was to obtain data that was relevant to the problem 'Women in Construction' and is based upon a survey of the relevant literature as well as a questionnaire survey. The following constitute the salient findings: construction is still largely regarded as a male domain, women are not taken seriously as professionals in the construction industry and society, tradition, organization culture and sexist attitudes play a major role when appointing women in construction. The construction industry should not be male-dominated because it is considered rough and tough and that women should be provided with the opportunity to prove themselves. Women cannot secure top jobs or successfully assume management roles due to factors such as actual talent, ability and skills. Despite the increase in the number of women being employed in the construction industry, they still constitute a very small percentage of the industry's workforce which is less than 10%. The study concludes that women are underrepresented in the construction industry and that although they may face many challenges and barriers, women are competent to rightfully take up a position on-site within the construction industry. Although, construction is still largely regarded as a male domain change should take place in the industry to rectify this specific train of thought and culture, and that women equally deserve to participate in construction even though it may be considered as a place for men only.

Keywords: construction, women, challenges, barriers, representation

INTRODUCTION

Why is there the distressing feeling that women are still playing second fiddle to men? Men ultimately decide what positions of power and leadership women occupy. Women shape their own futures through their determination, ambition, and resilience to take their rightful place in the world. 'The more things change, the more they stay the same!' A very common and widely used quote, but never more pertinent than when it relates to women's quest for equality and recognition in the workplace, home and society as a whole (Govender, 2007: 2). Despite having a constitution that entrenches equal rights, discrimination practices, structural inequalities, cultural factors, prejudices, patriarchy and sexism are some of the hindrances that are still rife in the South African construction industry (Pappaya, 2007: 4).

REVIEW OF THE LITERATURE

Representivity of Women in Construction

Although women account for 41.3% of South Africa's workforce, only 15% are executive managers and just 7% of all directors are women (Pandor, 2005: 2).

Women's increased involvement in the labour force, however, is not paralleled within the management levels of organizations. Women appear to be 'trapped' at middle and junior management roles within organisations (Cross & Linehan, 2006: 28-39).

An increasing number of women are now entering this traditionally male-dominated environment which is not surprising, although the numbers are still minimal when compared with men. The register of the Construction Industry Development Board (cidb) reflects a total of 44 100 construction enterprises of which 48% are owned by women (cidb, 2008: 1). However, 83% of the women-owned enterprises fall within grade one, and a further 12% in grades two and three. Only 5% of all women-owned enterprises registered with the cidb are found in grades four and higher. In fact there are only four women-owned enterprise at grade 8.

There are currently over 11 million women employed in the UK, accounting for 49.5% of the workforce. Despite increases in the number of women employed in the construction industry over the past decade, they still constitute only 13% of the industry's workforce. This indicates that construction continues to be the most male dominated of all the major industrial groups (Fielden, Davidson, Gale & Davey, 2000: 113-121).

While it is now socially acceptable for women to constitute a large proportion of the world's workforce, when it comes to climbing the corporate ladder, how many women had to experience various challenges from the start in order to achieve success? The world's boardrooms are sadly lacking in women and much has been written over the years about the sexist 'glass ceiling' that hampers women's success beyond a certain point in their career (Hayward, 2005: 29).

Misconceptions Relative to Women in Construction

Since the 19th century women globally have been trying to change how people view them economically, politically and socially. They have been demanding equality and justice especially in the workplace. Many argue that women's equality has yet to be achieved since the democracy in 1994; the post-apartheid government has prioritized women's empowerment (Naidoo, 2007: 3). It is thus viewed that the construction industry's cultural values will not change overnight for as long as both male and female workers in the industry continue upholding such values (Gale, 1994: 3-14); with male workers upholding these values considering them as the 'norm' and female workers finding themselves in a 'fit-in' situation.

Although similar in many ways to discrimination faced by members of racial and ethnic minorities, the inequity faced by women in the occupations has its unique side. Women are inexorably seen in relation to their child-bearing functions and child-rearing tasks, the delegation of family roles to them, and men's historical dominance in the family and in society. The attitudes connected with the child-bearing function are those most commonly evoked in the discussion of women at work. These are often used as rationalization and justification for the status quo. What is regarded as necessary, natural, and just, are the efforts to seek alternative solutions is thereby undermined (Epstein, 1971: 3).

Construction as a career path is still regarded largely as a male domain, and entering this career path is a challenge for most women. Nonetheless, there are women who are active in the entire spectrum of the construction industry, constructing houses, roads, dams, schools, and casinos (Moodley, 2006: 1). Women are not taken seriously as professionals in the construction industry. It begins at an early age when girls are not encouraged to pursue technical subjects at school, are taught by mostly male lecturers at college and continues in the workplace where they are seen as a temporary asset. Women are often paid less than men, are undervalued and regularly not considered for promotion (Fisher, 2002: 1). "The ball is rolling now. We must lift the aspiration of women and encourage them to pursue a career in construction. This issue will not go away. We need to make improvements at all levels." (Fisher, 2002: 2)

The construction industry, as one of the last male bastions, has seen a significant degree of resistance to concepts such as gender equity, affirmative action and resentment at what is seen as the 'big brother' approach of the government's social justice agenda. There is a widespread misinterpretation of equal opportunity, with men either taking the stand that women are not equal physically or that if they want equal opportunity they must demonstrate that they can do everything in the very same way that a man does on the construction site (Pringle & Winning, 1998: 220). Men who have been developed viewing themselves as superior to women have great difficulty coping with women at management level. Balanced men will happily accept women in the boardroom and acknowledge that they have worked with men who do accept women on an equal footing (Hayward, 2005: 33).

Vinnicombe and Sturges (1995: 1-19) suggest that some organisations operate a double standard for marriage: they view the married male manager as an asset, with a stable support network at home allowing him to give his undivided attention to his work, but they view the married female manager as a liability, likely to neglect her career at the expense of her family at every opportunity.

Competencies of Women in Construction

It is vital to retain women at every stage of their career. Mitos (2001) has argued that there is a need to recognize the promotion of women in science as crucial to improving the relationship between science and society, in order that science better reflects the diversity of the entire population. Logue and Talapessy (1993) suggest that the lack of women in science poses a threat in terms of a number of aspects (Powell, Hassan, Dainty & Cartert, 2007: 347-348):

:

- Equity – gender discrimination is a violation of human rights;
- Excellence – the under-representation of women threatens excellence;
- Efficacy – the ageing population and the shrinking pool of young scientists makes it essential to target both genders, and
- Efficiency – it is wasteful to educate and train women scientists, but then not use their skills in employment.

The Council of Europe (1999) identified 3 goals with regards to women in science and technology (Powell, Hassan, Dainty & Cartert, 2007: 347-348):

- To improve our information on the place women occupy in science and technology;
- To improve girls' access to scientific and technological studies and careers, and
- To achieve greater equality in the relationship between men and women throughout society.

Most women sought site-based experience in their early career stages; in contrast they tend to seek experience on smaller projects within regionally-based divisional companies. Women felt that smaller projects would allow them to gain a broader range of skills and experience, which would help them to demonstrate their competence to male colleagues who were skeptical of their ability. Women were encouraged by senior male managers to enter supporting roles which tend to be office based. Such positions, which tend to be removed from the production function, were widely acknowledged not to afford as many opportunities for rapid advancement (Bagilhole, Dainty & Neale, 1999: 355).

Women's self-perception and the understanding of it by men is important because it helps to explain how women make sense of the barriers and challenges they face in a male dominated environment and culture, and how they seek to attain positive outcomes for themselves. When comparing women in construction with women in other male-dominated and female-dominated industries there is minimal variation in self-perception. Women in the construction industry emerge relatively positive with the highest overall self-esteem which is encouraging and surprising when considerable evidence of significant barriers to entry and career progression for women in the construction industry is taken into account, compared to that of other industries. This indicates that the construction industry is not a special case and that support strategies used in other industries are directly transferable, although the culture of the construction industry makes it more difficult to implement. Women who work in male-dominated occupations in particular are often thought to be sexless. The woman who takes her work seriously – the career women – traditionally has been viewed as the antithesis of the feminine woman (Epstein, 1971: 23).

Women were excluded from certain jobs, and from career progression through jobs, because of the expectations that they would marry, have children, and take responsibility for raising them. Employers are segregative and inflexible about the designation of the appropriate gender for jobs, because their utilization of fixed capital and organisation of work are closely linked to the process of sex-typing of jobs (de Groot and Schrover, 1995: 4). Women workers are generally denied access to formal training in traditionally masculine areas of work. Comparing the skills required in women's and men's work is therefore not simply a technical matter. Women's work tends to fall into the unskilled or semi-skilled categories of official classifications (de Groot and Schrover, 1995: 5). Women have intrinsic values – they are quietly determined, have learnt to read others and understand them and make good team leaders. Women should be recognized for their strong qualities, and society should appreciate the added value women offer (Fisher, 2002: 1). There is this idea that women are emotional and not able to strategise and give clear direction. "That's not true...if women can organize in the union like they do at home, we can have very strong women leaders." Men are brought up to be leaders. Women are brought up to follow men, as second class citizens. They are not expected to lead or make decisions and because of this most women do not believe it is possible that they can. Many do not even try. For those women who do, it is a long battle to be accepted as leaders by other women and men. They have to do the job better than men just to prove they can do it (Basckin, 1991: 15).

Palomar-Fresnedi says: "When it comes to being 100% focused on a situation, the men come out on the top: They are naturally 'wired' to have one thing going one hundred per cent and to do it well. I think if they have ten things going at the same time it's more difficult for men. Women seem to do well in situations where they need to manage different projects. That's just in their nature."

(Hayward, 2005: 36) Guy Mollet says: "In my experience, women in managerial positions are more demanding than their male counterparts. They tend to be less tolerant of incompetence, because they usually had to fight quite hard to get their job. That might be why men are reluctant to work for female bosses!" (Hayward 2005: 52) The glass ceiling is still there, but disappearing in a number of places, there are definitely some fissures and women now have that confidence to go out and promote themselves knowing that they are able to do the job and to do it well (Hayward, 2005: 34).

Challenges Faced by Women in Construction

Barriers to women entering and working in the construction industry have been identified (Fielden and Davidson, 2001: 293-304; Benett *et al.*, 1999: 273-291). The barriers include: the industry's masculine image, construction related career knowledge amongst students and adults, selection criteria on male-dominated courses, recruitment practices and procedures, sexist attitudes, male-dominated culture, and the work environment. Gale and Cartwright (1995: 3-8) characterize the construction industry's culture as constituting: male domination, crisis, aggression and conflict, gallant behaviour, and traditional attitudes. They consider one of the prerequisites for employment in the industry is the initiation into such a culture, through the socialization process inherent in the education system. Essentially they state lack of education deters the initiation into the industry's culture and hence employment.

Women that join the industry are hence compelled to adapt 'male values-cum-construction industry values' for them to survive (Dainty *et al.*, 2001: 297-304). Gale (1999) contends that for women in management positions the burdens placed upon them in this regard are enormous, and often happen at a time in their lives when they are trying to manage the requirements of young families, ageing parents and developing their own careers. In addition, such women face the psychological anxiety of the conflict between spending time pursuing their careers, and the remorse of not spending enough time with their families. A major obstacle to women's movement into wage labour has been stated to be a combination of patriarchal relations and the traditional division of labour by sex. Division of work according to socially constructed values such as the gendering of work exacerbates women's disadvantaged position and is significantly pronounced in the culture of the construction industry (Gale, 1994: 3-14). Prejudice and bias unfortunately still exist in the work place in terms of performance and salary. Managers sometimes fail women in a role to prove themselves right. Some may go as far as increasing the workload or complexity of the work to ensure failure bearing in mind that even the most experienced men in the same position would not cope (Govender, 2007: 2).

Equipping women with construction related skills as well as giving them confidence to improve their development, ensures that women engage in self-build housing projects, which not only ensures that women have adequate shelter, but also that they earn an income from these skills. Getting women to participate in the construction industry empowers women to harness their development, which reduces vulnerability amongst women. The women in South Africa are waiting to release their strength and ability in order to prove they are able to work in the construction industry. Women demonstrated that they are capable of joining together to make a difference when faced with significant challenges. Stereotypes were broken by both women making their mark in the male-dominated construction industry and by doing away with social stereotypes, which state that women are not competent when dealing with hard labour. Men are traditionally seen as technically competent and creative. Women are seen as incompetent – suited only to work with machines that have been made and are maintained by men. This negative association between women and technology is one of the features of the sex typing of jobs. Men identify themselves with technology, and technology is identified with masculinity (de Groot and Schrover, 1995: 1). There are minimal categories of women's work that are designated as skilled, because of the pervasive belief that women's work is by definition unskilled. Female skills are considered complementary to male skills. If women lack a certain skill, men are

supposed to possess it, and vice versa. All jobs done by men, simply by virtue of the fact, are seen as more skilled than those done by women. Women's skills, such as cooking, caring and sewing, are seen as 'natural' (de Groot and Schrover, 1995: 5).

While for men the 'glass ceiling' may be just a myth, for many women it is a source of actual frustration and can potentially spell the end of their career unless they can find a way to break through. Why can't women secure the top jobs? There are several issues. Hayward (2005: 29-32) argues that there is a huge and widening gulf between the perception of whether women can successfully take on a management role and their actual talent, ability and skills for doing so. There's also the changing culture of the workplace; the traditionally 'female' skills involving communication and team building are more essential today than they have ever been, which could actually put some traditional male 'macho' men at a disadvantage as their traditional empire crumbles around them. At the launch of SAWiC, Sigcau (1999: 1) said: "To have gained entry in what is regarded as male terrain must have called for great courage – despite the odds you have lived up to the challenge and proved to be worthy players in the mainstream economy of the country."

At the Annual General Meeting of SAWiC, Bici (2002: 1-5) said: "A milestone does not mean the end of the road. It signifies the end of a stretch and the beginning of another. We are fully aware of the challenges many have to face in order to gain recognition. These obstacles are universal in occurrence and afflict women contractors and women in construction in many parts of the world, including developed countries such as the UK and the USA. Women universally still find it difficult to penetrate and persevere in the male-dominated built environment, including construction."

The barriers to women advancement were identified as, *inter alia*: as arising from the industry's macho image; male-biased construction education courses; selection criteria; recruitment practices; sexist attitudes; male dominated work environment and culture, as well as a general lack of women representation in the industry's many formal structures. There are many battles women have to wage before they win the war against prejudice. When Marcia Rackley was installed as the 47th President of NAWiC, she dedicated her term of office to 'plugging into the power of women'. The concept referred to the construction industry's critical need for labour and the average woman's desire for achievement (Bici, 2002: 1-5).

Although Niall Fitzgerald says: "I believe it is increasingly important that women should stop feeling they have to be like men to succeed like men. This is going in the wrong direction." (Hayward, 2005: 48), Fisher (2002: 1) says: "Women must seize the opportunities and make things happen."

RESEARCH

Methodology and sample strata

The total number of general contractors (GCs) registered with the East Cape Master Builders Association (ECMBA) is 109. The registered contractors include probationary, standard, and master contractors. Given the poor response rates relative to previous research studies, it was deemed necessary to randomly select GCs from among the 109 registered GCs, more specifically from the standard and master registered GCs in order to maximize the number of responses. These GCs were contacted per telephone and asked whether they were willing to participate in the research and questionnaires were sent via facsimile and hand delivered to those who agreed. The total number of GCs that indicated they were willing to participate totaled 56. A covering letter stating the purpose of the survey, contact and return details was attached to the questionnaire. Respondents were assured that the data provided would be treated with confidentiality and anonymity. The questionnaires were returned by the GCs via facsimile with the exception of four GCs who requested that the questionnaire be hand delivered to them. These

were then collected in person. A list was evolved to facilitate the control process of sent and returned questionnaires, as well as those who could not be reached due to technical problems experienced with their facsimile machines.

11 Responses were received from the 56 GCs that indicated they were willing to participate, which equates to a response rate of 19.6%.

The design of the questionnaire

The primary aim of the questionnaire was to obtain data that was relevant to the problems being researched. The questionnaire was compiled based upon literature relative to the various sub-problems. The qualitative research method was applied, which constitutes the focus on phenomena that occur in the 'real world' and involves studying these phenomena in all their complexity (Leedy, 2005: 133). Most questions were based on a five-point scale being either:

- 1 (minor) to 5 (major);
- 1 (strongly disagree) to 5 (strongly agree);
- 1 (rarely) to 5 (mostly), and
- 'No' and 'yes'.

An 'unsure' option was provided for most questions.

Findings

Terms used when commenting on the data are defined as follows:

- Minority - 33.3% and less
- Less than half - 33.3% and more, but less than 50%
- Half - 50%
- More than half - greater than 50%, but less than 66.7%
- Majority - 66.7% and more, but less than 80%
- Nearly all - 80% and more, but less than 100%, and
- All - 100%

More than half of the respondents' organisations employed > 12 < 35 employees, whereas the minority indicated ≤ 12 employees. Only one respondent indicated 100 employees. However, the organization specialises in major building work, and has been in business for over 20 years.

Less than half of the respondents indicated their organisations employed > 1 < 4 women. The majority of respondents indicated that their organisations employed no women. However, one respondent indicated that their organisation employed more than 15 women.

Less than half of the respondents indicated that their organizations employed women in management positions, which varies between > 1 < 4 women. More than half of the respondents indicated that their organizations have no women in management positions.

More than half of the respondents indicated that women are not taken seriously as professionals in construction. Slightly more than the minority indicated that women are taken seriously as professionals in construction with the exception of one respondent who indicated unsure. Fisher (2002: 1) concludes that women are not taken seriously as professionals in the construction industry. It begins at an early age when girls are not encouraged to pursue technical subjects at school, are taught by mostly male lecturers at college, and continues in the workplace where they

are seen as a temporary asset. Women are often paid less than men, are undervalued and regularly not considered for promotion.

Most of the respondents, namely 81.8% indicated that women are prepared to work harder in order to be successful if given a chance to prove themselves. 18.2% of respondents indicated that women are not prepared to work harder in order to be successful if given a chance to prove themselves. Hayward (2005: 5-27) concludes that in today's society women are increasingly making conscious decisions about their lives and taking responsibility for their actions. In some industries and particularly those dominated by men, it can seem a time-consuming battle for female recognition. The stereotypes of the permanently glamorous and polished, short-skirted female executive or that of the battle axe have now given way to a more realistic picture of women who are prepared to work hard for their success.

The majority of respondents believe that women seem to do well in situations where they need to manage different projects all at once. However, it is notable that 18.2% of the respondents were unsure.

Nearly all respondents, namely 90.9% believe that women have the confidence to pursue and motivate themselves in the construction industry knowing that they are able to do the job, and do it well. There were no negative responses, and limited unsure responses. Hayward (2005: 34) concludes that the 'glass ceiling' is still there, but disappearing in a number of places, there are definitely some fissures and women now have that confidence to go out and promote themselves knowing that they are able to do the job and to do it well.

Most of the respondents believe that women have made great strides in construction, but that the 'glass ceiling' is far from being shattered. The remainder of the respondents were unsure. This finding concludes that women have made great strides in business, but the 'glass ceiling' is far from completely shattered. Women still earn less than men, encounter various challenges in order to obtain promotions and venture capital, and have fewer role models. In addition, women typically continue to take on most of the burdens at home, which makes it more challenging for them to manage a career.

All the respondents agree that despite the increase in the number of women being employed in the construction industry, they still constitute only a very small percentage of the industry's workforce. Epstein (1971: 9) concludes that an increasing number of women are now entering this traditionally male-dominated environment which is not surprising, although the numbers are still minimal when compared with men. Currently less than 10% of the 3 257 registered emerging contractors on the government database are women. Few women are at the top anywhere in the world. Despite the wide base of female professional personnel in construction, the number of women decreases disproportionately relative to the top in the hierarchy, both professional and governmental, and things do not seem to improve. However, Fielden, Davidson, Gale and Davey (2000: 113-121) conclude that there are currently in excess of 11 million women employed in the UK, accounting for 49.5% of the workforce. Despite increases in the number of women employed in the construction industry over the past decade, they still constitute only 13% of the industry's workforce. This indicates that construction continues to be the most male dominated of all the major industrial groups (Fielden, Davidson, Gale & Davey, 2000: 113-121).

CONCLUSIONS

It can be concluded that construction is still largely regarded as a male domain and that women are not taken seriously as professionals in construction. Society, tradition, organization culture, and sexist attitudes play a major role when appointing women in leadership positions. Construction should not be male dominated because it is considered rough and tough and that women should be given a chance to prove themselves in the construction industry.

There is a clear indication that commitment, dedication, acknowledgement, responsibility and confidence have a major impact on the core-competencies of women in construction. Self-promotion does not have a major effect. Women are prepared to work harder in order to be successful if given a chance to prove themselves. Women seem to do well in situations where they need to manage different projects all at once. Women in managerial positions are on a major basis more demanding than their male counterparts. Women have the confidence to pursue and motivate themselves in the construction industry knowing that they can do the job and complete it successfully.

To participate in construction takes great courage mainly because it is regarded as male terrain. Women have to face many challenges in order to gain recognition in the construction industry, which makes it difficult to penetrate and persevere in the male dominated environment. Women can succeed in construction using their female skills without having to adopt a masculine approach. Women have made great strides in construction, but the 'glass ceiling' is far from being completely shattered. Women's representation in the construction industry's formal structure ranked first among the factors that constitute barriers to advancement of women in construction followed by male dominated work environment and culture. It is increasingly important that women cease thinking that they have to be similar to men in order to succeed as men do.

Despite the increase in the number of women being employed in the construction industry, they still constitute only a small percentage of the industry's workforce. Relative to succeeding in construction, the competition is tough especially when competing against your male counterparts. It can be deemed that the construction industry's boardrooms are sadly lacking women in MD posts as well as in CEO posts in the construction industry. Women are seldom employed in construction as the maximum amount employed constitutes about 1-4 women employees.

RECOMMENDATIONS

The recommendations are aimed at manipulating the male-orientated culture. Initiatives aimed at the management of culture have been shown to be more successful when they are integrated into packages of change initiatives. The range of equality measures should comprise a mix of gender-specific initiatives aimed at improving women's careers, and at addressing the barriers to women's careers. If women must participate optimally in the construction industry, strategies aimed at mainstreaming women into construction need to be embarked upon.

Appropriate steps should be taken to create a more equitable work environment through the development of cultural change within construction organisations. It is only through a genuine commitment to the development of a more equitable industry from the highest level, that women are likely to be able to develop their careers in parity with men. However, if more women can be retained in this way, then this may in turn lead to a further increase in the number of women entering construction as those obtaining management positions act as role models for future entrants. The main implication for organisations in the construction industry is that they need to improve the industry's image if they are to attract women graduates. Organisations need to provide mentors for undergraduates and young graduates entering the construction industry. The mentors should ideally be women who would also act as role models to women entering the industry, although male mentors would help reduce some of the stereotypes of management through increased interaction with women recruits.

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INTERNATIONAL CONFERENCE ON MULTI-NATIONAL CONSTRUCTION PROJECTS

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Multi National Architecture Design Processes, A Case Study; Istanbul

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ABSTRACT

Architectural design is a complex process which consists of many sub-processes. The borders of architectural design sub-processes are not defined clearly. Many actors from different disciplines play a role in these sub-processes. Multi-national architecture is defined by various professionals from different nationalities who take roles in sub-processes which are conceptual design, construction project and construction. The standardization of the building elements turn out the building construction methods standardized and these circumstances, combining with globalization, increase the multi-national construction all over the world.

Turkey's geographic location and construction-based economy are the main reasons of demanding the multi-national architectural projects in Turkey. On the other hand, the leaders of the contractors in Turkey are located in Istanbul. This enables Istanbul to be an abundant example of an urban development to examine multi-national architectural design processes.

In Istanbul, architectural offices are grouped in two main groups. The first type consists of local offices, which are founded by Turkish architects, whereas the second type consists of offices which are associated with foreign offices. In this study, the interviews, in the subject of the multi-national design process, are realized with the chief designers of the architectural offices. The data of the interviews are modelled according to the identified parameters. Examining the multi-national design processes in Istanbul and developing a major method by grouping these models is aimed to be presented as a result of the study.

Keywords: Design process, actors in design, architectural office types

1. INTRODUCTION

Architectural offices in Istanbul, which work on multi-national design jobs are examined in this paper. Design methods of architectural offices in Istanbul were examined in the master thesis study of Fatih Yazicioglu in Istanbul Technical University, which was named “Detail Design For Application Process In Architectural Offices in Istanbul”, in 2007. In that study, some of about 3000 offices in Istanbul were examined by survey, face to face meeting, and observation. It was realized that some of these offices work in multi-national architectural design projects, and use different methods in these projects.

The dense use of communication devices and the increasing amount of data exchanged in the world defined this period of time as information era. Although data was exchanged for a long time in history, it is the increasing speed of this exchange which gives life to the concept globalization. The concept globalization effects architectural design and construction processes by the appearance of multi-national architectural projects. It can be said that there are 3 major types of multi-nationality about the architectural offices in Istanbul. All 3 types of architectural offices are located in Istanbul but the first type of architectural offices belong to foreign architects, the second type of architectural offices belong to Turkish architects, the third type of architectural offices also belong to Turkish architects but work in cooperation with foreign offices, and these 3 types all produce architectural designs for some place outside Turkey.

2. ARCHITECTURAL DESIGN PROCESS

This study is about the research of how architectural design process is preceded during the multinational architectural projects in the architectural offices in Turkey. The organizational frame and the roles of the actors who take place in the architectural office are the first main subjects which firstly will be mentioned. In this context, architectural design process, architect, architectural office, multinational architectural services and the situation of Turkey through these key words is the guide for the second part of the study.

2.1 Architectural Design Process and Architectural Office Concept

At the present day, designers develop their own design methods upon some identified basic approaches and it is accepted that experiment is the main factor for this development by various specialists. Besides, during the design process it is not the only subject to design an object but the design method and design of the whole process is also considered (Broadbent, G., 1969).

On the contrary to the times when architect is identified as the designer and the constructor of the building during the production process, at the present day each phase of the production process of building needs to be analyzed by the specialists. Evaluation and complexity of the buildings that reached today's situation makes difficult to complete the whole processes of architectural design, architectural project and construction by a single architect. Consequently, the phases which are mentioned are not realized by a single architect but executed by a team. So the team members and the leader architect constitute the architectural office.

The task of the architectural office differs according the countries and they are edited by several associations. The editions are related with the work types of the architectural offices but do not identify how these works should be done in the architectural office. This situation takes it root from the subjective frame of the architecture. This subjective frame is related with the architectural education of the members of the office and the working experience after education. By the reason of the architectural practice realizes the architect's personal

ideas, architectural design has a flexible frame. Thus the architectural offices has individual interoffice organizations.

Architectural organization of Turkey is defined by the related law. The organization which gathers all architectural offices together is named as Architectural Chamber of Turkey. This organization has sub-divisions and is formed as representative offices in the cities of Turkey. The tasks of these representative offices can be identified as registering the architects to the chamber and controlling the registration, allowing the project to be built where the selected geographical area is under the responsibility of the office and controlling the architects of this project, having a voice when there is a conflict in the area that is under their responsibility. Architectural services are divided into four parts in Turkish Republic. These are the first draft, direct project, application project and detailing. These parts can be summed up as the first draft consists of the architectural design decisions, direct project is the part that the construction method and tools defined, application project is the part that appropriate measuring and detail points are defined, detailing the drawing of the details.

2.2 Multi-national Architecture Service

The credits, investments and contractor services of multinational market create architectural service demand. As a result of globalization, the fame of the architects spread all over the world and demand for the projects of these architects from various countries is resulted as multinational architecture service. Additionally, international architecture design competitions enable architects to built their projects in the various countries.

Turkish architects offer architectural services to foreign countries, firstly the Islamic ones and then independent countries which are established after the dispersion of The Soviet Union. After the procuring mutual confidence, some of the Turkish architects offer architectural service to these countries directly. Besides, Turkish architects have a chance to take the role of architectural design contractor where Turkish contractors take place as contractor in the foreign projects. There are also some Turkish architects who create their own opportunity or win the competition of international architectural design projects so that they construct buildings in the foreign countries.

Upgrading the standards of architectural service and improving themselves not to get behind the revolutions of contemporary architecture are advantages of multinational projects for the architects who take place in this process. By strengthening the attempts of presentation of the architectural potential of Turkey throughout the country and the other countries, can increase the multinational architectural offices in Turkey.

Multinational architecture project can be mentioned as contribution to universality of architecture. The competitions which are open to international participation encourage architecture students and opens new directions for professional architects. Professional experience and accumulation level in Turkey will be raised by working with foreign advanced architectural offices as partners.

3. CASE STUDY

Architectural design, architectural practice, and architectural office, concepts and the meanings of these concepts in Turkey were examined in the above sections of this paper. In this section the architectural design methods of some architectural offices in Istanbul which take a role in multi-national design processes are going to be examined.

3.1 The Method Used To Select The Offices, Scope

3 major types of architectural offices were chosen to be examined in this study. All these 3 types of offices are located in Istanbul, and produce architectural projects which is going to be constructed outside Turkey but the first type of offices belong to foreign architects, the second type belong to Turkish architects and the third type also belong to Turkish architects but have foreign partners.

Foreign architects practice architecture in Turkey since the beginning of the 20th century. Turkish architecture was effected by the western style because of the foreign architecture teachers in the architecture education and also the designs of foreign architects in Turkey.

Today there are examples of buildings which were designed by some foreign architecture offices. Foreign architects either open an office in Turkey and design buildings for Turkey or design buildings for Turkey from their original office in another country. The buildings which are constructed in Turkey was held out of this study without looking if their designer is Turkish or a foreigner. Only the offices which design buildings to some other country than Turkey but which also has somehow relation with Turkey.

The foreign-based architectural offices in Turkey take place in İstanbul. In the consideration of the position of İstanbul in Turkey and the head quarters of the firms such as trade, construction and architecture take place in İstanbul are the reasons for defining İstanbul as a border of this study. İstanbul is a candidate to be a world-city with its architectural character that attracts foreigners' attention. International Union of Architects, UIA 2005, World Congress, which was performed in İstanbul and had more than 10thousand participant-architect, provide the potentials of İstanbul to be discovered. As a result of globalization, it can not be ignored the effect of the worldwide images but famous-architect-invited competition projects in Turkey also present the importance of multi-national architecture in Turkey.

Istanbul is one of the boundaries of this study as mentioned before. In the consideration of this data and according to the interview with the Chamber of Architects İstanbul Office, there is no classification about the registered architectural offices' practices if they are related with the foreign countries or not.

There are nearly 13thousand architects and 3thousand registered architectural offices in İstanbul and these numbers enables classifying. In the consideration of this situation, Professional Architect Association, İstanbul Office is defined as the research field for this study which has its own identified rules for registering and the selection of members is realized according to these rules. As a result of this selection, the members naturally take place on a higher level by their architectural practices than the other architectural offices. The results of this study which include the members of this organization can not be arrogated to the whole country and architecture media of Turkey. But there will be meaningful results for this type of architectural offices, so the second boundary of the study is defined with the organization Professional Architect Association, İstanbul Office.

Additionally, the working methods of Turkish architectural offices which execute projects with foreign architectural offices as partners are evaluated in this study. In this context, the projects which are held outside Turkey is the feature of the projects for choosing the office to implicate this study.

3.2 Research Method

In the study, get across with the members of the organization and 23 of these take place in this

study. Three of the architectural offices which have the continuity and systematic multi-national-projects developing architectural offices have been researched. Additionally, two of the architectural offices that work in global scale and have offices in İstanbul are evaluated in this study.

First of all, face-to-face interviews have been realized with the head designers or the owners of these offices. As a result of these interviews, the diagrams are created which represent the offices' design process in a holistic way. The architectural office's working method, at which level the project is given, which tasks it undertakes, what sub-processes there is in the office, what tasks the workers undertake, at which level the project is delivered to the contractor or employer, what tasks office has after delivering the project are the subjects that are pointed out in these diagrams. After creating the diagrams, they are checked according to the interviews with the office workers.

3.3 Findings

At the end of the examination of 25 architectural offices in Istanbul, 5 offices were found out that they work on multi-national architectural processes systematically. These offices are observed deeply. The specialities of these offices are listed below:

3.3.1 Office A

The office consist of 2 partners and 7 employees. It is rather a young office which is about 15 years old. They work on architecture, interior design and urban design areas. They produce many projects both in Turkey and abroad. The projects they produced abroad are located in New York, Azerbaijan, India, Kiev, Sarajevo, Jordan and Qatar. The office evaluate conceptual projects and if the investor likes it, the office evaluates the concept in coordination with the contractor. The contractor is important for the office because most of the projects are brought to the office by the contractor.

3.3.2 Office B

This office consist of 2 partners and 10 employees and is 35 years old. The office has been active in the fields of projecting and consulting. With the second honor prize of the "London Islam Cultural Center and Mosque" competition, UMO has gained international recognition as well. During this 50 years, UMO has prepared complete project and tender files for buildings of many official, semiofficial and private establishments. It has also undertaken the technical control, supervision services and construction organization for some of these works. The company has undertaken a great number of buildings, building groups and structures of various types both in Turkey and abroad. The office works on many big projects which are locate especially in the Turkish countries in the Asia. It uses a similar method with the office A. But this office works on the phases which are related with the engineering more.

3.3.3 Office C

This Turkish office was founded in 1950's by the father of one of today's 2 partners. It has 75 employees. One of the main aspects of their work is to achieve such success in design and building technology in Turkey and abroad that will set an example for the contemporary modern architecture. The Office renders services of projects and counselling in architecture, urban planning, and interior design, in national and worldwide scales. The office developes many big architectural projects projects in many countries in Arabian Peninsula, Asia, North Africa. It has many projects which have been done by its foreign partners. In these kind of porjects the office usually evaluate the concept together with its partner but evaluete the other

phases by itself.

3.3.4 Office D

This office was founded by 3 English partners in London and it is about 60 years old. The Turkish sub-office was established in Istanbul under the leadership of a Turkish senior partner in 2000. It has 15 employees in Istanbul office. Since then the Istanbul practice has carried out several architectural and interior design commissions for a variety of building types including airport terminals, shopping centers, offices, hotels, residential and leisure developments. The sub-office in Istanbul evaluate the conceptual projects in cooperation with the head office, detail design and the application projects are developed in the Istanbul office.

3.3.5 Office E

The history of this office goes back to 1960's and it has sub-offices in 22 countries. The head office takes place the United Kingdom and there is a sub-office of it in Istanbul. There are over 1000 employees in this office. The Istanbul sub-office of it has just founded. The Istanbul sub-office works on the application projects of the studies of the office which were conceptually developed in the head office. Most of these offices are located in Asia, North Africa and Middle East.

4. MULTI-NATIONAL DESIGN PROCESS MODELS

After the examination of the offices, it was found out that the design processes of the foreign architectural offices in Turkey use similar architectural design methods. On the other hand there are two different types of architectural design processes among the Turkish architectural offices. In this section of the paper the similar architectural design processes are grouped and modeled both with graphics and with literary.

4.1 Model A

It can be said that there are 2 major types of studies in the foreign architecture offices in Turkey. The first type consist of studies which are done for Turkish investors and are located in Turkey. These offices starts these projects from the conceptual phase and complete all the other sub-processes like design project or application project phase. They also control the application phase to ensure that the application is done according to the projects. The second type of studies of these offices are projects which conceptually developed in the main foreign office, and sent to Turkey. Turkey division of this foreign office detail design these concept projects and produce application projects.

The design process in these offices consist of these sub processes: The investor goes to the main foreign office and explain his needs. The main office produce some concept alternatives and present them to the investor. The investor choose an alternative and the main office produce the design project of this concept. In this phase the constructor which is usually chosen by the investor is also participate the process and guide the project to be feasible according to the construction capabilities. After the completion of the design project another phase starts in which the design is going to be detailed for construction. Usually if the geographic location of the project is somewhere in Asia, Middle East or North Africa, the design project is sent to the sub-office which is located in Istanbul.

In the phases which takes place in Turkey the design project is controlled and developed from the beginning and redesigned and revised according to constructability. Engineers involve the process and start to produce the engineering processes. The engineers can be Turkish or

foreigner who were chosen by the investor, constructor and main architectural office. The detail design of the building elements are also made in Turkey, the building system and material alternatives are chosen in cooperation with the main office. At the last step all the drawn and written documents are combined in Turkey and the application project is delivered to the investor and/or the constructor. The control of the application is usually organized by the main office.

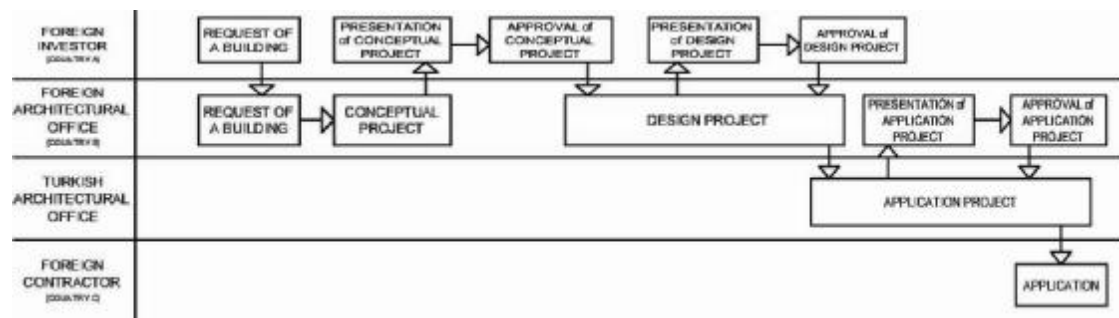


Figure 1. Architectural design model A in multi-national architectural design processes in Turkey

4.2 Model B

The first type of Turkish offices which take place in multi-national projects usually get projects from contractors. These contractors usually want conceptual projects for some place in or around Russia. These conceptual projects are usually visually strong and effective. Most of these types of studies do not evaluate to the later steps but some of them are wanted to be more detailed by the contractor.

The design process in these kinds of studies is as follows: an investor in a foreign country starts to take proposals for a certain construction project. A Turkish contractor who has worked in that country and know the dynamics in that country before take the information about the project and give them to some Turkish architectural offices which are chosen by himself with some personal criteria. But the important thing in this situation is that the contractor know about the dynamics and likings in that country and guide the offices according to that dynamics and likings. Once the conceptual projects are ready the contractor pay for them and take them to the investor. Usually the investor like one of those concepts. After this choice has been made by the investor, the contractor goes to the architectural office which evaluate that concept and want them to evaluate the concept to the later phases.

Once the architectural office starts to work on the application project phase it starts to communicate with the contractor very much. The reason of this is that, all the engineering projects are being developed by the experts who are either an employee of the contractor or the contractor chose them. On the other hand all the building systems and the materials are also chosen by the contractor and are detailed by the experts who are chosen by the contractor. So the architectural office combine and develop all the data which come from directly form the contractor or from the experts who work for the contractor. The architectural office send every new output to the contractor for approval but the contractor also send all new output to the investor who also have both architects and engineers working for himself. After the completion of these phases and the experts of the investor approve the application project the application starts and the architectural office start to control the application to see if the application is being done according to the application project, but this control is usually not so strict. And the contractor may make some differences according to the evaluation of the application.

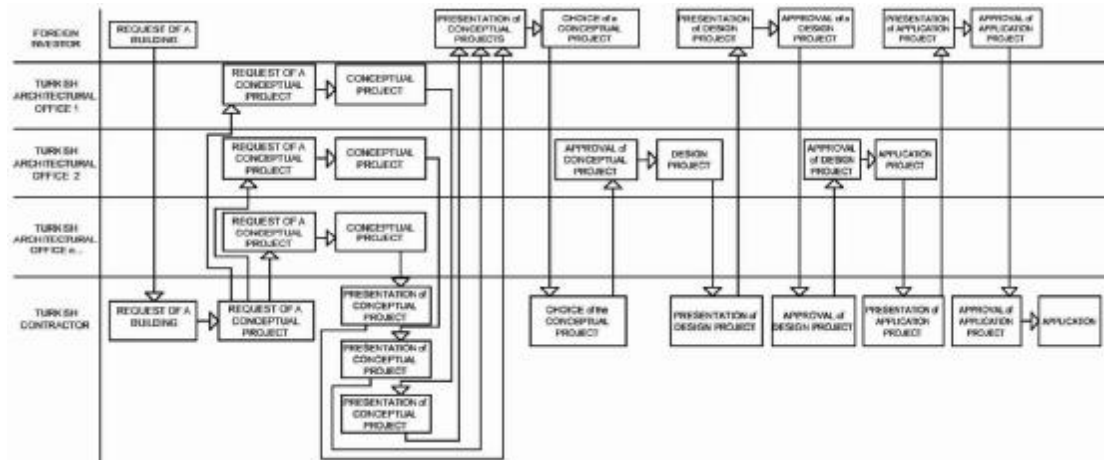


Figure 2. Architectural design model B in multi-national architectural design processes in Turkey

4.3 Model C

A different type of design method is also observed in the Turkish architectural offices. In this type of design method the architectural office evaluate a concept with a foreign partner but evaluate the engineering projects and the application projects mostly in its own capabilities.

The design process in this kind of studies is as follows: a foreign or a Turkish investor goes to either Turkish architectural office or its foreign partner with the need of a building in a foreign country. These two partners evaluate architectural concepts together and present them to the investor and the investor choose a concept. The partners evaluate the design project together but once the need of engineers appear the Turkish office explain the investor that the process will evaluate better if engineers and architects know and get used to eachother and offer the investor to also evaluate the engineering projects also in its own capabilities. If the investor accepts this situation the Turkish architectural office starts to work on the application projects.

All the building element alternatives and materials are considered in the Turkish office and chosen in cooperation with the investor. The detail designs are being made by either the office itself or the building system or material producers detail design their part but the office combine all the data and finish the application project phase. In these kind of studies the application control process is also made seriously by the office itself.

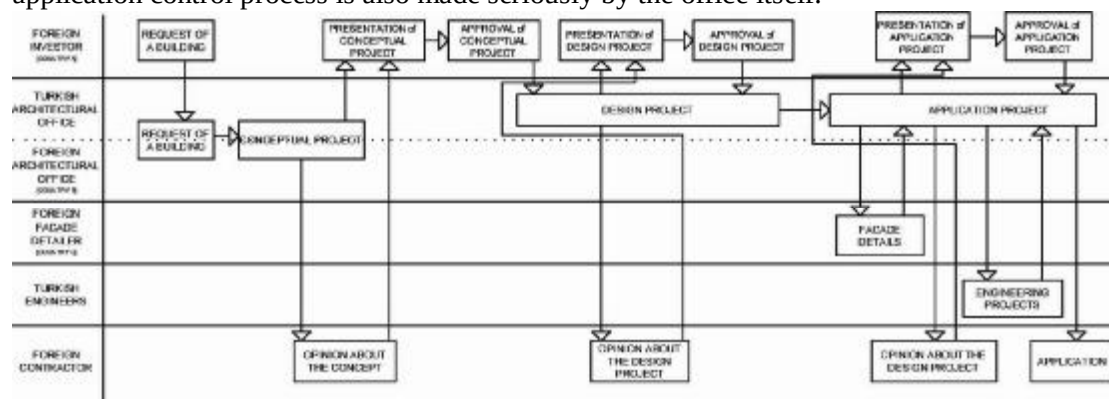


Figure 3. Architectural design model C in multi-national architectural design processes in Turkey

5. CONCLUSION

The main aim of this paper is searching how architecture design offices in İstanbul handle international architectural design works. During this research 27 offices have been examined. While 23 of these offices belong to ISMD (İstanbul Freelance Architects Association), the other 4 are branch offices of worldwide known architectural offices in İstanbul. These offices have been examined through different ways; interviewed with major designers and/or owners, their design process observed in their workplaces, interviewed with employees and sample projects collected.

As a result of these studies, it was seen that architectural design process methods show some similarities. Similar methods have been grouped and three super model have developed. These super models can be seen in the third chapter graphically. The outputs of the study can be summarized as follows:

- I. 8 of the architectural offices work on multinational projects over 25 examined offices.
- II. 3 of the multi-national working architectural offices are owned or/and run as a head designer by Turkish architects; other 2 are globally known architects.
- III. all the Turkish architectural offices that work on multi-national projects fulfills the all activities from concept development to application project in their own structure.
- IV. foreign architecture offices that work on multi-national projects are managed by Turkish architects.
- V. the concept and the first draft is prepared in the foreign countries. Application based design detailed design and application project is developed in Turkey in multi-national project based foreign architectural offices.
- VI. the projects are applied in Turkey or in another foreign country that are produced in multi-national project based foreign architectural offices.
- VII. the application projects are prepared in multi-national project based foreign architectural offices but any task related to application controlling is not being held.
- VIII. most of the employers in multi-national project based Turkish architectural offices are Turkish contractors.
- IX. a part of the concept projects prepared by multi-national based Turkish architectural offices could not proceed to the next step.
- X. generally, Turkish contractor employers of the multi-national project based Turkish architectural offices take concept offers to more than one architectural office for the same project.
- XI. the multi-national project based Turkish architectural offices mostly create the concept project with the information that comes from constructor before seeing the application area.
- XII. Turkish architectural offices that develop Multi-national based concept projects mostly produce images which have visually powerful and 3d modeling.

6. FUTURE STUDIES

The roles of the architectural offices in İstanbul, in the architectural design process of multi-national architectural projects are understood in this study. But the architectural design process is a holistic process which starts with the decision of the need for a building and last with the completion of the construction or further more includes the reuse or deconstruction phases. So in order to obtain scientific and meaningful results the process should also be examined in a holistic approach. That is why, the architectural design sub-processes which are done outside Turkey in the examined offices should also be examined in the further studies.

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INTERNATIONAL CONFERENCE ON MULTI-NATIONAL CONSTRUCTION PROJECTS
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Organizational Model Research for Multi-National Program Implementation --Based On World Expo Shanghai 2010 Construction Program Case Studies

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ABSTRACT

The abstract should not exceed 300 words. Nowadays, multi-national program can easily be found worldwide especially for those boosting countries with construction sites spreading all over in virtue of the global corporation and inflowing financial investment. Therefore, cultural interactions, financing methods, dispute resolution and other different aspects caused by multiple nations might result in ill-influence such as lower construction productivity, overdue projects period, even for projects fail. This paper, based on the World Expo Shanghai 2010 construction program case studies, describes influence and the challenge of construction sites, program management and organizational model characters affected by Multi-nations Cooperation. After the comparison and contrast, the paper brings forward the proper and practicable model for multi-national program's organization as well as some suitable suggestion.

Keywords:

Multi-nations, program management, organizational model, EXPO

1 Introduction

Nowadays, there are increasing numbers of multi-national programs because of global economic integration, construction industry functional division and cooperation, as well as international fierce competition. Taking china for example, lots of influential and large-scale multi-national programs bring into great efforts to the Chinese economy and social development. However, not all of these programs are successful if evaluated by program implement efficiency. The main reason for this phenomenon is multi-national construction programs need more complicated organizational model rather than the single project does. Program Management is the process of managing multiple ongoing inter-dependent projects, with the key character including: multiple projects, focusing strategy, horizontal concurrent, different skill and method, modernized computer assistance. Program management pays more attention to the organizational strategy, program development and the whole plan for the programs rather than project management cares.

This paper, based on the World Expo Shanghai 2010 (hereinafter referred to EXPO) construction program practice, tries to put forward a suitable multi-national program's organizational model in order to improve the implementation efficiency.

2 Case Study

2.1 Background

As the highest and largest comprehensive exhibitive activity in china, EXPO attracts all the eyeballs from all over the world. EXPO construction site locates along the HuangPu riverside, areas between NanPu bridge and LuPu bridge, with theme of “better city, better life” demonstrating sustainable and harmonious city lifestyle. There are 5.28 km² lands for planning and use, 3.28 km² within the toll area and 2.0 km² for service facility. Until Oct. 6th 2008, 223 countries and international organization have already confirmed to attend this EXPO, which creating a new EXPO attendance record.¹ There are three different types for the exhibition as following,

Type 1 : Pavilion designed and built by an official participant on the plot allocated by the Organizer, or Self-built Pavilion. (Shown in the grey block in the Figure1)

Type 2 : Stand-alone pavilion built by the Organizer and rented to an official participant, or Rented Pavilions.

Type 3 : Covered exhibition space in a joint pavilion constructed by the Organizer and allocated to developing countries free of charge, or Joint Pavilion.



Figure 1. World EXPO Shanghai 2010 self-built pavilion location

2.2 Construction Program Characters

How to meet with different multi-national participants' requests and control the quality, schedule, and cost in the meanwhile is the key point challenging the whole construction program. In summary, there are several characters should attached attention as following.

First, EXPO construction is a comprehensive program covering substantial infrastructure projects, multi-national pavilions and auxiliary facilities, such as railway transportation, facility equipments for water, electricity, coal and fuel, etc. Second, the construction program is spatial, which connects #7, #8, #13 subways and Maglev train station both on and under the ground. Besides, the newly built underground areas will over than 400,000-500,000 m². Third, time request for the whole construction is urgent. No matter what happens, the EXPO will open at May 1st 2010, so all the construction programs including infrastructure, pavilions and facility equipment should be finished in time. Four, abundant of coordination work for program are necessary because all the programs should be implemented concurrently in the same areas, within the restrained time and interfaced sections. Five, sustainable development for

¹ World EXPO Shanghai 2010 official website <http://www.expo2010china.com/> Oct. 2008

EXPO construction also should be fully analyzed in order to diminish the construction trash and reuse the buildings in the future.

3 Multi-national Program Management Working Goals

3.1 Program Management Goals System

According to this unique and comprehensive construction, the suited program management targets are different from normal projects. The differences are shown in the figure 2.

The general project management's goals are project's investment, time, quality and safety; Large-scale exhibition project management needs to consider more, such as how to satisfy the visitors and tourists; EXPO program management not only involves those targets above, but also should guide and cooperate with multi-national participants to implement their self-built pavilions according with unified construction planning and regulations.

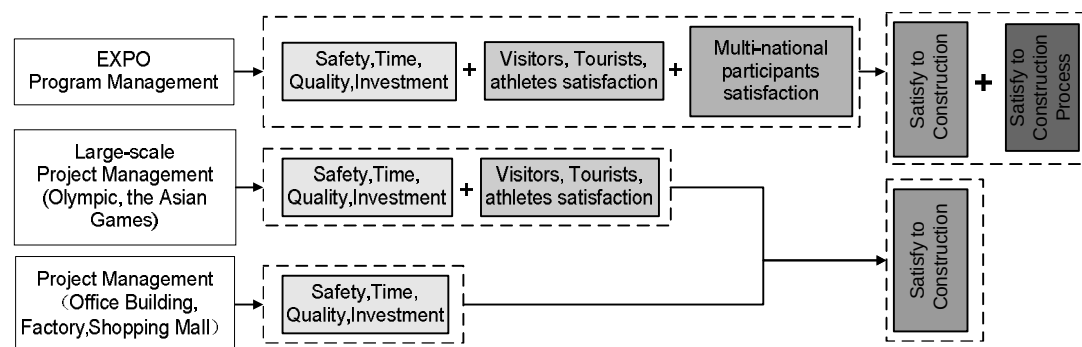


Figure 2. Different Project Management Goals System

All of these multi-national construction complexities make the program management work facing two major problems:

Firstly, there are numerous close cooperation work should be done along the whole EXPO construction process including primary design communication, detail construction design, on-site land survey and land transfer. By doing these, the construction meets with lots of pending troubles with politics, culture, custom, habit rather than only construction itself.

Secondly, EXPO is the worldwide banquet for people both from national and international. Therefore how to satisfy over 200 international enterprises, 70 million tourists (40,000/day on average, 80,000/day at maximum) during the 180 days is such a challenge differing from the general project management.

3.2 Program Management Working Goals and Tasks

The goal of multi-national construction program management, keeping pace with the goal of EXPO whole program management, is to assist, guide, coordinate and promote multi-national participants' construction implement under the premise of the whole EXPO program systematic planning and regulation.

According to the time sequence, multi-national program management can be divided into four main tasks, exhibition invitation, prophase technical communication and coordination, pavilion examination & approval affairs and construction cooperation. Word Breakdown Structure can be used to describe every phase's work tasks as fig.3.

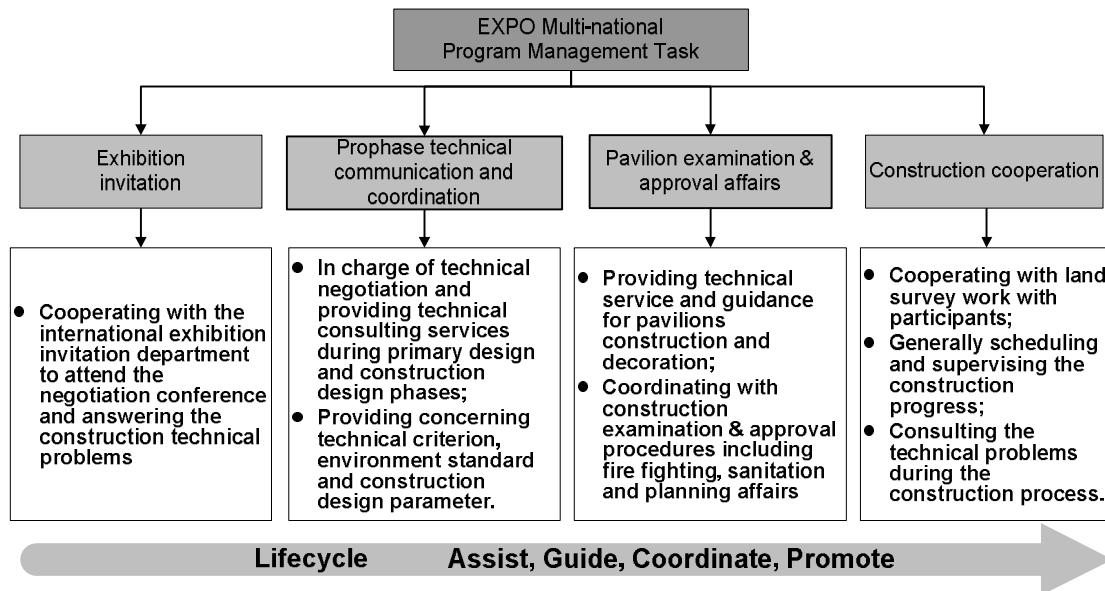


Fig. 3 WBS for EXPO Multi-national Program Management Task

3.3 Problem and Challenge for the Program management work

International official participants attach much importance to EXPO exhibition, which also brings a series of problems for program management coordination as follow:

1) Design coordination

It takes such a long time for multi-national participants to negotiate and locate their self-built pavilions places, so as to delay the time of signing exhibition contracts, overall construction planning as well as facility equipment and infrastructure layout. If the participants give up the self-built pavilions choice and choose rented pavilion, the concerning block, facility equipment, infrastructure, even the overall planning will be changed. Moreover, how to join the facility equipment with all the exhibition pavilions is a problem. For example, considering people flow, climate, green landscape, and exhibition requirement, the host specially designs a 3800 meters overhead sidewalk. However, whether this sidewalk connects to the pavilion and how to deal with the joint, all of these questions should negotiate to all participants because it related to safety, scene, vision etc.

Absolutely, all the multi-national participants hope to realize their various design purpose, architecture style and latest construction technology on their pavilions in Shanghai. Nevertheless there are existing innumerable coordination problems between China and foreign countries along with design process, planning regulation, government examination and approval terms, affiliated equipments, construction standard, land and soil quality. For example, Chinese engineers draft the primary design based on the 1st rough survey and develop the construction drawing based on the 2nd deeply detail survey; comparatively, foreign engineers need enough detail survey materials to draft the primary design in order to finish all the process. This asks for a strict land conditions and more construction prepared workload for the host and the whole program management.

2) Approval coordination

While all the participants starting to construct their pavilions, lots of approval works should be done by program management members including confirming the subject of liability, optimizing the approval flow, examining the scheme and communicating the technical method in the process of applying approval, planning approval and constructing approval.

3) On-site coordination

Because EXPO site locates in the center areas of Shanghai, the program management will exert efforts to cooperate with citizens movement, factory rebuilding, site clearance, land inspection and environment assessment in order to meet with multi-national participants requirement.

4) Other aspects

Multi-national program management covers extensive ranges including providing Shanghai annual weather data, different angle' pictures taken from LuPu bridge, native toilet closestools arrangement, humanized direction mark etc. Besides, program management also should deal with some new problems such as how to balance the Value In Kind (VIK) price and how to charge for the cooling system.

Therefore, a reasonable and practicable organizational model is needed to handle all these problems effectively and efficiently for multi-national program management as well as for satisfying the whole EXPO targets.

4 Multi-national program management organizational model

According to above analysis, this paper designs three different organizational models for the multi-national program management coordination.

4.1 Model 1 – Linear Structure

Linear structure originates from strict army system, representing centralizing the power, and the basic character is that all the positions in the structure are allocated as vertical linear system. Therefore each department only orders its underling branch, while every work unit receives only one command. Multi-national program management linear structure model are shown in the figure 4.

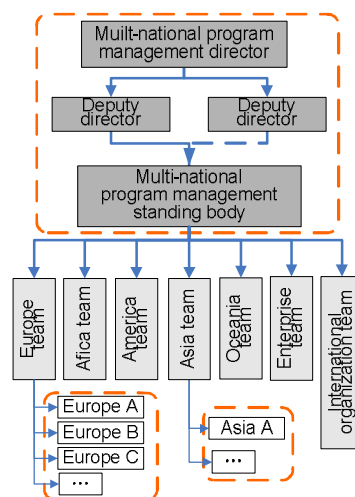


Figure 4. Linear structure model for multi-national program management

The advantages for this model are: avoiding paradox orders from different higher levels, dividing teams into geography areas, transferring the order rapidly, making decision fast, cost-saving, and high efficiency. Linear structure model is generally used as international large-scale project because it guarantees everyone following the only order in the whole organization.

However, this model requires very extreme qualification for the program management director, who should familiarize with all the aspects of knowledge so as to manage each team which takes charge for the pavilions. Also, probably the path of command is too long to jeopardize

the operational efficiency. Therefore this model possibly doesn't match the EXPO multi-national program coordination.

4.2 Model 2 -- Functional Structure

Functional Structure, representing the decentralization, is defined as groups of people together because they use the same kind of skills in an organization and perform a similar set of tasks. functional structure model for multi-national program management is shown in the figure 5.

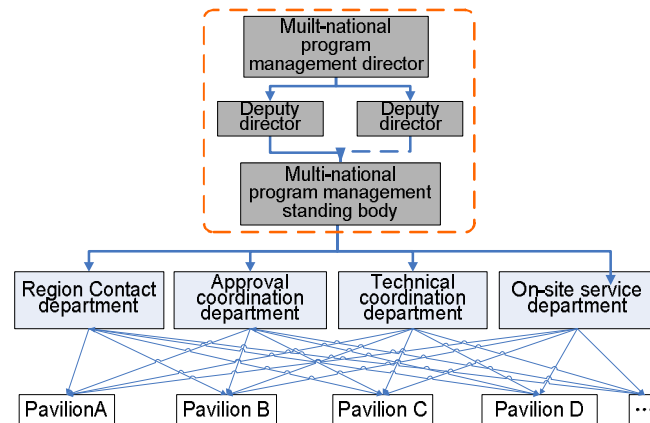


Figure 5. Functional structure model for multi-national program management

The advantages for functional structure model are: functioning the management work, easily communicating among specialists, improving the management specialization, quick decisions. However, every pavilion team usually receives different orders at the same time, which resulting in operational efficient decline and even project failure. Moreover, much coordination work should be done to serve the needs from different regions. Therefore, functional structure maybe not the best one fitting multi-national EXPO program management.

4.3 Model 3 -- Matrix Structure

In matrix structure, there are simultaneously groups of people in two ways- by the function of which they are engaged in investment control, schedule control, quality control, contract management, information management, human resource management, financial management and material management and by the project team on which they are currently employed by different projects department.

If any pavilion received ambiguity or conflicting command, the program management director will coordinate the problem. In order to reducing possibility of paradox command, matrix structure can give priority to either vertical department or horizontal department, which can also lighten the director's coordination burden. The matrix structure model for multi-national program management is shown in the figure 6.

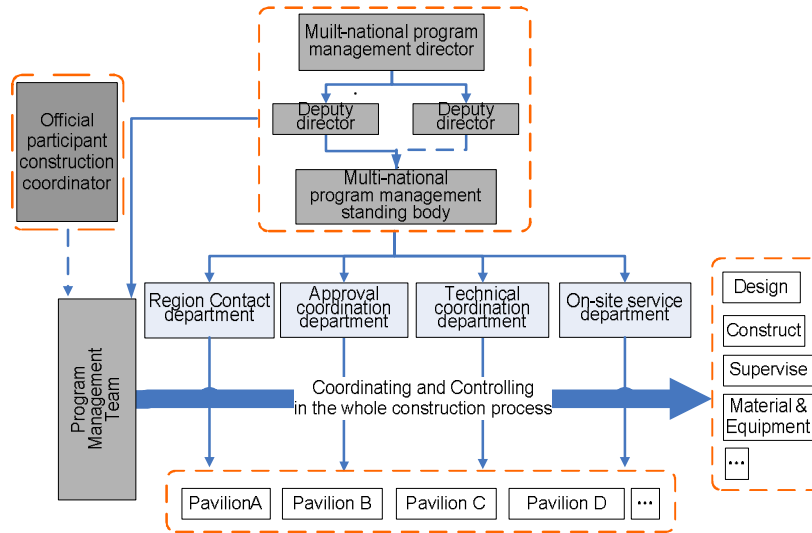


Figure 6. Matrix structure model for multi-national program management

Matrix structure combines linear structure's advantage with functional structure's, benefiting both interior project and exterior project. Meanwhile, matrix structure can rapidly response to the outside environment changes including conflicting, diversity and other projects requirement in order to satisfy various request.

Besides, program management matrix structure model have advantages as follow,

- I Cultivating numbers of specialists familiarized with multi-national program management soon in short time;
- I Coordinating different departments' work easily, and promoting the work efficiency rapidly;
- I Specializing multi-national coordination affairs, and benefiting the operational management effect;
- I Broadening the members knowledge by working together, and accumulating the experience for multi-national program management;
- I Promoting operational capability and integrity cooperation in virtue of people's co-learning and communication.

Certainly, matrix structure has its flaws such as bilateral commands, slow reaction time, and long decision-making, because when encountering troubles project manager have no right to allocate resources but asking for functional manager's negotiation.

Moreover, matrix structure exists other shortage, such as involving n-dimensions of information flow and work flow in the whole process; paying more time and effort on the project initiating stage to establish regulation and procedure.

4.4 Comparison and Suggestion for different models

In summary, the advantages and disadvantages of above three organizational structure models as demonstrated as following table 1,

	Advantage	Disadvantage
Linear Structure	- ü Only one command; - ü transferring the order rapidly, making decision fast; - ü cost-saving, high efficiency.	- û High requirement for the program director; - û Long command path.
Functional Structure	- ü functioning the management work; - ü easily communicating among specialists;	- û Ambiguous commands; - û Different region operational inefficiency.

	- ü improving the management specialization; - ü quick decisions.	
Matrix Structure	- ü benefiting both interior project and exterior project; - ü rapidly response to the outside environment changes; - ü Cultivating numbers of specialists soon; - ü Easily coordinating the work and promoting the work efficiency rapidly; - ü Broadening the members' knowledge and accumulating experiences; - ü Promoting operational capability and integrity cooperation.	- û bilateral commands - û slow reaction time, and long decision-making - û Involving n-dimensions of information flow and work flow - û Different targets between program management and project - û Paying more time and effort on the project initiating stage

Table 1 Comparison among different models

Based on above analysis, the matrix structure can be used as the suitable one for the multi-national EXPO program organizational structure. However, this structure remains three key points should be paid attention during the implementation:

- 1) In matrix structure, program teams have the final decision while considering functional department's opinions. When meeting with conflicting problems, priority should be given to program management team leaders;
- 2) Program management team members should own comprehensive knowledge and capability and keep stable in order to compete for requirement from multi-national EXPO program management.
- 3) The public information portal can be established to avoid too much information sources, promoting the information communication efficiently.

5 Conclusions

This paper, based on the Expo construction program case studies, discusses the program management goals, tasks, contents and challenges for multi-nations cooperation. Then three different program management organizational models are offered and analyzed. After comparison, the matrix organizational structure seems to be more suitable for the program coordination of the World Expo Shanghai 2010.

Certainly, to manage this large program efficiently, some measures should be taken to deal with the disadvantages of matrix organizational structure in advance because of EXPO complexity and characteristic.

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Dynamics of direct and securitized investments in China metropolis property market

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Abstract:

This paper examines price dynamics for both direct and securitized investments in residential sectors of China metropolis' property market. The property market of China is the largest among the developing countries and has been growing rapidly in recent years. This makes China an excellent place to examine price discovery. The result shows that the returns for securitized real estate in China has a strong prediction power of the appraisal based returns for the direct investment market.

Key words: Securitized investment, Price discovery, Direct and indirect real estate, China

1. Introduction

This paper investigates the differences between the price setting for direct real estate and securitized real estate investments in the capital China. In recent years, over \$630 billion in foreign direct investment (FDI) has facilitated China's economic growth, which accounts for 16% of the world's economic growth in 2006. Real estate investment plays a significant role in this development.

Real Estate Price Discovery is a process in which relevant market information resolve and reveal themselves to buyers and sellers, who in turn determine the prices as transacted. There are two major categories of real estate investment (a) the unsecuritized physical asset, also known as direct or private real estate; and (b) securitized investment backed by real estate or public real estate. Listed real estate companies contribute significantly to China's stock market. Should REIT (Real estate investment trust) be introduced in the next few years, real estate stock will become even more important.

Researchers in western developed countries have discovered that generally real estate securities lead direct real estate prices. However, due to the significant difference in institutional systems, we are not sure that the lead-lag relationship holds in China. So far, no research has been conducted on the securitized real estate and their linkages to the direct real estate markets in China. This issue is particularly important, real estate funds keep growing and thus require up-to-date knowledge in the very near future. The purpose of this study is to investigate the linkages between the indirect and direct real estate markets. In some advanced economies like Hong Kong, researchers have found a Granger causality relationship between the direct and indirect real estate markets. This research will highlight the unique characters of China real estate market, which could allow investors to diversify their portfolio in both direct and indirect real estate.

2. Literature review

Geltner et al. (2003) have the explanation in which 'Fundamental economic theory suggests that asset price levels in the public and private markets should be co-integrated, as they both price the same assets. The tendency towards equilibrium across the two markets should prevent price levels from deviating permanently from each other. While market frictions such as transaction costs and imperfect information prevent 'perfect arbitrage' between the two markets, denying completely riskless profit opportunities from price deviations, the ability of capital to find various routes to flow between the two markets in search of profit opportunity prevents fundamental asset valuations from differing too far, or for too long, between the two markets. Exactly how far and for how long the valuations may differ are matters of debate and currently on the cutting edge of research; and, certainly, the answers to these questions may differ at different times and in different countries'.

Years ago, some researchers claimed that the relationship between direct real estate market and the stock market is not significant. (Brueggeman et al., 1984; Miles and McCue, 1984; Hartzell et al., 1986). Others found the evidence that the securitized real estate market is highly correlated with the stock market (Titman and Warga, 1986; Kuhle, 1987; Chan et al., 1990; Martin and Cook, 1991). After that, several authors (Firstenberg et al., 1988; Ross and

Zisler, 1991) have considered the performance of direct real estate and securitized real estate in the form of equity REITs (EREITs). Sagalyn (1990) finds no significant concurrent correlation between direct property and equity EREIT returns. But Hartzell and Mengden (1987) find a positive correlation between dividends produced by an equity REIT (EREIT) portfolio and cash flows from direct property.

In recent years, the relationship between the indirect and direct real estate markets has increasingly drawn more researchers' interests. Started from the United States (e.g., Giliberto, 1990; Gyourko and Keim, 1992; Myer and Webb, 1993; and Barkham and Geltner, 1995) and the United Kingdom (e.g., Barkham and Geltner, 1995). The general conclusion is that the lags of up to one year evident in the U.K. and up to two years evident in the U.S. Later on, researchers did similar work on major Asian markets like Hong Kong (e.g., Newell and Chau, 1996); Singapore (e.g., Ong, 1994, 1995; and Liow, 2001) and Taiwan (e.g., Chen and Patel, 1998), they generally find the lead lag relationship becomes shorter in Asia cities.

Real estate research has largely been directed to changing land tenure systems in China (Walker and Li, 1994; Li and Walker, 1996; Li, 1997; and Li, McKinnell and Walker, 2000), Chinese appraisal procedures (Li, 1995; and Wong, 1998), real estate development (Li, 1996; and Han, 1998), investment opportunities (Miles and Mei, 1994; and McCoy, 1995), housing markets (Zhang, 2001) and office markets in China (Tse, Chiang and Raftery, 1999; and Webb and Tse, 2000). So far, no research has been conducted on the securitized real estate and their linkages to the direct real estate markets in China.

3. Methodology

The existence of autocorrelation in direct real estate returns and not in securitized returns suggests that the former is not incorporating new information quickly. Accordingly, lagged cross-correlation would be expected between the return series, as the information in the securitized returns is transferred to the direct returns. This transfer is known as price discovery. Barkham and Geltner (1995) consider price discovery in the USA and UK. They desmoothed the direct returns and unlevered the securitized returns to obtain true real estate series. They considered the lagged relationships between the transformed series and test for Granger causality between the two series. They found evidence of price discovery from the indirect to the direct market in the UK. In the USA, price discovery appears to be weaker as price information does not transmit fully from the securitized real estate market for a year or more. In total, their results suggest that the securitized market in the UK is more closely and immediately linked to direct investments than in the USA.

The cointegration method tests whether there is an equilibrium relationship between the price processes generating the returns for two assets. Cointegration tests encompass tests based on the rate of return and have the advantage of retaining all of the stochastic and nonstochastic trend information available in the prices series. By applying this method, Ong (1994), Matysiak et al (1996) and Okunev and Wilson (1996) have tested the relationship between indirect property and the direct property markets in Singapore, the UK and the US with different findings.

The analysis of real estate price dynamics and causality is developed from the application of Vector Autoregression (VAR) model. But if a time series is non stationary, regression of one time series variable on one or more time variables can often give spurious results due to the effect of a common trend. The concept of the cointegrated series has been suggested by Engle and Granger (1987) as a solution to this problem. They develop a vector autoregression model, if the variables are non stationary and are cointegrated in the same order, the correct method is to estimate the Vector Error Correction Model (VECM), which is a VAR in first-differences with the addition of a vector of cointegrating residuals. Thus, this VAR system does not lose long run information.

For the stock market and real estate sectors, Risk-adjusted returns were assessed over 1999:Q1–2007:Q2. The lead-lag relationships between the Chinese real estate stock index and the Chinese real estate markets were assessed using lagged correlations and Granger

causality tests. The analysis considers the determinants of the appraisal-based property returns for the whole sector of China property market. In the beginning, we investigate the predictability of the appraisal returns based on contemporaneous stock returns. The stock returns could refer to the general stock market or the property sector of that. Further study should make it clear which kind of data applies better for developing economies like China. It's also of significant value to test the contemporaneous information flow between the indirect and direct property markets. This will indicate whether the price discovery exist or not and how long is the time in the information gap. Some macro-economic variables are also involved as instrument variables to investigate the impact of non-property sectors. Unlike the stock market which has almost immediate transaction time, property market often has lengthy interval during the transaction process. So market information which leads to price changes can not pass to the property market immediately. For this reason there is likely a lag between the stock price change and property return change. The static method can not reflect this relationship properly. A long-run method such as Co-integration is needed in this situation.

Moreover, low Durbin-Watson statistics often appear in previous studies. In the situation of regressions between share returns and asset returns, which are two time series variables, it is very likely that the low Durbin-Watson statistics are caused by non-stationary problem. If both variables are non-stationary, the regression results maybe spurious, such as very high R-squares, while in fact these two variables have no such relationship. This is mainly because of the common trend of time shown in the variables.

To identify whether a time series is non-stationary, we usually use two methods. The first one is the correlograms at different lags to show autocorrelation functions of the series. This way is intuitive and easy to use but lacks the exact statistical standard to define the limit between stationary and non-stationary. If there is obvious autocorrelation among different lags, we could say that there is non-stationary problem.

The second method is to use a statistical test called unit root test. The traditional unit root test is called Dickey-Fuller(DF) test, with standard form of regression model as follows,

$$Y_t = r Y_{t-1} + m_t \quad (1)$$

Where Y at time t is set as a function of Y at time $t-1$ and stochastic error m_t . In this equation, if $H_0: r = 1$ can not be rejected, we could say that there is a unit root problem and Y series is said to be non-stationary. An alternative model to conduct such test is as follows,

$$\Delta Y_t = (r - 1)Y_{t-1} + m_t \quad \text{or} \quad \Delta Y_t = d Y_{t-1} + m_t \quad (2)$$

Where $\Delta Y_t = Y_t - Y_{t-1}$ and $d = r - 1$. In this situation, if $H_0: d = 0$ can not be rejected, Y series is said to be non-stationary. To conduct this test, t statistics is used instead of traditional t statistics.

Based on this traditional unit root test, Dickey and Fuller developed a more accurate method called Augmented Dickey-Fuller(ADF) test. The equation is as follows,

$$\Delta Y_t = g Y_{t-1} + \sum_{j=1}^J b_j \Delta Y_{t-j} + m_t \quad (3)$$

Which is in a similar form with equation (6) with an additional term $\sum_{j=1}^J b_j \Delta Y_{t-j}$. These lagged differences of Y could "capture auto correlated omitted variables" (Philip Arestis). For the research in this paper, the Augmented Dickey-Fuller test is adopted to test the unit roots.

A combination of two non-stationary variables in regression model reminds us the necessity of using long-run regression method for real estate returns and share returns. For long-run situation, the identification of expected and unexpected inflation is unnecessary. So there are two variables involved in one model. Moreover, to adopt Co-integration method, there is a precondition that these two variables should be I(1) stationary. Usually there are three main forms of non-stationary for such variables in a long-run relationship. These forms are given as follows,

$$Y_t = Y_{t-1} + e_t \quad (a) \quad \text{or} \quad Y_t = a + Y_{t-1} + e_t \quad (b) \quad \text{or} \quad Y_t = a + Y_{t-1} + bt + e_t \quad (c)$$

Form (a) indicates that Y changes over time following a random walk. Form (b) indicates that in addition to changes happen in (a), there is a constant incremental amount of a each time Y changes. Form (c) indicates that in addition to the two factors described above that lead to changes of Y, there is still a time trend bt . All variables of these three forms can become stationary by taking first difference, or we could say adopting I(1) process. In order to use Co-integration, all variables involved should satisfy such I(1) stationary.

Co-integration method is to use residuals in static regressions between the two variables to test whether there is long-run relationship. First of all, the static model used to derive residual series is as follows,

$$Y_t = b_1 + b_2 X_t + m_t \quad (4)$$

After moving b_1 and $b_2 X_t$ to the right hand side,

$$m_t = Y_t - b_1 - b_2 X_t \quad (5)$$

We conduct Augmented Dickey-Fuller test on m_t series. Normally if Y_t and X_t are I(1) stationary, m_t is also I(1) stationary. However, if m_t is proved to be I(0) stationary, which means m_t could pass ADF test without first difference, we could say that Y_t and X_t series are cointegrated. This is to say these two series, although non-stationary, has a long-run equilibrium relationship and the difference between Y_t and X_t , which is denoted by m_t series, is proved to be constant. To identify I(0) stationary of m_t series in this situation, t statistics are no longer suitable and we use critical values calculated by Engle and Granger (1987), so this stage of Augmented Dickey-Fuller test is also called Engle-Granger(EG) test.

Engle-Granger test can not tell us the direction of the two variables relating to each other. For example, if Y_t and X_t are proved to be cointegrated by Engle-Granger test, we don't know whether it is variations of X_t which causes variations of Y_t , or vice versa. Similar situations happen when Y_t and X_t are not cointegrated. We use Granger Causality test to see this direction. If Y_t and X_t are cointegrated, the models are as follows,

$$\Delta Y_t = a + \sum_{i=1}^J d_{1i} \Delta Y_{t-i} + \sum_{i=1}^J g_{1i} \Delta X_{t-i} + u_t \quad (6)$$

$$\Delta X_t = a + \sum_{i=1}^J d_{2i} \Delta Y_{t-i} + \sum_{i=1}^J g_{2i} \Delta X_{t-i} + v_t \quad (7)$$

If Y_t and X_t are not cointegrated, an additional term z_{t-1} is necessary as an error correction term. The modified models are as follows,

$$\Delta Y_t = a + \sum_{i=1}^J d_{1i} \Delta Y_{t-i} + \sum_{i=1}^J g_{1i} \Delta X_{t-i} + V z_{1,t-1} + u_t \quad (8)$$

$$\Delta X_t = a + \sum_{i=1}^J d_{2i} \Delta Y_{t-i} + \sum_{i=1}^J g_{2i} \Delta X_{t-i} + V z_{1,t-1} + v_t \quad (9)$$

A joint F test for all coefficients g_i is then conducted for Granger Causality.

4. Data

The analyses use capital returns calculated from price and appraisal indices for various asset classes from the period 2001q2 to 2007q2. The returns are calculated as the difference of the logarithms of the price indexes. As 2001q2 is the beginning of real estate stock index in Shanghai exchange, quarterly data are collected.

The real estate price indices were obtained from DTZ Hong Kong and DTZ Beijing. The indices are available quarterly for the residential sub sector since 1991. The DTZ Index, produced quarterly, contains rents and price data for the office and residential sectors in the Chinese Mainland. Data provided covers from 1991 to today for Beijing, Shanghai, Guangzhou and Shenzhen; and from 1996 to Q1 2002 for Dalian and Tianjin. Here just the residential data were used for analysis.

The planned analyses below are undertaken using the desmoothed DTZ return series for direct property. The DTZ series is desmoothed using Geltner's (1991, 1993) approach. The smoothing parameter for residential sector is 0.385. The Shanghai property index is unlevered using the average of the leverage ratios published by the largest property companies which comprise the index.

	Rent	Price
Mean	86.82497	140.4758
Median	69.16830	135.2500
Maximum	147.4000	176.8779
Minimum	47.14200	100.0000
Std. Dev.	33.05477	17.76328
Observations	56	56

Table 1: Descriptive Statistics

5. Results and conclusion

These analyses consider the determinants of the DTZ appraisal-based property returns for the residential sectors of China property market. The predictability of the appraisal returns was first investigated based on simple contemporaneous stock returns. The existing literatures show that the price discovery is a dynamic process in the US and UK. Still we don't know how it works in developing economies like China. Generally, time series factors in the relationship between the stock and appraisal returns is considered. But here the D-W test result is above 2, which indicates that there is no serious first-order serial correlation in

regression, and no spurious results for coefficients. The results are demonstrated as in table 2.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003323	0.001674	1.984786	0.0567
QUARTER	0.161737	0.059992	2.695969	0.0116
R-squared	0.200403	Mean dependent var		0.004303
Adjusted R-squared	0.172830	S.D. dependent var		0.010003
S.E. of regression	0.009098	Akaike info criterion		-6.499231
Sum squared resid	0.002400	Schwarz criterion		-6.406716
Log likelihood	102.7381	F-statistic		7.268250
Durbin-Watson stat	2.340217	Prob(F-statistic)		0.011561

Table 2. Regression result

In China, the price mechanism of price discovery between share and appraisal returns has an interesting characteristic, unlike the existing literatures of the US, UK, Hong Kong and Singapore market. The inner relationship may be explained by a simple OLS regression model. If that is the case, the information transfer process is more efficient than in other economies, but other reasons like data quality may also affect this result. Further investigation may focus on data quality and new methodology.

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THE USE OF PUBLIC SECTOR COMPARATORS IN MULTINATIONAL PUBLIC PRIVATE PARTNERSHIPS

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ABSTRACT

The Public Sector Comparator (PSC) is a costing methodology used by government agencies to compare a proposed public private partnership project with a conventionally financed project providing the same performance deliverables. It is used in various configurations by a number of countries, including the United Kingdom and Australia. There is now widespread debate on the reliability, accuracy and relevance of a PSC approach. In particular, concern is growing over the reduced emphasis a PSC approach brings to the quality of the end product and the requirements of the end users. These concerns are magnified when considered in the context of multinational involvement in public private partnerships.

This paper discusses a range of emerging issues associated with a PSC approach, giving particular reference to the implications for multinational organisations. Two basic arguments are developed:

- (i) that the PSC methodology is really only about the bidding process, when public private partnership projects require a far longer term consideration. Certainly future cash flows are discounted, but with an over-emphasis given to the final discounted figure rather than the entire cash flow profile. The focus on a final figure makes the choice of discount rate central, and alternative discount rates can pre-preference certain multinational bids over others.
- (ii) that the PSC methodology is really only about costs, when value is the more appropriate consideration. A focus on costs is most likely to preference local bidders with established cost bases. Multinational bids tend to leverage on broader quality considerations, which suggests that the PSC methodology should be extended to include calculations to assess the total (environmental, social and financial) project value.

Keywords: Public Sector Comparator; Value for Money; Public Private Partnerships.

PPP TERMINOLOGY AND DEFINITIONS

Many papers on Public Private Partnerships (PPPs) begin with the comment that PPPs are notoriously difficult to define. Definitions tend to depend on a commentator's own particular perspective and range from the very general to the quite particular. Additionally the

terminology used by various government agencies can be confusing and seemingly contradictory.

For example Evans and Bowman (2005) cite a definition of PPP by Stern and Harding (2002) as 'a loose term applied to any venture which embraces both public and private sectors'. On the other hand they cite a much narrower definition of PPPs from Webb and Pulle (2002) as partnerships between the public and private sectors for the financing, design, construction, operation and maintenance, and /or the provision of assets or infrastructure and associated services that have traditionally been provided by the public sector.

Hodge and Greve (2005) also subscribe to the view that few people can agree on a definition for PPP. They note that PPPs have been defined in a number of ways, namely:

- As a new governance tool that will replace the traditional method of contracting out of public services through competitive tendering
- A new language in public sector management, designed to cover older established procedures involving private organizations in the delivery of public services
- A new way to handle infrastructure projects such as building tunnels and renewing harbours
- 'PPPs' and 'contracting' used interchangeably to describe contracting between governments and the private sector.

In the UK, Treasury addressed this issue in its report 'Public Private Partnerships: The Government's Approach' (2000), under the heading of 'What Are Public Private Partnerships (PPPs)?' To quote:

"Public Private Partnerships bring public and private sectors together in long term partnership for mutual benefit. The PPP label covers a wide range of different types of partnership, including:

- the introduction of private sector ownership into state-owned businesses, using the full range of possible structures (whether by flotation or the introduction of a strategic partner), with sales of either a majority or a minority stake;
- the Private Finance Initiative (PFI) and other arrangements where the public sector contracts to purchase quality services on a long-term basis so as to take advantage of private sector management skills incentivised by having private finance at risk. This includes concessions and franchises, where a private sector partner takes on the responsibility for providing a public service, including maintaining, enhancing or constructing the necessary infrastructure; and
- selling Government services into wider markets and other partnership arrangements where private sector expertise and finance are used to exploit the commercial potential of Government assets."

This consideration of PPP terminology is intended to underline the need for care in the use of the term to ensure that the contextual meaning is understood clearly. For the purposes of this paper we have adopted one of the very general definitions given by Hodge and Greve (2005) viz. that "PPPs are a new governance tool that replace the traditional method of contracting out of public services through competitive tendering".

PUBLIC SECTOR COMPARATORS: CONTEXT AND DEFINITIONS

As Hodge and Greve (2005) discuss in their introduction to 'The Challenge of Public-Private Partnerships, Learning from International Experience', very large commitments are being made by governments with the private sector under the aegis PPPs. In Australia, for example, this will have amounted to \$Aus20 billion (approx. \$US14 billion) from the period of 2003 to 2008. In the UK, by October 2005, 700 PFI transactions had been signed by central and local governments with a total capital value of approximately £50 billion (approx. \$US80 billion) (Partnerships UK 2006). As may be expected, this scale of 'contracting out' has added

considerable fuel to the emotive 'public versus private debate'. Sheil (2003) is of the view that PPPs represent not simply privatization by stealth but "privatization plus stealth". Quiggin (2004) presents a similar, if less forceful case in stating that: "In most cases the PPP approach involves an inappropriate allocation of risk between the public and private sectors, an excessive cost of capital, and an inappropriate bundling of risk through the use of a single private partner (or consortium) rather than separate contracting for separate project stages." Crouch, in an article expressing his views on the UK situation entitled 'PPPs are rotting to the core', presents the argument that "...corporations that are winning the contracts do not themselves have the experience of providing the services. Their core business is winning public contracts across a range of sectors" (2003). This is a recurring theme amongst critics of the PPP approach, namely that the major private sector players' expertise lies primarily in the organization and winning of tender bids rather than actually undertaking the work, specifically where the work extends into facility management.

Ideologically, the fundamental argument is whether the private sector is inherently more efficient than the public sector in the provision of goods and services. The Public Sector Comparator (PSC) is therefore central to this issue given that its primary purpose is to determine whether or not the private sector actually can perform more effectively than the public in a particular circumstance, based on a hypothetical comparison. Leigland (2006) writing on the adoption of PPPs in developing countries such as South Africa makes the following interesting comment that "The PSC method is meant to meet the need to make a compelling argument in favor [sic] of using private participation rather than traditional public works approaches". The phrase 'need to make a compelling argument' would certainly be interpreted by opponents of PPPs as typifying the use of PSCs to achieve a particular/desired outcome, rather than used to provide an objective comparison. In fairness to Leigland, other parts of his paper do examine the drawbacks of PPPs and PSCs, but the phrase "need to make a compelling argument" does bring the objectivity of PSCs into question. This question on the objectivity of PSCs is the central issue of this paper.

The PSC does not suffer from quite the same definitional problems as PPPs however that is not to say that defining PSCs is a straight forward task. For example, the definition of a PSC as given by HM Treasury (2006) is that "The PSC provides a quantitative analysis to support a qualitative judgment of the best procurement option, taking into account the risks of each procurement approach as a means of informing a wider value for money assessment." In other words, as defined by Treasury, the PSC is to be used to identify a preferred procurement option: it is intended to inform a choice of procurement route, not an assessment of competing bids. Treasury elaborated on this point in 2006 (HM Treasury 2006) by stating that "At the procurement stage the value for money appraisal should focus on the effects of market conditions and competition issues on the bids received, and will not be an evaluation of PFI as a procurement route, *which will have already been tested using the reformed PSC*" (our emphasis). Treasury in its 2003 report acknowledged that "a number of procuring authorities had treated the PSC as a pass/fail test to justify the choice of a procurement route, and potentially striven for spurious accuracy".

Treasury's emphasis on the use of PSCs to determine a procurement route as opposed to being used as a pass/fail mechanism to select a winning consortium is interesting. Internationally, (perhaps with the exception of the UK) there would seem to be a tacit assumption that the primary purpose of PSCs is in fact to inform decision takers as to the financial merits of competing bids. For example, the definition given by Leiglan (2006) is typical of the generally accepted view that the "PSC is a risk-adjusted financial model of a hypothetical public sector project. It estimates the total costs to the government of achieving the targeted outputs, assuming that the project is handled in the normal way, with reasonably foreseeable efficiency improvements."

PRIVATE SECTOR PERCEPTIONS OF PSC's

In a recent study of major private sector players in PPP consortiums in Australia, McGeorge et al (2007) found that attitudes towards the current application of PSCs in Australia ranged

from being critical of the accuracy of PSCs, to the use of the PSC merely to justify risk transfer, to support for the improved accountability. Typically, however, the view was that PSC criteria were either so poorly defined or not even disclosed that they could be (and are) used simply to manipulate results and cast a more favourable light on the public sector client in value for money terms. Used in this way, the PSC can unduly influence the size and scope of projects and even whether or not a project proceeds. It is also the case that bidders resent the lack of transparency, and the distorting effect that “hidden” performance criteria can exert. For example, in those jurisdictions where the mechanics of the PSC is not disclosed to bidders, concern was expressed that bidders are effectively bidding “blind”.

Whilst such perceptions specifically relate to the views of the private sector in Australia, they are also indicative of the current debate being conducted internationally regarding the usefulness and accuracy of the PSC. Bult-Spiering and Dewulf (2006) in their monograph ‘Strategic issues in public-private partnerships: an international perspective’ express a view that the PSC can be used incorrectly as a pass/fail test despite the fact that there are “many uncertainties involved in the calculation and the fact that the numbers could have been manipulated to obtain the desired results.”

PUBLIC SECTOR POLICIES ON PSC’s

From the foregoing discussions it can be seen that there is some evidence based on an empirical study, albeit largely restricted to Australia, that the private sector has a number of qualms *vis a vis* the effectiveness and fairness of PSCs and in the policies used by the public sector in the implementation of PSCs. In Australia some of this disquiet can be sheeted back to the wider issue of the genuineness of the ‘partnership’ in PPPs. This line of argument is advanced by Curnow et al (2005), who argue that in the context of social PPPs there is a strong body of opinion to support the contention that these are not true partnerships and there is a clear need to reduce the ‘tokenism’ of Australian PPPs. They argue that the public sector needs to make PPPs more attractive to the private sector and clarify the identification of risk if they wish to transfer more responsibility for that risk to the private sector.

In the UK, which is generally acknowledged to having initiated the PPP movement, issues associated with the appropriateness of PSCs have been taken on board by Treasury which has attempted to address many of the criticisms made by the private sector there on PSCs. In its report ‘PFI: meeting the investment challenge’ (2003), Treasury committed to “reform the Public Sector Comparator (PSC) to ensure an economically rigorous appraisal of a project’s outline business case prior to its procurement, to allow an alternative route to be chosen at this stage if it offers better value for money.” Whether or not these objectives have been fully achieved is perhaps a moot point, however, Treasury’s analysis of the effectiveness of PSCs in a UK context would seem to be a good starting point in summarising its pros and cons.

As a first base, at least in principle, the PSC provides a key tool for evaluating the value for money of PPP projects. The PSC provides a quantitative analysis to support a qualitative judgment of the best procurement option, taking into account the risks of each procurement approach as a means of informing a wider value for money assessment. However, the PSC is focused only on a narrow band of criteria on which future project options can be considered. It’s also the case that the PSC exercise is often done at a stage where it is not possible to take sufficient account of the wider factors associated with PPP programs, such as the generally increased pre-contract costs.

Further, there are a number of issues relating to the effectiveness of the PSC as an appraisal tool, particularly where it is used as the single pass/fail test to justify the choice of a PPP procurement route. Both the National Audit Office and Treasury emphasise the dangers of putting a disproportionate reliance on a single figure comparison. They now argue that the PSC should continue to have an important role, but as the second stage in a three stage process with emphasis being placed on the need to achieve value. The suggestion is that the existing PSC should be reformed into a comprehensive project appraisal carried out at the outline business case stage, i.e. prior to procurement and the role of the private sector, with

the quantitative aspect remaining part of a broader qualitative approach to the assessment. At this stage the procurement team should be in a position to look in greater detail at the specific characteristics of the project. It should be able to make an informed judgment as to whether the original choice of PPP or conventional procurement, made on the basis of the investment programme assessment, is confirmed. Should the specific characteristics of the project suggest that value for money would best be achieved through alternative procurement options, there should be sufficient flexibility within internal budgets for investment to ensure that the best value for money options are taken forward. At this point appraisers should also be preparing for the third stage, considering the project in the light of the potential strength of market interest.

It remains however a reasonable assumption to make that from a global perspective, with the exception of the UK (and this of course is a very large exception), the PSC is still seen as being primarily about the bidding process and the selection of the preferred bidder by making a hypothetical comparison with a notional public sector project. Discussing the adoption of the PSC approach in developing countries (specifically Africa) Leigland (2006), in an interesting critique on the current UK situation, makes the point that the earlier U.K. Treasury approach (i.e. the pre 2003 situation) may be more appropriate for developing countries, with the shortcomings of the PSC offset by simple but specific procedural rules for using conventional costing methods and informed expert judgment and for countering optimism bias. Certainly the situation in Australia is similar to the pre 2003 era in the UK and is likely to remain so until a PSC disclosure policy is adopted by all states.

DISCUSSION SPECIFIC TO MULTINATIONAL PPPs

This paper has touched on some of the ideological issues associated with PPPs and how these relate to an implicit assumption that the private sector is inevitably more efficient than the public sector. PPP projects, by their nature, tend to be high profile with a considerable element of political risk. The users of the project and long-term stakeholders are by-and-large the general public. Thus PPPs are often the subject of intense interest and emotive debate. By way of example Walker and Walker (2000) express the view that “PPP’s are misleading accounting trickery of the worst entrepreneurial kind”. Or Linder (1999) described PPPs as a ‘grammar of multiple meanings’ in which “The language of PPPs... is a game designed to ‘cloud’ other strategies and purposes.”

Notwithstanding the trenchant nature of the above comments, there is no doubt that PPPs are part of the contemporary procurement landscape and are here to stay. However, it is worthwhile acknowledging the depth of feeling which exists between the protagonists and antagonists of PPPs if progress is to be made on how to move from simply evaluating the cost of a project to assessing its long-term value.

In the particular context of multinational PPPs there are several key aspects of the PSC approach that impacts on bidders:

- *Local Cost Data.* Even in general, local knowledge of costs is important. But this is all the more so when the costs are projected over a 25-30 year life-span, as is the case in many PPP projects where an element of facility management is often included. The situation almost requires multinational bids to include a local partner to inform the facility management aspects. Of course, it is the choice of discount rate that is particularly critical in this regard. There is at least the perception that discount rates used in the PSC approach tend to be higher, in order to favour the higher initial cost weighting of a PPP project over a fully-public project. The public sector is generally considered better able to finance ongoing costs over initial costs. It might be argued that the larger multinational bidder is also better placed to mediate costs over the longer term, and would be similarly disadvantaged by the use of a higher discount rate in any PSC comparator calculation.
- *Dealing with Difference.* There are well-documented problems with the standardisation of how PSCs calculate and compare alternative project proposals. With large projects there are always going to be differences in how different organisations respond to the design

brief, certainly between private and public sector solutions. The lack of a common methodological framework for such a comparison affects every party, but particularly multinational bids, where the project proposal is more likely to be novel in the local market context. This also references the issue of subjectivity, which is often raised as a concern with the PSC approach. Several cases of “manipulation” have been found (U.K. House of Commons, Committee of Public Accounts, 2003), generally in terms of favouring the PPP *per se*, but it does open the way to manipulations motivated by broader political interests that might again disadvantage the multinational bidder who lacks local political influence.

- *Value for Money*. Most commentators now support the use of a PSC alongside a range of other assessment tools, including the more qualitative aspects of track record, public interest, etc. It does appear that the PSC approach is subjective in itself, and having a range of subjective measures provides some sense of balance to the consideration of alternative bids. However, any suggestion that the PSC might distinguish projects in terms of affordability and/or value for money is now being challenged. For the value drivers to be effective what is needed are genuine partnerships between the public and private sector (Curnow et al, 2005). There is thus a growing call for the PSC to be used as a starting point only, and as a vehicle for exploring and agreeing project scope with bidders at the pre-bid stage. This would also extend to the optimum allocation and transfer of risks between the various parties. With multinational bidders, these allocations and possibilities may be very different to local bids. In the context of value for money, therefore, the revised use of a PSC might improve the opportunity and capacity of a multinational bidder to offer the most effective project solution.
- *Staged Penetration*. The argument being advanced in this paper is that multinational organisations who wish to expand into market sectors (other than perhaps the UK) may find that firstly they will have to win market share on the basis of competing on a conventional PSC (bearing in mind that in some instances this PSC may not be disclosed) and then progress to the broader (and more progressive) criteria of quality of delivery and value.

The key aspects of a PSC approach to multinational PPPs are clearly not unique to that context, but apply more broadly to PPP projects in general. However, certain aspects are more particular and of more significance in the multinational context. A consensus appears to be emerging around the policy solutions required, especially in terms of the PSC. Effective implementation of these policies, as experience has shown, is exceedingly difficult when public, local and multinational concerns so often contradict each other.

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ADDIS ABABA RING ROAD PROJECT: A Case Study of a Chinese Construction Project in Ethiopia

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ABSTRACT

The Federal Democratic Republic of Ethiopia is becoming a prosperous construction market generally. Addis Ababa Ring Road Project used to be the first important project by which Chinese contractor open huge potential market in Ethiopian. This case study offers a window into the working conditions, staffing arrangements, project organization, claims processes, and political dynamics associated with the Ring Road project, a Chinese constructed project in Ethiopia. The case study also highlights how Chinese contractors perceive their strengths, weaknesses, opportunities and threats relative to both domestic firms and western competitors.

Keywords: Chinese Contractor, Addis Ababa Ring Road Project, SWOT, Western Contractor

1. INTRODUCTION OF PROJECT BACKGROUND

1.1 Ethiopia and its Road Infrastructure

The Federal Democratic Republic of Ethiopia, a landlocked African country, covers a territory of 1.133 million square km, has a population of 77.4 million composed of 80 ethnic groups, and has a GDP per head of \$100 per person. Alongside Congo and Myanmar, Ethiopia possesses the lowest GDP per head of all countries worldwide (Pocket World in Figures, 2006). To revivify the domestic market and move toward a market economy, the Ethiopian government launched an economic reform program in 1992 (Investment and Innovation Policy Review-Ethiopia, 2002). In order to restore Ethiopia's road network and develop institutional capacity within the road agencies, the Federal Democratic Republic of Ethiopia passed policies, regulations and legislation in 1997 under the auspices of the Road Sector Development Program (RSDP). The RSDP was formed to provide a coordinating guideline for planning and supervising road projects around the country.

By 2002, the total road network had grown to 33 297 km, of which 4 053 km (12%) were paved and the remaining 29 244 km (88%) were gravel. However, large parts of the country still have no access to road transport resulting in difficult access to social services and markets for agriculture outputs and goods inputs.

1.2 Chinese Road Constructor in Ethiopia

Chinese contractors are attracted to Ethiopia for its political stability, consistent growth, and relatively wholesome legal system as compared to many other African states. The majority of the Chinese companies work in some form of infrastructure construction; a significant proportion engages specifically in road construction. Road projects tend to be funded via three dominant sources:

- I Projects funded by loans from the World Bank, African Development Bank and other such institutions. The projects are awarded through some form of competitive international bidding;
- I Projects funded through Chinese government loans or financial aid to developing countries, and
- I Projects won through international bidding, financed by the Government of Ethiopia.

Strengths • Construction experience in developing countries • Low-cost Chinese work force as compared to Western countries • Fiscal stability and low inflation • Support from democratic national government • Friendly relationship between China and Ethiopia	Opportunities • RSDP and dramatic increase of Road Construction Projects compared to the rest of Africa • Infrastructure development, including telecommunications • Increased and stable funding • Mining and resource development • Access to other national markets e.g. Sudan and Uganda
Weaknesses • Lack of skilled, semi-skilled labour • Weak communications / infrastructure • Low standards of health and safety and occupational hazards on jobsites • Most construction materials imported from abroad e.g. fuel, bitumen, and cement • Internal managerial problems	Threats • Most funding from abroad • Increased competition from other nations such as Korea, Pakistan and JVs • Failure to resolve some compensation claims • Continuing war between Ethiopia and neighbouring countries Somali and Eritrea • Riots

Figure 1 SWOT analysis for Chinese Road Contractors

Many Chinese construction companies perceive a serious disadvantage compared to western firms due to a relative lack of skilled labour, management training, and communications infrastructure. Despite the perceived shortcomings, Chinese construction companies have proven their ability to stay cost-competitive with Western firms. In the scramble for market share, low cost continues to be important in maintaining a competitive advantage. The SWOT chart in Figure 1 illustrates the strengths, weaknesses, opportunities, and threats generally expressed by Chinese contractors that work in Ethiopia.

The government of Ethiopia has officially welcomed Chinese construction companies as a relatively inexpensive alternative to Western companies. The Chinese construction companies may not achieve large profits, but they are gradually taking up more corners in the Ethiopian construction market. Chinese contractors have done particularly well in sectors such as road infrastructure, where projects are awarded on a competitive basis and low cost is a key differentiator.

1.3 Addis Ababa Ring Road Project

Addis Ababa, which means *new flower*, is currently Ethiopia's largest metropolis, an official diplomatic capital of Africa, and the fourth largest diplomatic center in the world. The city rises from 1 800 to 3 200 meters above sea level. As the national economic center, Addis Ababa receives approximately 54% of Ethiopian investment.

The Addis Ababa Ring Road Project was initiated as part of the city's commitment towards implementing the city plan and enhancing circumjacent development. In 1998 China Road and Bridge Corporation (CRBC) signed a contract agreement with Addis Ababa City Roads Authority (AACRA) for the project. The contract price to complete the Ring Road project was US\$ 86.02 million, US\$ 67.25 million in the main contract for the road construction and US\$ 18.77 million in a supplemental contract.

The contract with the AACRA included the construction and upgrading of 33.4 km of highway, which included the upgrading of 14.2km of bituminous asphalt concrete surfacing and the construction of 19.2km of new road, 41 new structures, 6 flyover bridges, 23 pedestrian bridges, and 12 culverts.

The Ring Road was completed in 2004, six years after commencement. Local residents were content with the project for several reasons. The project allowed heavy vehicles entering the city of Addis Ababa from the main radial routes to bypass portions of the city; mainly, it became possible to avoid the city center. The project reduced traffic congestion in the area and linked neighborhoods with market places, schools, churches and clinics. The diminishing traffic congestion in turn reduced the risk of traffic accidents. Following completion, the project received accolades in the local press and was officially dubbed the 'Ethiopian First Road' and the 'Milestone Road'. The positive recognition for the project helped CRBC establish their reputation in the local construction market. Since the completion of the project, CRBC has expanded its business in Ethiopia significantly.

2. CASE STUDY OF THE PROJECT

2.1 Project Organization

Project entities are those individuals or groups who will be affected by the project. Project entities include senior managers directly or indirectly involved, end users, suppliers and strategic partners. In the Ring Road project, the key project entities are illustrated in Figure 2

Project Sponsor: Primary funding for the Ring Road project came from the Government of Ethiopia, which had the following responsibilities:

- I Setting the project objectives, including the environmental impact study;

- I Allocating funds and monitoring expenditures;
- I Supporting the project politically;
- I Starting up the project, and
- I Shepherding the project through contentious political debates.

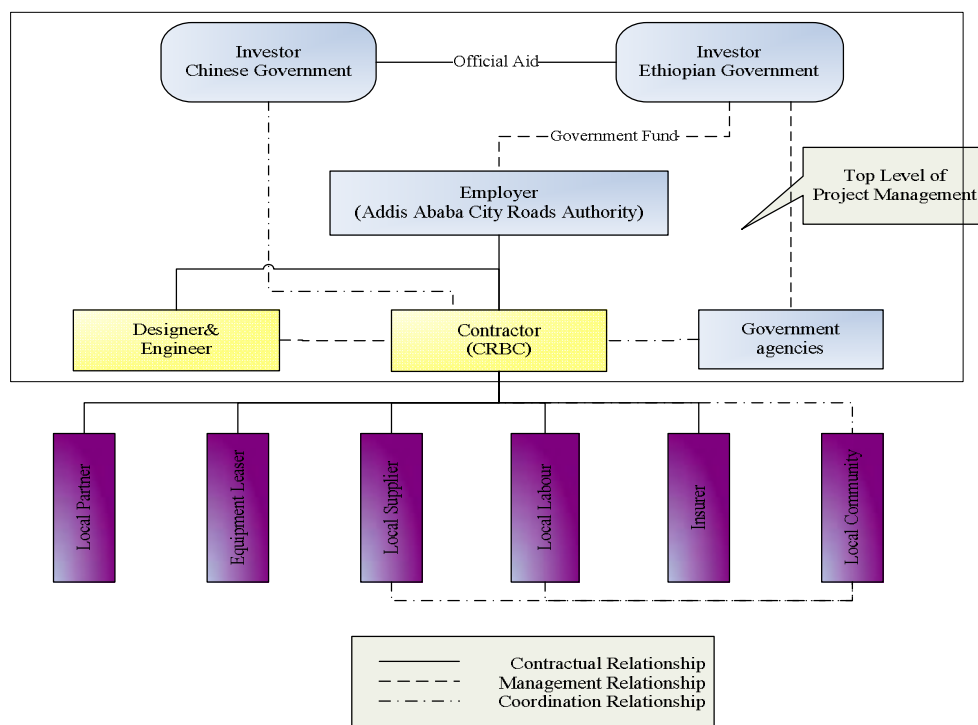


Figure 2 Project Entities Structure in the Ring Road Project

Owner: Addis Ababa City Roads Authority (AACRA), one of the key government agencies involved in the project, was responsible for defining the broad outcomes sought by the Government for the management, use, and maintenance of the Ring Road. Over the life cycle of the project, the role of AACRA evolved from direct supervision of CRBC's performance to contracting and supervising operators in the maintenance of the road after construction. During the construction period, the functions of AACRA focused on:

- I reviewing and following up issues presented in consultant's progress reports;
- I reviewing and processing of contractors' and consultants' certificates of payment;
- I assisting contractors in obtaining relevant government clearances for importation of equipment and materials and work permits for foreign personnel;
- I facilitating actions of other government agencies regarding land acquisitions, and removal of obstacles that affect the works;
- I undertaking inspections to works sites;
- I meetings with affected communities, and
- I assessing the environmental impact.

Designer and Engineer: The complexity of the Ring Road project necessitated that a large volume of work be completed by consultants; thus, a heavy load was placed on supervising engineering design and works. During the course of the project, the owner retained the design consultant, Parkman Limited, a UK based firm, to act as a quality control engineer, to supervise the many consultants involved in the project and to ensure the road and

infrastructure was constructed in accordance with the design objectives and specifications. AACRA believed that one consultant playing the dual roles of designer and engineer could better make the approved design understood and implemented. Due to the incompleteness of the original design specification and work conditions on site, the Engineer issued around 200 design variations in the 6 years. Inadequate specifications and the resulting variations led to substantial schedule-growth in the completion of the project.

Contractor: The construction contract between AACRA and CRBC was based on the FIDIC form of contract, an internationally accepted form that was developed by a UK based organization of professional engineers. CRBC was required to perform the construction activities in accordance with the approved project plans and specifications. These documents contained detailed requirements to achieve acceptable overall quality on the Ring Road project. CRBC set up a main office and four sub-site offices to carry out the construction.

Government Agencies: The Ring Road project could not have been undertaken without the support of government agencies in providing permits, temporary traffic control, and resolving emergent issues related to the project. The government was supportive as the Ring Road project represents the most important road project in Addis Ababa.

Contracting Organizations: Insurers, equipment leasers, local suppliers and local partners were all involved in the Ring Road project through contractual relationships. The language executed in these contracts was English.

- I Insurance companies which provided all-risk construction insurance and car insurance for the Ring Road project. All insurance companies were local Ethiopian firms;
- I The Equipment leaser rented out construction equipment to CRBC when needs could not be met by CRBC, and supplied spare parts to counter the three month delay observed when importing parts from China;
- I Local suppliers supplied fuel, cement, reinforcement, bitumen, and other consumables. CRBC built positive relationships with suppliers, many of which evolved into long-term collaboration with CRBC beyond the Ring Road project, and
- I Local partners included security firms, a customs clearance agency, and bank.

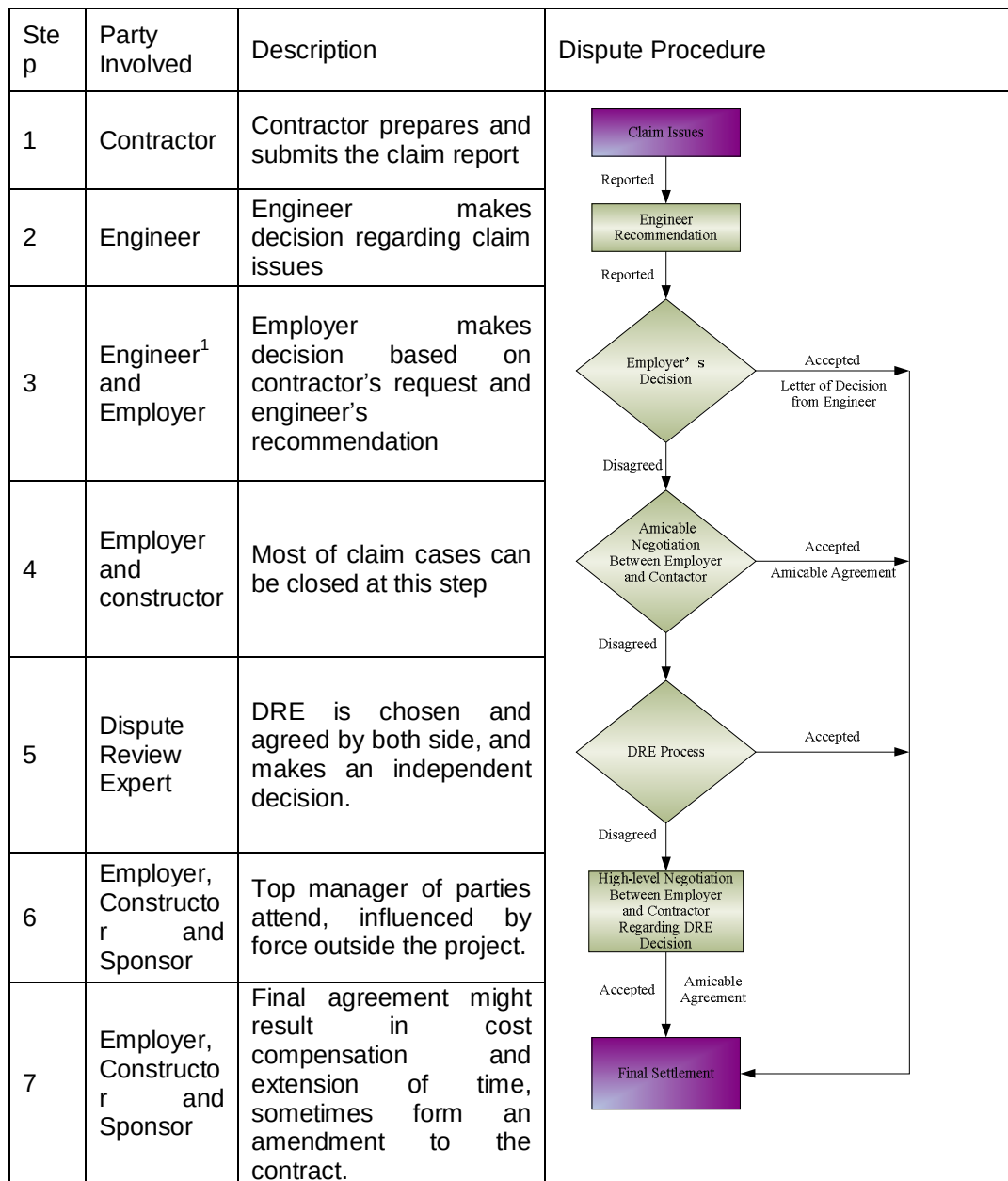
Community Organizations The community did not have direct influence on the Ring Road project, but the degree of acceptance by the community had an indirect impact on the attitude of some of the contractual partners. In Ethiopia, any individual, community or organization can 'potentially' protest or oppose a project through legal action. There was some dissatisfaction with the project, but the claims were always too weak to affect a government decision.

2.2 Legal framework and Disputes Procedure

Ethiopia comes from a civil law tradition and has six legal codes: civil, commercial, civil procedure, penal, criminal procedure, and maritime codes. The drafter of the civil code, René David, borrowed heavily from Code Napoleon and the civil codes of Switzerland, Greece, Egypt, Iran, Portugal, Israel, Turkey, Quebec and the Philippines. In addition, Ethiopian civil code has borrowed principles from the Common Law – mainly the United Kingdom, United States of America (USA), and India. Ethiopian civil code is among the most eclectic codes amongst the civil law countries.

Ethiopian contract law is found mainly in the 1960's civil code. There is legislation issued after the enactment of the civil code that is designed to govern some specific forms of contracts. Construction contracts and employment contracts are influenced by both common law and Napoleonic elements.

Ethiopia is a signatory to the International Convention on the Settlement of Investment Disputes (ICSID)—a World Bank agreement for the arbitration of investment disputes. According to the Ethiopian Investment Proclamation, disputes arising out of Chinese investment that involve a Chinese investor or the state may be settled by means agreeable to both parties. A dispute that cannot be settled amicably may be submitted to a competent Ethiopian court or to international arbitration. However, there is no guarantee that a decision of an international arbitration body will be fully accepted and implemented by Ethiopian authorities.



Note:

¹ Engineers are always Design consultant preparing drawings for tender.

Figure 3 General Dispute Procedure on Road Projects in Ethiopia

The construction contract between the client and CRBC on the Ring Road project was a modified FIDIC contract based on Ethiopian Law of Contract. Disputes in the Ring Road project were always settled following the procedure as shown in Figure 4 even though some of the steps were not supported by the contract or by the Ethiopian Law of Contract. The

procedure shown in Figure 3 is typically used by all Chinese contractors working on road projects in Ethiopia. As of 2007, only one claim case from CRBC got through the DRE claim Procedure in step 6. It is believed that GOE compelled CRBC to give up prolongation cost of around US\$ 2 million decided by Dispute Review Expert through its ability to influence the Chinese government. Other disputes between CRBC and Ethiopian Clients could reach an amicable settlement before Step 4.

2.3 Financial Support

Generally speaking, Ethiopia is not recognized as a country rich in natural resources. However, Ethiopia has a glorious past and occupies an important geopolitical position. Ethiopia serves as a linchpin to stability in the Horn of Africa and the Global War on Terrorism.

Road projects in Ethiopia receive support from five primary sources including international finance institutions, bilateral and multilateral sources, the Government of Ethiopia, the Road Fund and the Community. The total value of the Ring Road project was US\$ 86.02 Million. Financing came from two primary sources. The Government of Ethiopia provided US\$73.02 Million of equity support from the governmental budget. The remainder—US \$13 Million, which equates to one sixth of the contract price, was contributed from Chinese sources through an interest-free loan with a 30-year refund period.

2.4 Community Effect

Addis Ababa has a population of 3.5 million people, comprising approximately 60 percent of the total urban population of Ethiopia (2004). Throughout the six year project, the local community perception of CRBC transitioned from a sense of distrust and suspicion to acceptance and support. For example, during the land tenure process, construction delays in the beginning of the project were attributed to AACRA's failure to prepare a feasible plan to repossess land and resettle local residents. Local people forwardly assisted and were satisfied with the compensation for resettlements.

CRBC, in turn, attempted to realize a positive and effective impact on the local community. For example, CRBC donated to a local college and supplied summer internship positions to local students.

Active NGOs in the local community included the Ethiopian Evangelical Church Mekane Yesus, Kale Hiwot, The Weaving Association, The Tesfa Social and Development Association, Mary Joy Aid Through Development, St. Mary Children Aid, and Save the Children (USA). All of the NGOs provided financial assistance and relief to the poor. From the beginning of the project, the expectation was that the NGO involvement would have a positive impact in the region; especially on the local labourers. The labourers expected financial and educational support from the NGO involves.

2.5 Labour

Due to a serious shortage of skilled labour in Ethiopia during the time period of the project, highly skilled Chinese workers were imported for the few technical and managerial positions.

On the jobsite, the Chinese worker possessed outstanding features. The Chinese provided low cost and highly organized workers with an incredibly strong work ethic. In order to complete the project on-time, CRBC operated seven days per week and over 12 hour work days - from 6:30 am to 7:30 pm. Each worker performed nearly 4 380 hours per year of active time. The Chinese workers showed considerably better discipline than many of the local workers.

In Ethiopia, more than 80 percent of the population is living on less than US\$1 per day. Local labour was used primarily for low-skilled construction jobs and less so for managerial positions. At the beginning of the project, the unskilled labour wage rate was less than US\$ 1 per day. Skilled labour, such as equipment operators, were able to earn more than US \$1 000

per month after factoring in overtime remuneration at a rate of 1.5 times the basic rate. CRBC had a health and safety program for foreign and local workers regarding health, safety and environmental issues such as HIV & AIDS prevention. The full program of internal health and safety standards was rarely followed and never enforced.

During the 6-year construction duration, thousands of local labourers acquired new skills or upgraded their expertise. Even though most of them exited the construction industry after the project was finished, 10-20% chose to stay with CRBC and continue on the next road project.

2.6 Culture Diversity

The Chinese orient is one of the world's greatest ancient civilizations, while Africa is known as the origin of humankind. Both are cultured peoples, descended from the world's oldest known peoples. The Chinese and African cultures bear enormous similarities, but also differ in many aspects, such as languages, religions, traditions, values, and work practices.

From a cultural perspective, one of the most challenging barriers in the Ring Road Project was the language used for communication and instruction. In Addis Ababa, the main local language is Amharic, but English is the most widely spoken foreign language and thus used as the working language on the jobsite. On the jobsite, considering the problem of the language barrier, translators' had to occasionally participate in meetings and jobsite interactions, explaining expectations, task orders and troubleshooting misunderstandings. Also, perception of context through direct eye contact, facial expressions, and hand gestures provided crucial information for successful cross-cultural communication.

Culturally and ethnically diverse, the Ethiopian population is composed of about 80 ethnic groups. The Oromo and the Amhara are dominant, jointly accounting for 61% of the total population. Ethiopian Orthodox Christianity and Islam are the major religions. In contrast, China has over 100 million followers of various kinds of religions; 18 million from 10 ethnic minorities reported to practice Islam. On the project, it was observed that most Chinese staff were antitheists, who respected local religion and belief, but rarely understood and were uninvolved in religious activities.

Despite a lack of manifest or problematic differences in religious ideology, there were still barriers to be overcome, especially with respect to differences in internalized values. Ethiopian people traditionally value freedom, dynamism and individual creativity. The Ethiopians found their Chinese partners places more emphasis on trust, discipline and team work, as shaped by the thousand-year-long Confucius doctrine. Distinct value to quality of life always produced conflicts. For example, although Chinese staff pushed Ethiopian operators to work long hours, the Ethiopians usually would sneak in time to enjoy a cup of coffee.

3. COMPARISON AND CONCLUSION

Business activity: In the Ethiopian road construction market, there is no direct competition between Chinese companies and Western companies. While Chinese contractors secure a good share of construction contracts, Western companies from the UK, Canada and Holland focus their business on design and engineering consultancy services. In large-scale road projects, the low prices of Chinese contractors make it extremely difficult for Western contractors to compete; thus Western contractors usually do not even submit bids. However, competition among Chinese companies in the Ethiopian construction industry has become fierce. In order to increase market share at the expense of other companies, some Chinese companies reduce their profit margins to less than 3% or even bid for projects below cost. However, it is interesting that no Chinese company has entered the market as a design consultant or engineering consultant.

Project Organization: Chinese organizational structures commonly exhibit greater centralization, greater formalization and more developed hierarchical pyramid structures (Figure 4). Western organizational structures are usually flatter with a less distinctive

hierarchy. Furthermore, the Western approach to organizing construction companies usually consists of a bi-directional matrix with both a functional-skill hierarchy i.e. plumbing, electrical, and paving, and a project hierarchy i.e. tunnels, roads, and stations. Chinese construction companies typically structure their organizations on an individual project basis. Chinese construction companies rarely possess a functional-skill hierarchy that cuts across multiple projects.

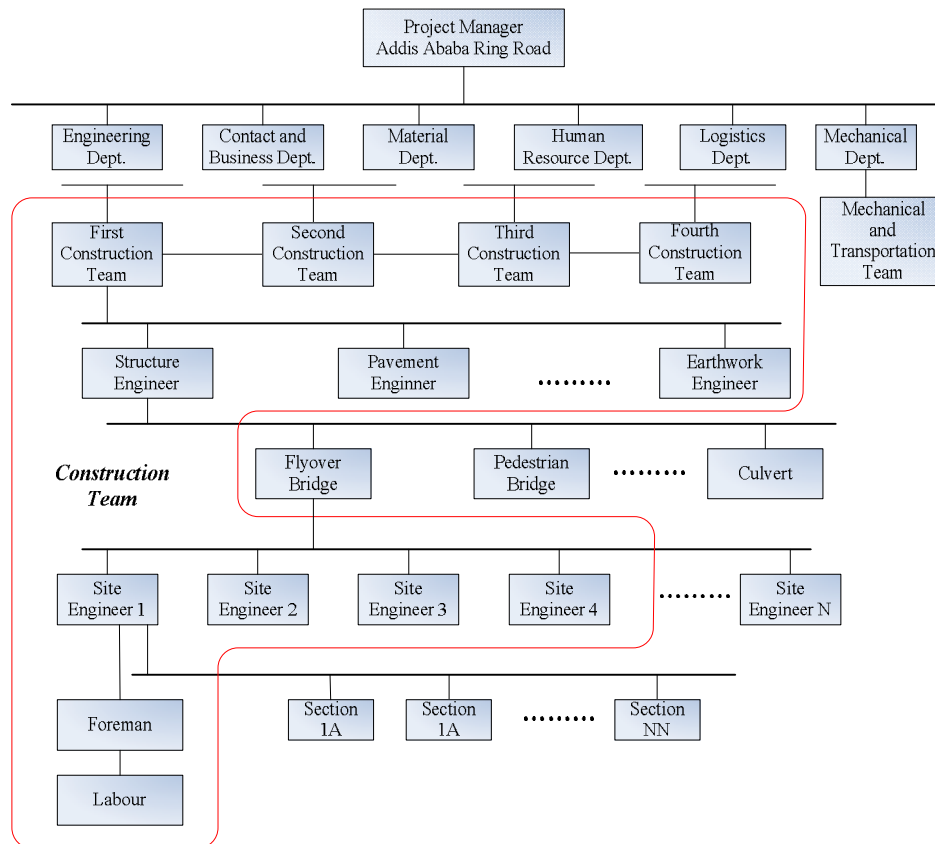


Figure 4 Organization Structure of Project Team in the Ring Road Project

Political: Ethiopia is strategically important to the USA, taken to represent the West, because of its geographic position. The USA was the most important donor of humanitarian assistance, followed by the EU, and has provided modest military assistance. Ethiopia has regularly exchanged visits with European and American officials, with development assistance and security at stake. The diplomatic relations and assistance between the USA and Ethiopia elucidates Ethiopia as a loyal supporter of the US policy. Ethiopia generally finds huge potential benefits with the growth of trade relations with China. In addition to Chinese aide packages and debt forgiveness, Chinese loans to Ethiopia do not have as many 'restrictions' as those of Western countries. In the Ethiopian construction industry, it seems that the political intervention and influence of the Chinese government has been more effective than from the West.

Legal: Being one of the two countries not colonized by the European colonial powers, the principle of Ethiopia Law is not derived from any one overseas law system, but instead is eclectic and independent. Under the same legal framework, the Chinese and western contractors have different approaches to the resolution of disputes with employers and suppliers, and different attitudes to the use of contracts. For the Chinese contractors, negotiation appears to be the first choice. Claims are considered as extreme and a last step that would result in the loss of 'face' of both sides. As a result, good relationships with all involved, especially with employers and engineers was absolutely critical for resolving all conflicts amicably. On the contrary, Western contractors consider claims to clients or contractual penalties as normal construction management practice. Based on author's personal observations, the employer in Ethiopia and engineer much preferred the Chinese

way of dealing with disputes during construction. It should be mentioned that those negotiations are based on the contracts and agreements under the Ethiopian legal system.

Finance: In the twentieth century, governments of Western countries assumed primary responsibility for financing and operating existing and new road projects. In comparison, the lion's shares of funds to Ethiopia were contributed by international donors aimed at helping develop transport infrastructure; thus, public debt was the most popular mode of financing road projects. In recent years private sector participation has emerged as an alternative to public financing and has been viewed as a way to minimize the inefficiencies of public administration and avoids the need for external borrowing.

Community Interface: As discussed, Chinese companies tend to have limited interaction with the local community. Antithetically, Western enterprises care and contribute more to the communities where their employees, customers and external stakeholders live and work, resulting in the concept of 'giving back' and 'doing good by doing well'. Every community is unique, so some Western contractors even have site-specific community relations programs to assist with the individual community's needs. Contributions may be financial, or may be in the form of the time and talent of volunteers, which targets non-profit organizations providing programs for children, youth, families, health, education, arts and civic projects, and seniors. Community protest or opposition to the projects in Western countries affects the construction and may even cause cancellation of the project entirely.

Treatment of Labour: All contractors, Chinese and western, value the management of the labour force and development of good relations with the local laborers as an integral part of project management. Chinese staff and project managers, by working and living together, try to form a good relationship with local workers so that the project team can function like a 'family'. Chinese staff and managers try to develop a supportive and cooperative relationship in the workplace as well as cordial relationships outside of work.

Due to cost constraints, Western contractors prefer hiring more qualified labour by paying a much higher salary. Chinese companies prefer importing numerous foreign site engineers at a lower cost. Instead of supervising the work on site, the Chinese believe the most effective way to work is to identify the problems and issues facing laborers in their work and to help them solve those problems. The cooperative relationship in Chinese companies helps develop a sense of trust in the work environment. On the other hand, Western contractors emphasize the importance of health and safety in the work place resulting from the comparatively strict health and safety legislation in Western countries.

Cultural Closeness: As far as foreign languages are concerned, English, French, Italian, and Arabic are spoken in Ethiopia, which are first or second languages in Western countries. Professionals of Western companies seldom experience language problems when they work in Ethiopia. In terms of religion, similar Christian beliefs make Westerners more acceptable to the local community than Chinese. It is therefore evident that in many ways, Western contractors are culturally closer to the Ethiopians than their Chinese counterparts.

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TOP MANAGEMENT COMMITMENT TOWARDS QUALITY MANAGEMENT IN THE CONTEXT OF MALAYSIAN CONSTRUCTION ORGANIZATIONS

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ABSTRACT

Top management commitment towards quality management is generally perceived as one of the key factors in determining its success. It has been observed that the local construction industry is facing a lot of quality issues. In relation to this, the authors are trying to perceive quality management in the context of Malaysian construction industry from the perspective of top management commitment. The research aims to identify the constructs of commitment from literatures and explore the top management commitment towards quality management in building construction projects based on the constructs identified in the context of Malaysian construction organizations. Survey samples were drawn from the construction organizations of G5, G6, and G7 registered with the Construction Industry Development Board (CIDB) Malaysia. Research findings show that the top management of construction organizations is generally committed to quality management implementation from the perspectives of quality goals, efforts, involvement and attitude to change. Nevertheless, there are some areas which need to be improved. Firstly, quality is still lacking in terms of its importance in the mentality of the top management compared to cost and time and secondly, resources allocation should be further increased to a more satisfactory level.

Keywords: Quality management, construction projects, constructs, top management commitment.

1. INTRODUCTION

A typical construction client's concerns include whether his/her project can be completed within cost and time allocated, and whether it has obtained satisfactory quality. Ashford (1992) defines quality as a summation of those characteristics, which together make a product acceptable to the market. The concept of quality can be translated into the quality dimensions that include: performance, reliability, conformance, durability, serviceability, aesthetics and perceived quality (McGeorge *et al.*, 2000; Evans *et al.*, 1999).

The quality of construction works can be evaluated based on the aforementioned quality dimensions although it can be rather subjective on certain dimensions such as aesthetics and perceived quality. On the other hand, a contractor should strive for high levels of the quality dimensions on his/her project. The achievement of these dimensions is through appropriate management of all processes that deliver those (McGeorge *et al.*, 2000). In terms of quality management, Harris *et al.* (2001) emphasised that it is a major management function within construction organizations for them to compete effectively in the construction market. The quality of construction works produced by a construction organization has significant implication on the reputation and competitive advantage of the organization in the construction market. Abdul-Rahman (1996) explained that management of quality in construction is an important factor in determining the competitive edge of a construction business. Similarly, Landin (2000) stated that quality management appears to be considered primarily as a means of increasing effectiveness and enhancing competitive advantage.

Taylor *et al.* (2003) concluded that senior managers' involvement, understanding and customer focus are essential antecedents of TQM success. Samson *et al.* (1999) described that leadership and human resources management are among strong predictors of performance TQM practices.

On construction-related researches, Low *et al.* (2004) commented top management commitment as one of the elements that would reflect TQM performance measures in construction firms. Chin *et al.* (2003) found that top management commitment is the most critical factor for successful ISO9000 implementation. Haupt *et al.* (2004) argued that high levels of management actions would lead to reduced prevalence of the problems as TQM is deployed on construction sites. Arditi *et al.* (1997) emphasized that management commitment to quality and to continuous quality improvement is very important in each phase of the building process. Biggar (1990) recommended that management must fully understand and support the TQM process and actively participate in its implementation rather than delegate it.

The ISO 9001:2000 requires the following practices in relation to management commitment, namely: communicating about the importance of meeting customer as well as statutory and regulatory requirements, establishing the quality policy, ensuring that quality objectives are established, conducting management reviews, and ensuring the availability of resources.

The above literatures examined the concept of quality and its management in construction industry. The importance of top management in quality management was addressed. Top management commitment towards quality management is generally perceived as one of the key factors in determining its success.

It has been observed that the local construction industry is facing a lot of quality issues. In relation to this, the authors are trying to perceive quality management in the context of Malaysian construction industry from the perspective of top management commitment. The understanding on the top management commitment of construction organizations towards quality management in construction project in Malaysia is limited as literatures on such studies focusing on local scenarios are difficult to be obtained in established publications.

2. OBJECTIVES

The objectives of this research are to:

1. Identify the constructs of commitment from literatures.
2. Explore the top management commitment towards quality management in building construction projects in the context of Malaysian construction organizations.

3. CONSTRUCTS OF TOP MANAGEMENT COMMITMENT

This section records the reviews on the top management commitment in quality management. It aims to identify the constructs adopted by researchers and the definition in the dictionary. The identification of constructs and definition is necessary for the research to proceed.

Oxford Dictionary (2001) defined “commitment” as the state or quality of being dedicated to a cause or activity. Some researches have been reviewed to identify the constructs for management commitment as quality management is concerned.

Top management commitment in quality management implementation has drawn much attention from researchers (such as Ahire *et al.*, 1998; Chin *et al.*, 2003; Low *et al.*, 2004). Rodgers *et al.* (1993) concerned the influence of top management commitment on the success of management programme generally.

Fottler (1977) emphasized on putting something as priority compared to other considerations, and effort put, as the indication of management commitment on it. Juran (1988, 89) referred commitment to quality management as leadership, participation, resources allocation, monitoring, and recognition as regard to it. Feigenbaum (1989) related involvement with management commitment.

Biggar (1990) found understand and support, and active participation as the constructs for management commitment. Rodgers *et al.* (1993) were of the opinion that goal setting, feedback, and participation to be the roles to be played by the management.

Low (1994) explained that the support shown by management in quality management indicate the level of its commitment. Crosby (1996) stated that participation, and having the right attitude reflect the commitment of management in quality management.

On the same matter, Goffin *et al.* (1996) highlighted the constructs of time and effort spent, clear goals, expertise, and focus on employees. Arditi *et al.* (1997) were more concerned in putting quality management as the priority, and to lead in its implementation. Goetsch *et al.* (1997) stressed on the involvement, and resources allocation. Similarly, Ahire *et al.* (1998) highlighted priority, involvement, goals, and resources allocation.

Howard *et al.* (1999) mentioned having quality strategy as the construct for management commitment towards quality management. On the other hand, Samson *et al.* (1999) put leadership and involvement as the constructs, whereas, Jaafari (2000) highlighted only leadership.

Chan *et al.* (2000) were other researchers who referred priority and resources allocation as the constructs of management commitment. On the same issue, Harris *et al.* (2001) were more concerned on initiative whereas Taylor *et al.* (2003) were looking at involvement.

Chin *et al.* (2003) stressed that for the management to be considered as committed towards quality management, they ought to have common goals on it, review and continuous improvement, involvement and leadership, and attitude to change as far as quality management is concerned.

Haupt *et al.* (2004) considered initiatives, and support to be the constructs for management commitment. Low *et al.* (2004) had their attention on allocation of budget, planning for change,

and providing methods of monitoring process. On the same issue, Thevnin (2004) used willingness to change for quality improvement, and participation shown to measure management commitment whereas Dadzie (2004) focused on initiatives, resources allocation, communication, and recognition/reward.

Summary of the above review is in Table 1. Based of the table, the commitment towards quality management is summarized into six constructs. These are: quality goals, priority, efforts, involvement, resource allocation and attitude to change.

1. Quality goals
 The most basic criteria for management commitment towards quality management should be the having of goals for quality. A goal is an objective to achieve or a direction to move forward.
2. Priority
 Management commitment on quality management can also be perceived from the extent they place the importance of quality in relation to other considerations such as time and cost.
3. Efforts
 Effort for quality is another aspect to judge management commitment on quality management. A person who puts an effort to enhance quality for product or services can be seen as being serious and committed to quality.
4. Involvement
 In terms of directness, the involvement of management in quality management can be direct (personally involved) or indirect (through delegation). From the angle of activeness, the involvement can be active or passive. To what level the management is involved in quality management indicates its commitment in the quality management implementation.
5. Resources allocation
 To implement quality management, sufficient resources are necessary. Basically, they are human resources and financial resources. The management of an organization plays the role of distributing resources for various needs. A committed management in quality management should try its best to allocate sufficient resources for the purpose.
6. Attitude to change
 Human beings normally resist change once they get used to certain habits, procedures, or methods. Such phenomena are even more severe if the practices have become part of their culture. A strong commitment might be required to get these practices changed even if such change is known for the good of themselves. With regard to the known difficulties in getting a person to change, management of an organization which is willing to change its practices for the purpose of quality management can be perceived as being committed about quality management.

Year	Author(s)	Industry	Research Methodology	Research Area	Constructs of Management Commitment
1977	Fottler	Finance	Case studies	Management commitment	Priority, effort
1988	Juran	General	-	Companywide QM	Leadership
1989	Juran	General	-	Strategic QM	Participation, resources allocation, monitoring, recognition
1989	Feigenbaum	General	-	Total quality control	Involvement
1990	Biggar	Construction	Reviews	Total Quality Management	Understand and support, actively participate
1993	Rodgers <i>et al.</i>	General	Meta-analysis	Top management commitment	Goal setting, feedback, participation
1994	Low	Construction	Case studies, q. survey	ISO 9000	Support
1996	Crosby	General	-	Management participation	Participation, right attitude
1996	Goffin <i>et al.</i>	General	Interviews	Management commitment	Time and effort, clear goals, expertise, focus on employees
1997	Arditi <i>et al.</i>	Construction	Reviews	Total Quality Management	Top priority, lead
1997	Goetsch <i>et al.</i>	General	-	Quality management	Involvement, resources allocation
1998	Ahire <i>et al.</i>	Auto parts	Questionnaire survey	Top management commitment	Priority, involvement, goals, resources allocation
1999	Howard <i>et al.</i>	High-tech	Questionnaire survey	Management commitment	Quality strategy
1999	Samson <i>et al.</i>	Manufacturing	Questionnaire survey	TQM practices	Leadership, involvement
2000	Jaafari	Construction	Reviews	Business competitiveness	Leadership
2000	Chan <i>et al.</i>	Manufacturing	Case studies	Total Quality Management	Priority, resources allocation
2001	Harris <i>et al.</i>	Construction	-	Quality management	Initiative
2003	Taylor <i>et al.</i>	General	Questionnaire survey	Management commitment	Involvement
2003	Chin <i>et al.</i>	Construction	Interviews	ISO 9000	Common goal, review and continuous improvement, involvement and leadership, attitude to change
2004	Haupt <i>et al.</i>	Construction	Questionnaire survey	Total Quality Management	Initiatives, support
2004	Low <i>et al.</i>	Construction	Case studies	Total Quality Management	Allocation of budget, planning for change, providing methods of monitoring progress
2004	Thevnin	General	Reviews	Management commitment	Willing to change, participation
2004	Dadzie	Service (library)	Case studies	Management commitment	Initiatives, resources allocation, communication, recognition/reward

Table 1: Summary of Literature Review for Management Commitment in Quality Management

4. SURVEY METHOD

The survey questions for this research were designed to determine the top management commitment towards the implementation of quality management in construction projects from various constructs as below:

1. Quality goals.
2. Priority.
3. Efforts.
4. Involvement.
5. Attitude to change.
6. Resources allocation.

Cooper *et al.* (1998) defined mail survey as a self-administered questionnaire delivered by the postal service, facsimile, or a courier service. In this survey, all questionnaires were sent by normal post. The administration of mail survey for this survey had seriously taken consideration of the concerns of Punch (1998), i.e. to ensure that respondents had been approached professionally, and the researcher should stay in control of the data collection procedure. For the purpose to ensure that respondents had been approached professionally, the cover letter attached to each questionnaire had fully informed about the purpose of the research. The total number of questionnaires for this survey was 1,500.

5. SELECTION OF SAMPLES

The population for this research is interpreted as all the construction companies in Malaysia those undertake building construction contracts. Survey samples were drawn from construction companies in Selangor and Kuala Lumpur which registered with the Construction Industry development Board (CIDB) under the category of building construction, from grade G5 to G7. The reason for construction companies of both areas were selected was that the total number of companies registered is relatively large compared to other areas. Under the terms of registration of CIDB for construction companies, there are seven grades (from G1 to G7) where G1 been the smallest with tendering capacity of not exceeding RM100,000 and G7 been the largest with unlimited tendering capacity. The tendering capacity for G5 and G6 are not exceeding 5 million and not exceeding 10 million respectively (both in ringgit Malaysia) (CIDB, 2005). As the three highest grades, the construction companies of grade G5, G6 and G7 perform a major role in the construction industry and their implementation of quality management should best reflecting the actual scenarios.

The CIDB directory as on the CIDB web site (www.cidb.com.my) on 27 March 2006 comprised 2,808 construction companies (sampling units) for the groups concerned. The breakdown is shown at Table 2. With the understanding of bigger sample size would generally increases the precision of survey results, together with the consideration of financial affordability (Mangione, 1995), a sample that comprises of 1,500 sampling units was randomly drawn (proportionate to the number of sampling units for each grade at each area) from the sampling frame. The breakdown of the sample is shown at Table 3.

Grade	Wilayah Persekutuan (Kuala Lumpur)	Selangor	TOTAL
G5	350	572	922
G6	150	226	376
G7	655	855	1,510
TOTAL (G5, G6 & G7 for both areas)			2,808

Table 2: Number of Sampling Units in the Sampling Frame

Grade	Wilayah Persekutuan (Kuala Lumpur)	Selangor	TOTAL
G5	188	305	493
G6	80	121	201
G7	350	456	806
TOTAL (G5, G6 & G7 for both areas)			1,500

Table 3: Number of Sampling Units in the Sample

6. RATE OF RESPONSE

There were 131 responses received at the stipulated date that the questionnaire should be returned. Out of the 131 responses, 129 were in the form of returned questionnaire and 2 were in the form of e-mail indicating they were not participating. There should also be noted that there were 2 questionnaires returned by the postal service due to the addressees had either shifted or ceased operation. Therefore, the total number for questionnaires successful sent out was 1,498. Considering all the above, the rate of response for this survey is 8.74%.

From the 129 returned questionnaires, 12 were rejected for further analysis due to various reasons. These included empty questionnaire returned, incomplete for most of the questions, and unserious attitude shown by the respondent by rating the same to almost all questions. After excluding these rejected questionnaires, the remaining questionnaires used for further analysis were 117 which equivalent to 7.88% of 1,484 (the number of total sent out after minus 14 for those rejected to participate and rejected questionnaires received).

The number of usable questionnaires (117) is more than the minimum number of respondents required for statistical analysis (Bouma, 1998; Lewin, 2005). In fact, the number is sufficient to be categorized under the category of large sample for statistical tests of almost all nonparametric methods (Mann, 2004).

7. RESULTS AND ANALYSIS

Respondents were requested to indicate the extent of their agreement on each item of questions asked as regard to the top management of their organizations. The scale provided were strongly disagree, disagree, neutral, agree, and strongly agree. The results are as shown in Table 4.

7.1 Quality goals

Questions on the construct of quality goals are Questions 1 and 2.

In Question 1, 61.5% of respondents agreed and 21.4% of respondents strongly agreed that the top managements of their organizations clearly identify project quality goals for project management teams to achieve. Total percentage of respondents who either agreed or strongly agreed to this question is 82.9%.

In Question 2, 64.1% of respondents agreed and 20.5% of respondents strongly agreed that the top managements of their organizations ensure that project quality goals are known to every member of the project management teams. Total percentage of respondents who either agreed or strongly agreed to this question is 84.6%.

The results show that the top management of construction organizations are generally having quality goals for their construction projects.

7.2 Priority

Questions on the construct of priority are Questions 3 and 4.

In Question 3, 36.8% of respondents agreed and 8.5% of respondents strongly agreed that the top managements of their organizations treat quality as being more important than cost. Total percentage of respondents who either agreed or strongly agreed to this question is 45.3%.

In Question 4, 34.2% of respondents agreed and 4.3% of respondents strongly agreed that the top managements of their organizations treat quality as being more important than time. Total percentage of respondents who either agreed or strongly agreed to this question is 38.5%.

The results clearly indicate that the top management of construction organizations are not treating quality as their priority in relation to the elements of cost and time.

7.3 Efforts

Questions on the construct of efforts are Questions 5 and 6.

In Question 5, 66.7% of respondents agreed and 15.4% of respondents strongly agreed that the top managements of their organizations ensure continuous efforts in enhancing the quality of construction works. Total percentage of respondents who either agreed or strongly agreed to this question is 82.1%.

In Question 6, 61.5% of respondents agreed and 18.8% of respondents strongly agreed that the top managements of their organizations always source for new ideas to enhance quality of construction works. Total percentage of respondents who either agreed or strongly agreed to this question is 80.3%.

The results reveal that generally the top management of construction organizations are putting efforts in quality management for construction projects.

7.4 Involvement

Questions on the construct of involvement are Questions 7 and 8.

In Question 7, 56.4% of respondents agreed and 12.0% of respondents strongly agreed that the top managements of their organizations are involved frequently in the quality management process. Total percentage of respondents who either agreed or strongly agreed to this question is 68.4%.

In Question 8, 56.4% of respondents agreed and 16.2% of respondents strongly agreed that the top managements of their organizations are personally involved in the quality management process. Total percentage of respondents who either agreed or strongly agreed to this question is 72.6%.

The results show that the top management of construction organizations have to get themselves more involved in quality management processes.

7.5 Attitude to change

Questions on the construct of attitude to change are Questions 9 and 10.

In Question 9, 58.1% of respondents agreed and 15.4% of respondents strongly agreed that the top managements of their organizations have strong willingness to change current work procedures to conform to requirements of quality system. Total percentage of respondents who either agreed or strongly agreed to this question is 73.5%.

In Question 10, 62.4% of respondents agreed and 11.1% of respondents strongly agreed that the top managements of their organizations maintain an organizational culture that emphasizes on the quality of construction works. Total percentage of respondents who either agreed or strongly agreed to this question is 73.5%.

The results reflect that most of the top management of construction organizations are having positive attitudes towards changes for quality management implementation.

7.6 Resources allocation

Questions on the construct of resources allocation are Questions 11 and 12.

In Question 11, 51.3% of respondents agreed and 11.1% of respondents strongly agreed that the top managements of their organizations allocate sufficient human resources for quality management. Total percentage of respondents who either agreed or strongly agreed to this question is 62.4%.

In Question 12, 47.9% of respondents agreed and 9.4% of respondents strongly agreed that the top managements of their organizations allocate sufficient financial resources for quality management. Total percentage of respondents who either agreed or strongly agreed to this question is 57.3%.

The results show that resources allocation for quality management implementation needs to be increased.

7.7 Summary

Table 5 and 6 show the items on top management commitment on quality management implementation which were rated either “Agree” or “Strongly Agree” by at least two thirds of respondents and less than two thirds of respondents respectively. From the two tables, it is indicated that all items for the constructs of quality goals, efforts, involvement, and attitude to change were rated either “Agree” or “Strongly Agree” by at least two thirds of respondents. However, all items for the constructs of priority and resources allocation were not rated either “Agree” or “Strongly Agree” by at least two thirds of respondents. The results show the top managements of construction organizations are committed to quality management but subject to the consideration of the factor of cost. The factor of time is indirectly related to cost as delay in the construction schedule of a project would bring financial loss to the project. Similarly, Rwelamila *et al.* (1995) described that in the construction industry, attention has been given to the elements of time and cost with little recognition to the importance of the aspect of quality.

Top Management Commitment on Quality Management Implementation (Total Respondents: 117)		0		1		2		3		4		5	
		Not Answered		Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1.	Clearly identify project quality goals for project management team to achieve.	0	0.0	2	1.7	2	1.7	16	13.7	72	61.5	25	21.4
2.	Ensure that project quality goals are known to every member of the project management team.	0	0.0	2	1.7	2	1.7	14	12.0	75	64.1	24	20.5
3.	Treat quality as being more important than cost.	0	0.0	2	1.7	23	19.7	39	33.3	43	36.8	10	8.5
4.	Treat quality as being more important than time.	0	0.0	3	2.6	25	21.4	44	37.6	40	34.2	5	4.3
5.	Ensure continuous efforts in enhancing the quality of construction works.	0	0.0	1	0.9	1	0.9	19	16.2	78	66.7	18	15.4
6.	Always source for new ideas to enhance quality of construction works.	0	0.0	1	0.9	1	0.9	21	17.9	72	61.5	22	18.8
7.	Involve frequently in the quality management process.	0	0.0	1	0.9	3	2.6	33	28.2	66	56.4	14	12.0
8.	Personally involved in the quality management process.	0	0.0	1	0.9	5	4.3	26	22.2	66	56.4	19	16.2
9.	Strong willingness to change current work procedures to conform to the requirements of quality system.	1	0.9	1	0.9	5	4.3	24	20.5	68	58.1	18	15.4
10.	Maintain an organizational culture that emphasize on the quality of construction works.	1	0.9	1	0.9	4	3.4	25	21.4	73	62.4	13	11.1
11.	Allocate sufficient human resources for quality management.	1	0.9	1	0.9	11	9.4	31	26.5	60	51.3	13	11.1
12.	Allocate sufficient financial resources for quality management.	1	0.9	1	0.9	9	7.7	39	33.3	56	47.9	11	9.4

Table 4: Top Management Commitment on Quality Management Implementation

Construct	Question	Agree and Strongly Agree (%)
Quality goals	Clearly identify project quality goals for project management team to achieve.	82.9
Quality goals	Ensure that project quality goals are known to every member of the project management team.	84.6
Efforts	Ensure continuous efforts in enhancing the quality of construction works.	82.1
Efforts	Always source for new ideas to enhance quality of construction works.	80.3
Involvement	Involve frequently in the quality management process.	68.4
Involvement	Personally involved in the quality management process.	72.6
Attitude to change	Strong willingness to change current work procedures to conform to the requirements of quality system.	73.5
Attitude to change	Maintain an organizational culture that emphasize on the quality of construction works.	73.5

Table 5: Top Management Commitment on Quality Management Implementation Rated “Agree” or “Strongly Agree” By At Least Two Thirds of Respondents

Construct	Question	Agree and Strongly Agree (%)
Priority	Treat quality as being more important than cost.	45.3
Priority	Treat quality as being more important than time.	38.5
Resources allocation	Allocate sufficient human resources for quality management.	62.4
Resources allocation	Allocate sufficient financial resources for quality management.	57.3

Table 6: Top Management Commitment on Quality Management Implementation Not Rated “Agree” or “Strongly Agree” By At Least Two Thirds of Respondents

8. CONCLUSIONS

It is found that the top management of construction organizations are generally committed to quality management implementation from the perspectives of quality goals, efforts, involvement and attitude to change. Nevertheless, there are some areas which need to be improved. Firstly, quality is still lacking in terms of its importance in the mentality of the top management compared to cost and time. It is evident from the fact that most construction organizations are reluctant to sacrifice both finance and time for the sake of quality. Secondly, resources allocation should be further increased to a more satisfactory level.

The findings of this research should be looked seriously as they provide a potential explanation to the series of quality problems in the local construction industry. It is recommended the top management of construction organizations should change their mindset and give more priority to quality in project management.

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**DISPUTE RESOLUTION PRACTICES IN THE CONSTRUCTION INDUSTRY IN
PALESTINE**

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ABSTRACT

The construction industry is subject to more conflicts, disputes and claims more than many other industries. Construction industry in Gaza Strip suffers from the misunderstanding of dispute resolution management as a number of factors affect the development of dispute resolution practice. Over the last years, there has been a break down in the relationship between parties involved in the construction process which affected the development and expansion of the construction sector. The current unstable political condition has also contributed to the increase in the number of construction disputes. The objective of this paper is to examine the current dispute resolution practices in the construction industry in the Gaza Strip. The results of this study indicated that litigation method is rarely used in resolving disputes as it depletes more time and cost, and can cause side conflicts between owners and contractors. In the Palestinian environment, choosing court to resolve disputes is considered by many as an aggressive act, unlike western culture. Alternative dispute resolution methods are mostly used in Gaza Strip. The results also showed that most contractors used informal negotiation in resolving disputes with owners. It is advisable to organize regular training programs in order to increase contracting parties' knowledge concerning dispute resolution systems and how to deal with conflicts in the most efficient and practical way.

Keywords: Dispute, resolution, litigation, negotiation, construction

INTRODUCTION

Most governmental and non-governmental institutions in the Gaza Strip are using different types of contracts in their projects. The selection of the contract depends on several factors such as: agency type, project type, and donor identity. Sometimes the local agencies are enforced to use the donor country contract for projects financed by that Donor. Also the agency may use more than one type of contracts according to the project type. Most of the agencies presume the special conditions in order to overcome some of the general conditions provisions that are not suitable to the agency.

The most used form of international contract is FIDIC. FIDIC is the French acronym for the International Federation of Consulting Engineers, which was founded in 1913. Other construction contracts used in the Gaza Strip are: European Community (EC), World Bank (WB), unified contract for public works. Owner often uses his own contract forms in projects unless Donors select another contracting system. All construction contracts include provisions for dispute resolution procedures. These provisions can be different from one contract to another according to the nationality and regulation of donor agency. According to the concept of the conflict spectrum any conflict begins with a claim, which if it is unresolved can lead to a dispute, and it required a fair resolution by one of the reciprocal dispute resolution techniques.

The local institutions that involved in the construction dispute resolution are: local courts, Association of Engineers (AoE), Palestinian Contractors Union (PCU) and some private experts. Association of Engineers is considered one of the most reliable agencies that can assist in resolving many construction disputes. Most of owners, especially the public owners, stated in their contract provisions of arbitration that in case of dispute occurs it should be referred to AoE to resolve it. The objective of this paper is to examine the current dispute resolution practices in the construction industry in Gaza Strip.

CONSTRUCTION DISPUTE RESOLUTION

Roxene (1998) stated that changes in construction technology and the complexity of projects have made building more complicated. Present used contracts and project management techniques are struggling to keep up with the dynamics of industry. In addition, owners have become highly leveraged with tighter budgets and restricted cash flow. Pressures to get projects up and running have led to tighter time schedules and experiments with new accelerated project delivery methods. As a result, the cumulative effect of these factors has caused traditionally cooperative relationships to deteriorate, and be replacing by adversarial, antagonistic relationships, 'win-lose' attitudes, and general dissension. Cheung and Chuah (1999) reported that in recent years, a number of researchers and practitioners in project management have reported that there is an increasing trend in the use of cross-functional project teams because of the dynamic nature of today's projects and their life cycles.

Yates (2003) stated that contractors' claims are often opportunistically inflated, exaggerated or even spurious and clients (and their staff/consultants) frequently respond with reciprocal opportunism, by rejecting contractors' claims out of hand. Theoretically, it is possible that a claim genuinely made by one party could genuinely be disputed by the other involving no opportunistic behavior by either party. In today's complex construction projects, resolving disputes has become an inevitable part of a project manager's work (Cheung, 1999). The methods of resolving disputes range from informal negotiation to formal proceedings like arbitration and litigation. Arbitration and litigation proceedings have proved to be time consuming and expensive. In addition, these proceedings are often confrontational and require many hours of unproductive effort (Cheung and Yeung, 1998, Barrie and Paulson 1992).

While litigation is generally the most costly means of resolving construction disputes, it certainly presents the best opportunity for a party to have its dispute determined in accordance with applicable laws and in a formal setting where the rules of evidence apply. Resolution of a dispute through the courts also affords a party the chance for a jury trial and, when appropriate, the ability to appeal an adverse ruling (UNITAR, 2004). Cheung (1999) stated that litigation is a rigidly regulated process, the process is subject to the rules and procedures set out by the court. By adopting the litigation route, the parties surrender their control over the process and a third party will impose the outcome. The courts are seen as too expensive and too slow to resolve cases.

Alternative Dispute Resolutions (ADR) is the generally accepted acronym for alternative dispute resolution. Most simply put, ADR denotes all forms of dispute resolution other than litigation or adjudication through the courts. ADR provides an opportunity to resolve disputes and conflict through the utilization of a process that is best suited to the particular dispute or conflict (Barkai 2003). Taschuk and Chambers (1999) said that ADR could be defined as a collection of techniques for the resolution of disputes quickly and economically, in a fashion not usually possible with the traditional litigation process. It is important to note that these processes are not designed to remove the court process, nor are they mutually exclusive.

Within the past decade, the construction industry in the US has taken steps to avoid litigation and to control disputes by developing and employing various mechanisms for alternative dispute resolution that can be implemented during almost any stage of a construction project (Jannadia et al. 1999). In opposite to litigation, which is characterized by open proceedings, Agarwal (2001) said that alternative dispute resolution proceedings take place in private. They are not public proceedings. Thus, they ensure confidentiality. Kaplan et al. 1991; Fenn and Gameson 1992; Brown and Marriott 1999 as cited in Cheung et al. (2002) concluded that the perceived shortcomings of litigation and arbitration, with their concomitant rise in costs, delays, and adversarial relationships, have encouraged the rapid growth of alternative dispute resolution processes, namely conciliation, mediation, adjudication, and other hybrid processes.

Prevention techniques do not guarantee total dispute elimination. In negotiation, the parties have absolute freedom with respect to the form, process and type of agreement. If negotiation fails, the disputants can assign a neutral third party, which has two possible formats, the standing neutral and non-binding resolution. Dispute review boards and dispute resolution advisors have been used for the purpose of the standing neutral. The standing neutral concept involves the participation of a neutral person in order to solve problems at the source (Cheung, 1999, Barkai, 2003). Zanelidin (2006) stated that claims in the United Arab Emirates appear to hinder the completion of the construction and cause delays in delivering projects. Hassanein and El Nemr (2008), for example, reported that claims management in the Egyptian construction sector suffers from the lack of proper notification procedures and poor documentation management.

Under the title of (ADR is the fast-track method) Totterdill (2000) said that many of the differences, claims and disputes will be resolved by discussion and negotiation between the people who are working on the site. However, problems may arise which cannot be resolved by direct negotiation. Some forms of outside assistance will be required. The challenge for the engineers and managers, on both sides of the dispute, is to agree on a procedure, which will resolve the problem with the minimum disturbance to the project and the minimum cost to the parties to the contract. Cheung and Yeung (1998) reported that the traditional methods used in dispute resolution were litigation and arbitration.

Barkai (2003) ensured that it is possible to combine both mediation and arbitration. Some processes provide of "Med-Arb" or even "Arb-Med". "Med-Arb" means to use mediation first and then to use arbitration if the mediation does not produce a solution. "Arb-Med" means to use arbitration first to reach a decision and then allow the parties to mediate the same dispute to see if they can negotiate in mediation an agreement that is better for both parties than the arbitration award. These processes might use the same person as both the mediator and the arbitrator.

METHODOLOGY

The research approach adopted in this study comprised a preliminary pilot study and questionnaire survey. The pilot study was conducted following a review of literature with eleven local experts who were able to provide competent information. The pilot study was conducted to test the validity and the reliability of the research tool, and to ensure that the information sought in the questionnaire would be relevant to the study. The questionnaire was refined a number of

times based on the feed back from experts panel before it was used as a base for the structure questionnaire that have been used for data collection. There are numerous methods available in the international commercial world for resolving construction disputes between contract parties. Resolution methods classification depends on the formality of the method, so that formal and informal are the main categories of these methods. Many construction dispute resolution methods were collected from the literature such as; Cheung 1999, Cheung and Yeung 1998, Thomas 2000, UNITAR 2004, Barkai 2003, Cheung 1999).

Extensive use was made of ordinal scale measures for eliciting data on respondents' perceptions. Ordinal scale is a ranking or rating data that normally uses integers in ascending or descending order. The respondents were asked to rate their agreement or disagreement concerning the stated dispute causes on a five-point Likert scale, where 1= strongly agree, 2 = agree, 3 = no idea, 4 = disagree, and 5 = strongly disagree. The numbers assigned to the agreement or degree of influence (1, 2, 3, 4, and 5) doesn't indicate that the intervals between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels (Naom 1998). The normal distribution test was conducted and it has been found that the collected data were normally distributed. The main parametric test, which is the One Sample T Test, has been used.

The population of this study was 72 respondents representing seventy two construction firms. The designation of the respondents was: 52% company director, 18% vice director, 19% project manager, and 11% site engineer. The contract value ranges from 5 million US\$ to 15 million US\$.

RESULTS AND DISCUSSIONS

Dispute resolution methods

The respondents were asked regarding their points of view about the usage and the effectiveness of the dispute resolution methods. Table 1 shows the statistical analysis results for the usage and effectiveness of the litigation method and the alternative dispute resolution methods. For the usage degree of litigation method of mean value 1.9697, it can be inferred that the respondents' opinions are negative and are not in agreement with the item content. This means that litigation is not often used in resolving disputes due to its negative impacts on the disputants and project concerning time and money. On the other hand, the respondents' opinions are neutral for the effectiveness of the item content with a mean value of 2.7069. This means that the respondents consider the litigation method has a weak to a moderate effectiveness level in resolving disputes.

For the usage degree of the alternative dispute resolution methods, it can be inferred that the respondents opinions are positive and in agreement with item content for the items ranked 1,2,3,4,5, and 6. The respondents' opinions are negative and are not in agreement with item content for the items ranked 9, 10 and 11. The respondents' opinions are neutral of the item content for the items ranked 7 and 8. On the other hand, for the effectiveness degree of the alternative dispute resolution methods, it can be inferred that the respondents opinions are positive and in agreement with the item content for the items ranked 1,2,3,4,5,6,7 and 8. The respondents' opinions are neutral for the item content for the items rank 9 and 10.

Table 1: Dispute resolution methods

	Type	Group Items	Mean of (5)	Rank	Weight Ratio %	T - value	P-value
Usage	Legal	Litigation method	1.9697	-	39.4	- 10.2	0.000

	Type	Group Items	Mean of (5)	Rank	Weight Ratio %	T - value	P-value
	Alternative dispute resolution methods	Dealing with disputes through informal negotiation (at field level)	3.5362	1	70.7	3.726	0.000
		Dealing with disputes through formal negotiation (at field level)	3.4776	2	69.6	3.674	0.000
		Dealing with disputes through formal negotiation (central office)	3.4638	3	69.3	4.062	0.000
		Dealing with disputes through informal negotiation (central office)	3.4179	4	68.4	3.268	0.002
		Collaborative Problem Solving	3.3134	5	66.3	2.168	0.024
		Mediation	3.2769	6	65.5	2.182	0.033
		Conciliation	3.1719	7	63.4	1.156	0.252
		Arbitration	3.1111	8	62.2	0.926	0.358
		Dealing with disputes through formal negotiation (legal dept.)	2.4627	9	49.3	- 3.88	0.000
		Dealing with disputes through informal negotiation (legal dept.)	2.3529	10	47.1	- 4.56	0.000
		Dispute Adjudication Board DAB	2.0313	11	40.6	- 7.81	0.000
		Average	3.0714		61.4	1.294	0.200
Effectiveness	Legal	Litigation method	2.7069	-	54.1	- 1.38	0.171
	Alternative dispute resolution methods	Arbitration	3.8833	1	77.7	6.775	0.000
		Dealing with disputes through formal negotiation (central office)	3.8769	2	77.5	6.712	0.000
		Dealing with disputes through formal negotiation (at field level)	3.6563	3	73.1	4.482	0.000
		Collaborative Problem Solving	3.6349	4	72.7	4.314	0.000
		Mediation	3.5714	5	71.4	4.168	0.000
		Conciliation	3.5238	6	70.5	3.382	0.008
		Dealing with disputes through informal negotiation (central office)	3.5238	7	70.5	3.762	0.000
		Dealing with disputes through informal negotiation (at field level)	3.4127	8	68.3	2.467	0.016
		Dispute Adjudication Board DAB	2.9	9	58	- 0.60	0.549
			2.6613	10	53.2	1.85	0.068
		Dealing with disputes through					

	Type	Group Items	Mean of (5)	Rank	Weight Ratio %	T - value	P-value
		formal negotiation (legal dept.)					
		Dealing with disputes through informal negotiation (legal dept.)	2.6032	11	52.1	- 2.33	0.023
		Average	3.444		68.9	5.145	0.000

* Tabulated T-value equal 1.98 at $\alpha = 0.05$ and degrees of freedom = 72

Legal Methods

Table 1 illustrates that the litigation method has a mean value of 1.9697, which is a very low value. This indicates that the litigation method is rarely used in solving disputes. The respondents' opinion is negative towards using it in solving disputes due to the T-value is less than 1.98 and the P-value is less than 0.05. In the same time Table 2 illustrates that 80.3% of the respondents agree that litigation is not used in solving construction disputes. This result can be explained that litigation method depletes more time and money and can cause side conflicts between the owner and contractor. Contractors try to avoid courts in solving disputes. Many employers would blacklist the contractor who has taken them to court, or known to have taken others to court, and label him as claims oriented. This means that the decision to go to court could not only affect the contractor projects in hand but also could jeopardize his future contracts. Employers and Engineers use this stranglehold to manipulate contractors, knowing that they would hesitate to take legal action. Table 2 shows the mean and the percentage of usage in order to clarify the weight of ranking for litigation.

Table 2: Usage of legal methods

	Legal Methods	% Used	% Not used	Mean
1	Litigation	3.1	80.3	1.9697

Alternative Dispute Resolution Methods

Table 1 illustrates that the alternative resolution methods (ADR) have mean values varies from 3.5362 to 2.0313. In the same time Table 3 shows that, the four types of negotiation method (formal or informal) at the field or office level having the highest weights of usage. This can be explained that contractors wishing to solve work problems by negotiation in order to save time and keep the relation with the owner in a good manner for future interests. On the other hand, formal or informal negotiations at the legal level were ranked at the end of the list due to the sensitivity of owner towards legal actions.

As illustrated in Table 3, the informal negotiation method, was ranked in the first position with a mean value of 3.5362; and 67% of respondents stated that they used it in solving disputes. This method deals with disputes through informal negotiation in the field level as it can solve most of the minor conflicts in the site. In the second position, respondents ranked the formal negotiation in the field level with a mean value of 3.4776 and 58.2% of them used it. These results emphasize that conflicts and disputes should be resolved quickly at their early stages. Contractors support the informal solutions in order to obtain quick field decisions to avoid delay and disruption of formal procedures.

At the center office level, formal negotiation has been ranked in the third position with a mean value of 3.4638 and 47.8% of the respondents stated that they have used it. Informal negotiation has been ranked in the fourth position with a mean value of 3.4179 and 43.3% usage. This means that the dispute becomes complicated and so the need for formal procedures is required to save time. Each party will be responsible for office negotiation outputs and decisions. Collaborative problem solution, mediation, conciliation and arbitration were ranked in the fifth, sixth, seventh and eight positions in a descending order after negotiation with mean values of 3.3134, 3.2769, 3.1719 and 3.1111 respectively. 43.3% of respondents indicated that they have used collaborative problem solution. This result depicts the positive attitude of the contractor towards the owner to exert collaboration efforts to solve problems and disputes together in their early stages.

Ranking Collaborative problem solution before mediation and conciliation means that the disputants themselves try to resolve most of the conflicts and the disputes without a third party in stead of transferring disputes to dispute resolution institutions or agencies. It can be deduced that, the number of disputes that are raised to be solved through specialized centers or institutions is less than the number of disputes that are resolved by cooperation between the contractor and owner or resolved by right demission and quitclaim from one party or all parties.

Table 3: Ranking order and usage of alternative dispute resolution methods

Alternative dispute resolution methods	% Used	% Not used	Mean	Rank order
Dealing with disputes through <i>informal negotiation</i> (at field level)	67	20.2	3.5362	1
Dealing with disputes through <i>formal negotiation</i> (at field level)	58.2	17.9	3.4776	2
Dealing with disputes through <i>formal negotiation</i> (central office)	47.8	14.4	3.4638	3
Dealing with disputes through <i>informal negotiation</i> (central office)	43.3	19.4	3.4179	4
Collaborative Problem Solving	43.3	19.4	3.3134	5
Mediation	44.6	19.8	3.2769	6
Conciliation	46.8	29.7	3.1719	7
Arbitration	38.1	23.8	3.1111	8
Dealing with disputes through <i>formal negotiation</i> (legal dept.)	17.9	61.2	2.4627	9
Dealing with disputes through <i>informal negotiation</i> (legal dept.)	17.7	61.8	2.3529	10
Dispute Adjudication Board DAB	6.2	71.9	2.0313	11

Dispute Adjudication Board (DAB) is the least used method. This result can be explained that the DAB is not widely known to the local contractors or consultants. Moreover, it is rarely used in Gaza Strip except some contracts such as World Bank contract, which require DAB in its dispute resolution clauses. DAB is a precautionary system that can protect the contract parties from disputes and claims through reviewing and solving conflicts in its early stages. It is obvious that usage of alternative dispute resolution methods is more frequent than the usage of legal methods. This can be ascribed to the positive characteristics of ADR methods, and the social environment that dominates in the Middle East and the hard procedures of legal methods. In Palestine choosing the court is considered by many to be an aggressive act, unlike western cultures that

consider it a way to resolve disputes. This outlook may have evolved due to the slow legal resolution of disputes in the Palestine.

CONCLUSION

The aim of this study was to examine the current dispute resolution practices in the construction industry in the Gaza Strip. The results indicated that litigation method is rarely used in resolving disputes. The respondents' contractors stressed that litigation method depletes more time and cost and can cause side conflicts between contractors and owners. In the Palestinian environment, choosing court to resolve disputes is considered by many to be an aggressive act, unlike western culture. Therefore, they tried to avoid courts. Alternative dispute resolution methods are more frequently used than legal methods. Informal negotiation is the most used dispute resolution method. Mediation and conciliation are also widely used methods. Dispute Adjudication Board (DAB) is the least used method, as it is not widely known to the local contractors or owners.

AoE and PCU should exert cooperative efforts in order to qualify specialized arbitrators to help in settling conflicts and litigation disputes. Qualifying new arbitrators can be done through reputation of experts to train and prepare local trainers and arbitrators. Negotiation techniques should be emphasized in the dispute resolution clauses in the contract in order to direct the disputants to use negotiation in solving their conflicts. PCU should conduct continuous training programs in cooperation with AoE to develop the contractors' and owners managerial abilities regarding dispute resolution. These managerial abilities include the ability of contractor to avoid conflicts, deal with conflicts, try to resolve it and participate in the solution.

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A comparative study of arbitration and mediation to resolve disputes on sites in Hong Kong

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ABSTRACT

When there are two parties exist, a dispute might arise due to conflict of interest. Construction industry is not of exception. Dispute among the practitioners on site is one of the major problems in our industry. There are many different ways to resolve disputes. Nevertheless, the most common method of dispute resolution in Hong Kong construction industry, by far, is mediation and arbitration. Mediation is a dispute resolution process whereby a third party helps assist two or more disputants in reaching voluntary settlement. The parties themselves can then choose whether to accept the method of resolution, rather than accepting “resolution settlement” which is imposed by a third party without choice. Mediators use appropriate method and skills to open a dialogue between disputants, aiming to help the parties arrive at an agreement on the disputed matter. Arbitration, on the other hand, is a legal procedure for resolving disputes, wherein the parties to a dispute refer it to the arbitrator where such decisions have to be bound. Arbitration can be classified as a form of binding dispute resolution which is equivalent to litigation in courts. It is entirely different from the various forms of non-binding dispute resolution, such as negotiation and mediation. This is a theoretical paper which will first revisit the

history of the arbitration and mediation; follows by the comparison between mediation and arbitration. After that, it will provide some suggestions to the practitioners in construction field under which circumstances we should choose mediation or arbitration method.

Key words: mediation, arbitration, construction industry and Hong Kong

1. INTRODUCTION

Construction is a complex process which requires the jointly effort of a temporarily assembled organization with many different parties, each having different goals and expecting to maximize its own benefits. Since differences exist in perception and goals among partners to a project, conflicts in the construction environment are inevitable. Conflicts can quickly turn into disputes if not properly handled. Dispute is regarded as a form of conflict that needs resolution (Cheung & Suen, 2002). Many different approaches can be adopted to resolve disputes. However, mediation and arbitration are two most common methods to resolve dispute in Hong Kong by far.

Mediation is one of the dispute resolution processes where a third party, mediator, assists two or more disputants in achieving a voluntary, compromising settlement or agreement. It is the mediators' responsibility to use suitable techniques, methods and skills to initiate a dialogue between disputants, help the parties arrive at an agreement on the disputed matter. Whether an agreement is reached or not finally, the parties themselves have to decide and choose, rather than accepting a decision decided and imposed by a third party. The disputes may involve organizations, communities, individuals or other representatives with a vested interest in the outcome. Mediation can apply in a variety of disputes, such as commercial, legal, diplomatic, workplace, community and divorce or other family matters (Anonymous, 2007).

Arbitration is a legal procedure for disputes resolution; however, they are not bound by legal formalities as those cases in courts (Bladel 1999). Parties in a dispute refer the case rely on one or more persons, the arbitrator, to arrive at a legal binding decisions. Arbitration can be classified as a form of binding dispute resolution which is entirely distinct from the various forms of non-binding alternative dispute resolution, such as negotiation and mediation. Arbitration is most commonly used for the resolution of commercial disputes, predominantly in international commercial transactions and

credit obligations. It is also used in some countries to resolve other types of disputes, such as labour, consumer or family disputes (Anonymous, 2007). Arbitration is used commonly as a means to resolve disputes in construction because it is quite common that the technical background of the case is far too difficult for substantive laws to resolve. Court may held wrongly as the judge might not have a thorough understanding in the norm or normal practice in construction industry. Yet, arbitrators usually have substantial practical experiences in construction industry which can provide a relatively fair decision. Besides, Bladel (1999) holds the view that arbitration is also best reserved for transactions where the parties are contracting for a long relationship in which the maintenance of commercial trust between die parties is reasonably assured (Bladel 1999).

2. HISTORICAL BACKGROUND

Mediation activity was first developed in Ancient Greece, Roman civilization and after that, Roman law. The Romans called mediators in many different ways, such as *internuncius*, *interpolator*, *interpres*, and *mediator etc.* Ancient cultures have vast different or even contradictory viewpoints on mediators. Some viewed them as a sacred figure, worthy of particular respect; and the role partly overlapped with that of traditional wise men. In stark contrast, however, people in the Middle Ages viewed mediation as a practice which should be forbidden or restricted its use to authorities centralized.

No official written record is available concerning when formal arbitration first began. In ancient Egypt, arbitration was firstly used as a means of dispute resolution to resolve conflicts between high priests and the general public. It was also popular in both ancient Rome and Greece. One of the English legal scholars, Sir Edward Coke, figures out that there is an earlier decision during the sovereignty of Edward IV which was ended in the fifteenth century. Early arbitrations under common law system suffered from serious weak point that no party in the dispute could depart from the arbitrator's mandate right up until the announcement of the arbitral award even if the decisions seemed to be going against them. Whilst the Arbitration Act was firstly implemented in Great Britain in 1610, the first arbitral judicial court trial record was only produced since 1967.

3. CAUSES OF CONSTRUCTION DISPUTES IN HONG KONG CONSTRUCTION INDUSTRY

Lau (1996) points out that there are several major causes in construction disputes. The first type of disputes is contract document errors; these include defects, omissions or errors in the contract documents. It is common to see those lower bid contractors try their best to capture back all the possible costs, this prompts another types of arguments on site. They might provide a low bid only because they have some misunderstandings on the projects. After winning the bid, they try to find ways in recovering parts of the money. It is unavoidable to have changes in requirements from clients; documents need to be conformed with all these alterations as well. Yet, these can cause the third type of arguments due to poor communications and misunderstandings.

4. APPLICATION IN HONG KONG CONSTRUCTION INDUSTRY

In Hong Kong, the dispute resolution system has changed from conventional formalized litigation to comparatively less formalized arbitration to reduce unnecessary delay, costs, procedural technicalities and even the hostility that the litigation system can initiate (Suen, 2000). The HKIAC promoted “Hong Kong as a center for arbitration” in 1985. From then on, arbitration has been widely used as primary means of resolving disputes; especially in private contractual matters. More specifically, the Standard Form of Building Contract for Private Works has also included arbitration in the dispute clause of the construction contract. Nonetheless, time and again, there have been concerns over the “jurisdiction of arbitration” by arbitrators leading to delays and high costs equivalent to those involved in litigation. Moreover, there is a growing interest in alternatives to arbitration and litigation (Suen, 2000).

Mediation as an alternative to arbitration are designed to meet the increased demand for the fast, financially viable, and non-adversarial resolution of disputes. According to Suen (2000), the first mediation case took place shortly after the publication of the Mediation Service Rules of the Hong Kong Government in 1986. Since then, there have been a large crowd of mediations in private practice also involved in the government as a participant. In 1991, the Hong Kong Government Mediation Rules and the Administrative Guidelines for Mediation in Construction Disputes were introduced in the building and civil contracts. Having a glance at the introduction to the Administrative Guideline for Mediation in Construction Disputes, it is eye catching to see the sentence: “The Directors continue to recognize that arbitration can

be unnecessary, expensive and time consuming and have agreed that mediation should remain as an optional means of resolving disputes.” (Suen, 2000)

5. COMPARISON OF MEDIATION AND ARBITRATION

5.1 Decision control and process control by disputants

Decision control is determined by a large extent to which any one of the participants may unilaterally determine the results of the dispute. For instance, when a third-party decision maker alone may order a resolution to be imposed, the decision maker has total decision control. Control over the process refers to control over the development and collection of information that will constitute the starting point for resolving the dispute. Participants given authority to conduct an exploration and to plan the presentation of evidence may be said to exercise significant process control. Mediation and arbitration both can offer the disputants a high process control, for disputants have plenty of opportunity to present information as they attempt to influence the perceptions of the third party. However, while disputants have high decision control in mediation (they may decline any settlement proposed by the mediator) but low decision control in arbitration (they must accept an arbitration resolution) (Ross & Conlon, 2000).

5.2 Cost and Time Savings

Cost is referred to the total costs involved in reaching a settlement (Cheung & Suen, 2002). Cost and time are interrelated or even directly. Speedy resolution generally leads to reduced overall expense (Cheung & Suen, 2002). Standard procedures are required to adhere in litigation which have been written and established over a long period of time. It is not unlikely to take months or years before there is a trial in court. From this perspective, arbitration can be faster because it has saved much time on waiting to have a trial in court (Bladel, 1999). A hearing can be arranged within a relatively short period of time in arbitration procedures: there is no fixed place of hearing as those in litigation cases. Arbitrator can also reduce the party-incurred costs in a great amount because of the ability to control the preparations by means of the variety of procedures open to him. This makes arbitration quicker than litigation (Bladel, 1999).

In a survey carried out in one thousand largest U.S. corporations, Zimmerman showed that nearly 90% of the respondents found that mediation saved money and time. A

strong reason supported for using mediation was that it allowed the parties to control their own destinies as both sides must agree to the settlement. Fewer respondents reported that arbitration saved both time and money (Zimmerman, 1999).

The major reason behind this finding is one of two parties in dispute can control the time of arbitration, for instance, one party can call upon a lot of evidence. May it be expert evidence, witnesses etc, all these increase hearing time. The larger gang of witnesses, the longer the time of the hearing processes. It is, however, not the interest of arbitrator to stop or reduce the length of hearing process. They are paid on the time spent on the whole process! Therefore, in case one side of the party is wealthier than their counterpart substantially, it is unwise for the poor side to initiate arbitration as a means of dispute resolution. Such problem, however, is relatively mild in mediation.

5.3 Enforceability

It is undeniable that the enforceability of mediation is not as good as arbitration. In the light of this, a dispute is only suitable to be resolved by mediation when the parties reach agreements on terms of settlement. The outcome of mediation should not be either a settlement or abandonment of the mediation (Suen, 2000). Unavoidably, mediation may not be effective as it might not be able end up in a valid solution to the dispute. This is in sharp contrast to a court judgment or an arbitral award which could be immediately enforced by the law. Compared to mediation, arbitration awards are final and binding upon all the parties or stakeholders concerned. According to Suen (2000), under Section 2GG “Enforcement of Decisions of Arbitral Tribunal” of the Arbitration Ordinance: “(1) An award, order or direction made or given in or in relation to arbitration proceedings by an arbitral tribunal is enforceable in the same way as a judgment, order or direction of the Court that has the same effect, but only with the leave of the Court or a judge of the Court. If that leave is given, the Court or judge may enter judgment in terms of the award, order or direction.”

5.4 Incorporation into Contractual Agreement

Survey conducted previously by Zimmerman 1999 found that disputants choose arbitration when it is extensively used in their own industry. For instance, arbitration is usually contractually required in the construction industry and broadly applied for dispute resolutions. Costly construction delays due to slow motion by courts can be avoided by using faster arbitration process instead (Zimmerman, 1999) Most arbitration arises from agreements that enclose an arbitration clause. Such clause can form a foundation for arbitration as a method in resolving future disputes. Each arbitration body provides the parties with a list of probable arbitrators and gives them

the chance to select suitable candidates from the list (Berman, 1994). Mediation is once in a blue moon entered contractually. The parties generally entered it any time prior to or even during litigation (Zimmerman, 1999).

5.5 Relationship conservation between disputants

A long-lasting, continuing relationship is one of the critical elements in the management of business. It is never in doubt that such kind of precious relations require effort and the commitment of both parties and stakeholders involved to maintain it (Cheung & Suen, 2002). While mediation can result in the settlement of a dispute in a cost-efficient manner, it can also conserve business relationships that might be annihilated through litigation. Mediators often try their best to negotiate on behalf of the two parties, aim at achieving a conclusion which can favor both parties. Participants seldom feel as though one side has won while the other has lost. Discussions leading to settlement can often result in a better understanding of how the disagreement arose and how such disputes could be avoided in the future. With arbitration, the outcome is adjudicated and imposed by the arbitrators; disputants may not agree with the decision but have to accept ultimately unless they would like to kick off a legal procedure in court which can be even more expensive (Zimmerman, 1999).

5.6 Conformity with traditional culture

No activities can depart from informal institution which includes cultures and norms in a society. In Asian countries, mediation can be attributed to the collective cultures where integrity, security and conformity are valued high. Hong Kong is not of exception. It is quite often that the face-saving tactics is most popular in resolving conflicts. Dragging construction disputes into litigation or arbitration as disputes resolution method might cause one party to suffer from loss face (Lau 1996). Mediation, however, only seek to find a comprising solution which save the fact of both parties.

6. DISCUSSION AND CONCLUSION

The paper has mentioned two methods to resolve disputes: arbitration and mediation. These two methods are commonly adopted in disputes resolution in Hong Kong construction industry. Yet, there are substantial differences in their inherent characteristics. The greatest merit of arbitration is that they provide an enforceable

solution for the parties involved. In case the mediator fails to provide a solution acceptable to both parties. It is very likely to meet in court or in front of the arbitrators again. Besides, arbitration might be as expensive as traditional litigation and causes substantial delay in construction. So, which one should be used? It is difficult to judge. It depends on 1) whether the party has confidence that such matters can be solved by the mediator which can provide a satisfied solution to both parties. If not, arbitration might be the final solution as the mediator cannot provide satiable answers. Arbitration can save much costs and time wastes on mediation 2) whether our party are wealthier than our counterparts in a large extent, if yes, arbitration can be chosen. 3) Whether relationship conservation is important? If yes, mediation will be chosen and vice versa (see figure 1).

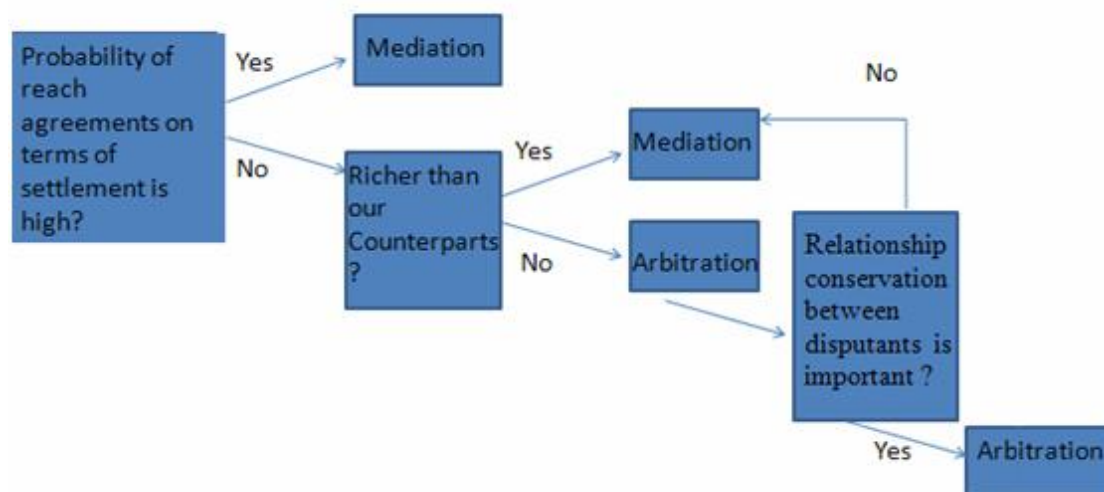


Figure 1 Selection criteria in arbitration and mediation

By way of conclusion, there is no definite answer as to which resolution method is better. Deep understanding in the rules is the only key to success in dispute resolution.

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Withdrawal Signals in Construction Dispute Negotiation

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WITHDRAWAL SIGNALS IN CONSTRUCTION DISPUTE NEGOTIATION

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ABSTRACT

Withdrawal from negotiation is defined as the situation when a negotiator loses interest to continue a negotiation. Its detrimental effect on the negotiation is obvious as the chance of having a negotiated settlement is rather slim once withdrawal occurs. Through an in-depth anecdotal longitudinal analysis of wages negotiations between the Hong Kong Construction Industry Bar-bending Workers Union (CIB-BWU) and the Hong Kong Bar-Bending Contractors Association (BCA), several withdrawal symptoms were identified. Among them, three were found to be powerful detectors of withdrawal. Firstly, ultimate withdrawal was found to be preceded by a series of dysfunctional behaviors. In the steel bender negotiation case, CIB-BWU refused to work overtime to press for concession. This served as an ultimatum before withdrawal. Secondly, divergent view among the fractions within the CIB-BWU because of the differences in their respective demand was another major factor that had led to withdrawal. Thirdly, slowing down of negotiation process was also found to be a prelude of withdrawal because it represents a state of insufficiency or slow progress. These three cues are analogous to the concept of catastrophe flags as proposed by Gilmore's (1981) work in explaining catastrophic phenomena. This paper aims to extend this analogy and conceptualization in construction dispute negotiation (CDN).

Keywords: Negotiation withdrawing behavior, signs of withdrawal, construction dispute negotiation

1. INTRODUCTION

Withdrawal from negotiation is defined as the situation when a negotiator loses interest to continue a negotiation (Chow and Cheung 2008). When this happens, the negotiation is likely to fail. Withdrawal is the result of a multistage, attitudinal and decisional struggle (Bateman and Strasser 1984). Its detrimental effect on negotiation is obvious as the chance of having a negotiated settlement in short-run is rather slim after withdrawal. Failed negotiation can be devastating not only to intra-organizational relations but also to the entire social order in international dispute (Figure 1). Withdrawal often happens in industrial action where negotiation between employer and employee is involved. Hicks (1932) commented that most

strikes are the result of faulty industrial action negotiations. Avoiding withdrawal perhaps is the first step against failing negotiation (Spector 2006). With the notion of “prevention is better than cure”, early detection of withdrawal in dispute negotiation would be instrumental. Nevertheless, there is a paucity of advice for negotiators in this respect. It is often difficult to obtain criterion data since strikes and other forms of concerted action are not planned or controlled (Thompson and Borglum 1973). Recent negotiation over daily wage and working conditions between the steel benders’ union and the trade association in Hong Kong provides an illustrative example of withdrawing behavior.

<Figure 1. Withdrawal cycle here>

2. CAUSES OF NEGOTIATION FAILURE

2.1. Negotiation failure

At every decision node of a negotiation, Iklé (1964) described three possible choices for a negotiator; (1) accepting currently available terms in the proposals from counterparts; (2) continual negotiating in the hope of securing better terms; and (3) breaking off talks with no intentions of resuming them in short-run. Negotiation failure comes with option (3). Researchers may wonder about the seemingly absurd situation that negotiations result in further conflicts and thus the study of the causes is worth noticed. Despite negotiators can all be “getting to yes” (Fisher and Ury 1991), it is equally important for negotiators to cope with “getting past no” (Ury 1991). The potential sources of negotiation failure have been highlighted in industrial relations, social psychology, managerial science and political science.

Firstly, *issue management and dilemmas in concession-making* often protract negotiation in industrial relations. In particular, negotiators typically face the negotiation dilemma to determine whether issues are distributive (either/or, win/lose) or integrative (varying sum, win/win). On the other hand, *nature of issues* is said to be the generic content of the dispute itself. It can be illustrated a similar concept in term of *strategic barriers*. The metaphorical representation of the negotiation process is defining the size of a pie and dividing it. The perception of disputant may affect the size of the pie in a variety of ways. However, there is time limitation for exploiting the underlying interests of every party. With respect to pure distribution, some parties may be better off and some may be worse off. In addition, the *reactive devaluation of compromises and concessions* explained that social psychological barrier arising from the dynamics of negotiation process diminishes the attractiveness of the proposal offered by counterpart, thus reduces the possibility to settle. In this situation, negotiators are often subjected to a wide range of cognitive and motivational influences. In particular, it suggested that the exchange of proposed concessions and compromises between adversaries can be very problematic. Although there are *many solution concepts; many, many possible equilibrium*, it is often impossible to limit outcomes to a unique or even small number of solutions. Thus, negotiator possibly imposes restrictions to winnow them down to a single predicted outcome. Moreover, *widely scattered negotiation outcomes in practice* cause the deviations in negotiator behavior from fully rational. It is provided that negotiation approach depends on agent’s starting point. Too often, *the game’s structure, rules, and possible moves are not common knowledge*. In general, what are known by one party may not necessarily be those of the other. The full set of actual and potential players, interests, beliefs, issues alternatives to agreement, rules, and agreements, are often imperfectly identified. In fact, *uncertainty* is inherently embedded in every negotiation. The possibility to achieve a solution is possible only when negotiators have the ability to explore relevant recourses. It is argued that when actors feel they lack information that is pertinent to decision-making, it *tends to slow down the process and disturb the search for mutually advantageous solutions*. It is represented by the *inaccurate information* of the misperception of preferences, interest and position of negotiating parties. Reversely, a belief that a counterpart or even a constituent misperceives the negotiator position can affect his/her own behavior.

Secondly, *union preference, politics and internal structure* refers to union action that influences negotiation. Union is an identifiable and specific agent representing the workers. Its presence makes dispute events more newsworthy. The dispute is then publicized in terms of exiting images, stereotypes and expectations. The ruling of union may not encounter individual members' specific needs or aspirations. It results in the loss of individuality as well as the loss of opportunity to negotiate individual arrangement. Once there are different preferences on outstanding issues, it ends in the diversification of union. The internal structure of a union may split into several disintegrated groups under acute disagreement. In this connection, the inability in unanimous decision may ultimately leads to negotiation cessation. In other words, the *principal/agent problem* presented a similar concept. It describes an important feature in negotiation; an agent perception of a negotiation. Problems can arise when the interest of the agent conflicts with that of his/her principal. Numerous examples of such evolution are given in the literature ([Lewicki and Litterer 1985](#)). An example of such principal-agent problems in construction industry comes from the relationship between the stakeholders of a company and a project manager who run a construction project. The owners would like the manager to resolve the construction dispute in ways that maximize the value of their shares, whereas the managers' priority may be to accomplish the building project through his/her professional skills.

Thirdly, *external pressures on the corporation* concerns two factors. The first one is a competitive reason. The continuity of an organization depends on not only its own capability but also the external market conditions. Organization who fails to deal with external pressures in a negotiation is unlikely to develop and sustain its competitive edge. The time and resources invested in the negotiation can be used in a more productive way. The second factor is that external pressures can have both negative and positive project motivations. Thus, the unduly strong public expectations on a conflict may help or hinder its resolution. In a similar way, *politically inadequate solutions* refer to a misfit between what is seen to be a desirable solution in theory and what is a viable option in reality. The ideal policy outcome on scientific, economic and political grounds may fail to coincide which may differ from the most politically feasible option.

Fourthly, *cognitive barriers* can be explained as a by-product of information processing. Human decision making relies on inferences and judgments. As such, loss aversion and framing effects can often have a critical influence on negotiator choices which may destabilize the negotiation process. It is suggested that negotiation behaviors are subjected to the cognitive framework of individual negotiator, even under the well-structured negotiating situations negotiator behavior more than trivially departs from the canons of rationality. It is represented by *significant departures from full game-theoretic "rationality"*. A resemble concept, *insensitivity to behavioral expectations*, further explains the possible cause of such negotiation failure as a result of "process-generated stakes". This notion assumes that parties not only have substantive expectations about issues and outcomes, but also behavioral expectations about the implications of their behavior with respect to their image and reputation. In other words, *"negotiation is not only a decision-making process; it is also to some extent an unofficial game of performance and reputation"* ([Iklé 1964](#)). Actions must add credibility to the general positions or preferences that parties have committed to, which makes certain actions more politically beneficial or costly than others. At the same time, process-generated stakes can contribute to negotiation success as well as failure. The possible causes of negotiation failure in the construction dispute negotiation (CDN), thus, are conceptualized as contract zone conundrum, negotiator's selection, political pressure and withdrawal ([Table 1](#)). The first three are relatively stable and dictated by exogenous factors. The last one can be varied through the deployment of different negotiation tactics.

<[Table 1. Possible sources of negotiation failure here](#)>

2.2. Contract zone conundrum

"People negotiate in order to satisfy the totality of their interests better through some jointly decided action than they could otherwise" ([Sebenius 1992](#)). In this connection, the normative approach of decision making in negotiation is that negotiators evaluate their alternatives based on their interests and those of their counterparts. It is important to distinguish parties'

underlying interest and issues under negotiation. The availability of *positive contract zone* than no-agreement alternatives is a prerequisite of an agreement (Neale and Bazerman 1985) (Figure 2). It is shown that the efficiency of bargaining is related to the size of the bargaining zone. However, there is neither *a priori* nor empirically derived instant solution to determine the contract zone since real life situations are often mix-motive in nature. There are often too many proposals on the table, which keep the core issues from being discussed until the very late of negotiations. The rationale for a particular choice may ultimately seem arbitrary. In addition, mutually inconsistent expectations on negotiation issues even lead to a zero or small contract zone. In other words, alternatives to agreement are contingent and multi-attributed in which going to court or simply accepting a negotiated settlement involves plenty of uncertainty. They may change over time with new information, interpretations, competitive moves, or opportunities. The departures from the game-theoretic rationality and information symmetry give rise to the potential pitfall in negotiation assessment. The failure to ascertain the contract zone may eventually lead to deadlock and stalemate (Neale and Bazerman 1985).

<Figure2. Contract zone here>

2.3. The selection of negotiator

Neale and Bazerman (1985) pointed out that the existence of a contract zone is necessary, but not sufficient for a successful negotiation. With the identified positive bargaining zone, negotiators remain bounded by their ability to achieve rational decision. Construction contracting negotiators represent their own organizations to interact with the project team to accomplish the contract goal. They maintain a dual identity as negotiators representing their parental organization and as a team member in the project team. This is described as boundary role positions in the boundary interaction system (Jones and Worchei 1992). They have to simultaneously bargain with their constituency and the project team organizations' representatives (Figure 3). The salient costs related to negotiation such as loss of face and perceived incompetency provide a partial explanation for the increasing tendency of negotiator's choice of concluding negotiation without reaching an agreement (Neale and Bazerman 1985). On the other hand, transaction cost economics offers an additional explanation. The incentives for a representative negotiating on behalf of his/her organization to a dispute may induce behavior that fails to serve the interests of the principal itself. This divergence may act as a barrier to an efficient resolution of a conflict. It is particularly profound with the presence of union. The gathering together of different interest groups heightens public awareness. Positional negotiation is often the result of such aggregation. The consequences are making positional commitment, manipulation of concession patterns, withholding information, misleading other parties, as well as exploiting cultural and other expectations. Evidences indicate that representatives' voice is not a complete substitute for collective voice which often allow participant to articulate grievances towards the decision. The empirical literature on collective bargaining in CDN is still in its infancy while relevant studies in the field of social psychology provide insightful references.

<Figure 3. Structure of representative negotiation.>

2.4. Political pressure

Construction contracting regime involves a myriad of contractual web, particularly in complex projects. Bilateral negotiations seldom involve purely the disputing parties. It is usually nested within broader political processes. In particular, the delay in reaching a settlement in a dispute often triggers consecutive disputes in another field producing a demand for mechanisms of inter-institutional coordination. Thus, negotiators' political, cultural, and social backgrounds have considerable influence on CDN process. Political pressure usually builds up if repeated dealings are likely. Even in the context of one-shot bargaining, political pressure can have substantial influence (Gely and Chandler 1993). With a political stance, negotiating parties are likely forced to form rivalry which encouraged very few genuine attempts in conflict resolution. They are no longer in a position to make decisions based on the overall tradeoffs. In particular, strong pressures on representatives to be accountable to their political constituents are likely to be intransigent.

2.5. Withdrawal

[Chow and Cheung \(2008\)](#) proposed a model relating perceptions of withdrawing behavior in CDN. In their conceptualization, withdrawing behavior is considered to be influenced by a range of underlying psychological factors. It is pivotal to the success or otherwise failure of the negotiation. Negotiation remains hopeful only when negotiators are interested to negotiate until reaching an agreement. In turn, withdrawing behavior manifests in the form of reduction in socio-psychological attraction to organization. It is revealed as counterproductive behaviors such as aggression in physical and verbal behavior and sabotage. To a large degree, the model is driven by conditions which are hypothesized to contribute to increased withdrawing behavior in CDN. These conditions include: increased task level versus relationship level; increased emotional level versus rational level; and increased competitive level versus cooperative level ([Chow and Cheung 2008](#)).

2.6. Overview

It is suggested that negotiator's interest to negotiate is nonlinear in nature ([Watkins 1998](#)). With several indicators given, (1) negotiator's interest is sensitive to early events which are profoundly influential to events thereafter; (2) negotiator's withdrawal action impacts the negotiation in an irreversible way that creates barriers to further agreements even when the same effort of reverting the change is given; (3) a slight move may have no apparent effect in negotiation, but a larger move may lead to a disproportional large change, which exhibits a threshold effect; and (4) negotiation dynamic once commences, it can become self-reinforcing. These feed-back loops of negotiation may build momentum toward desired outcomes, or form a vicious cycle that ultimately ends with withdrawal. Thus, the need to put negotiations back on track once withdrawal happened relies heavily on the ability to control withdrawing behavior. The plausible phenomena of nonlinear withdrawal allow researchers to probe into new perspectives. Thus, it is made possible to make analogy between withdrawing behavior and catastrophe flags as proposed by [Gilmore's \(1981\)](#) work in explaining catastrophic phenomena. Anecdotal data from recent steel bending union negotiation in Hong Kong is used to illustrate the proposed conceptualization of withdrawal in negotiation.

3. WITHDRAWAL SYMPTOMS

3.1. Background

In 2007, Hong Kong endured the longest bar-bender strike in postwar history. More than 800 workers participated in the strike lasting over 36 days from 6 August to 12 September ([Table 2](#)). The negotiation was punctuated with several crises including walk-outs by the delegations. Daily wage and working condition reviews have been held between the Hong Kong Construction Industry Bar-bending Workers Union (CIB-BWU) and the Hong Kong Bar-Bending Contractors Association (BCA). Both parties agreed to adjust wages through negotiation in August annually. Nevertheless, the postponement of the wages negotiation meeting until November 2007 triggered the fear of continued stagnation on wages. The strike affected approximately 60 private projects and 10 government projects. Although the two sides eventually reached an agreement, they both endured heavy losses. Many workers went into heavy debt while they were on the picket lines. On the other hand, there were huge liquidated damages imposed on their employers for the irretrievable projects' delay. In the most serious case, withdrawal consequence can be represented in terms of organizational discontinuity. A substantial daily wage cut from HK\$1300 to HK\$800 in 1997. The wage has then been frozen, largely because of the low level of construction activities started in 1997 till 2007. The economy recovery in 2007 sparked off a wage raise demand. Bar-benders' initially demanded the daily wage to be raised to HK\$950 per day and 8-hour work day. The trade association only offered HK\$850 per 8.5-hour work day with a 15-minute break at work. Through an in-depth anecdotal longitudinal analysis of the negotiation between the two parties from literature search and interviews with key personnel, several withdrawal symptoms were identified. Among them, three were found to be powerful detectors of withdrawal.

<[Table 2. A list of critical events in the negotiation between CIB-BWU and BCA in 2007 here](#)>

3.2. Preceding dysfunctional behaviors

Firstly, ultimate withdrawal was found to be preceded by a series of dysfunctional behaviors. It manifests in the form of contribution reduction when leaving the organization is not a viable option to employees. Employees concern the degree to which the organization values their contribution and cares about their well-being. As such, the employer-employee relationship is strengthened through the trade of positive outcomes to reward increased efforts made by the employees. In fact, the delay in wages negotiation which usually took place implicitly on 1 August violated the reciprocity norm (Rousseau 1995). Thus, the bar-benders showed an increased dissatisfaction toward present contract conditions. The psychological impacts of the dissatisfaction were translated into reduced employee morale, tardiness, unnecessary absenteeism and lateness which exacerbates both task and relationship conflicts within work place (Duffy *et al.* 2000). In the steel bender negotiation case, the CIB-BWU refused to work overtime to press for concession. This served as an ultimatum before withdrawal. These individual withdrawing behaviors if unnoticed are likely to be contagious. The increasing number of employee having tendency in conforming to high withdrawing behavior ultimately led to collective withdrawal.

3.3. Divergent view

Secondly, divergent view among the fractions within the CIB-BWU because of the differences in their respective demand was a major factor that had led to withdrawal. Negotiators are subjected to various sources of tension, especially when they are being evaluated by constituents and bounded by mandates. The newly formed Construction Site Workers General Union (CSWGU) held major different views on the wages issues with CIB-BWU. The lack of unanimously perceived organizational support from unions had led to distressing behavior of the bar-benders. One of the psychological consequences of distress was deterioration of perceived general functioning (MacBride *et al.* 1981). In other words, bar-benders experienced dissonance of union rivalry followed by diverging supports. The bar-benders were unable to recognize a common authority and engage in limited cooperation. The achievement of cooperation is depended neither on deference to hierarchical authority nor on centralized enforcement (Keohane 1986). Consequently, bar-benders were left idle and de-motivated to the compliance with rules and regulations of the negotiation. They expect their contributions in the negotiation to be reciprocated. Withdrawal provides a leeway to reduce the unpleasant feelings of the perceived disproportional inputs to outcomes ratios described (Adams 1965). Siegel and Lane's (1982) discrepancy theory offers us another explanation on how the dissonance on perceived and received outcomes affects the decision to withdraw. The lack of bar-benders' autonomy to hold the union accountable to the negotiation action resulted in lowering mutual respect and recognition between the union and bar-benders. It triggered the amelioration process (Aquino *et al.* 1997). The negotiator expected that withdrawal can improve their positions in subsequent negotiation. As a result, bar-benders intended to leave the negotiation table.

3.4. Slowing down

Thirdly, slowing down of negotiation process was found to be a preemption of withdrawal. It represents a state of insufficient progress. It shows that negotiators relied on cognitive heuristics when placing demands were less likely to revise their unfounded fixed-pie perceptions during negotiation, and therefore constrained to use positional bargaining tactics. The hard negotiating rhetoric reduces parties' flexibility to search for mutual interests. The involvement of wide media coverage in essence provoked confrontation and position hardening, thus forging toward impasse. Despite realizing that the conflict is going nowhere, it is often difficult for parties to transform the nature of the conflict and consider a settlement. Especially, individuals have been customized to the polarized mentality of self and other. The decrease in concession made further hardening of parties' own stands. When negotiator judgment falls systematically short of rationality, they would perform sub-optimally by turning into aggressive mode. Nonetheless, both sides have already invested significantly. They hesitated to admit that pursuing the conflict was a mistake. If this occurs, both sides would think twice. They would also realize that the costs of continuing the struggle greatly exceed

the benefits to be gained. This is the situation known as stalemate. It is often ripe for the introduction of proposal for settlement ([Figure 4](#)). The ignorance of the ripeness of resolution manifests in the form of delaying response. It was shown that the longer the time of negotiation, the more difficult the retrospective salary adjustment in the case. Parties felt frustrated because of delay in settlement of disputes. Poorly managed conflicts can create a pool of future unresolved issues, frustration and resentment. Failure to adequately confront and deal with conflicts can result in the creation of stalemate and impasse, thus undermining the commitment to project goals. This delay contributes to continuous rise in the number of intensified disputes. The onslaught of negative emotion and the rigidity provoked by threats to seemingly sacred resources can clearly serve as significant obstacles to negotiation success. <[Figure 4. Conflict intensity during negotiation here](#)>

4. CONCLUDING REMARKS AND FURTHER RESEARCH DIRECTION

Withdrawing behavior has its roots in human interaction and its proactive prevention can benefit the chance of achieving success in construction dispute negotiation (CDN). The ultimate goal of construction is successful delivery of built facilities. The failure in dispute resolution through negotiation leads to delay in project, over-budget and poor quality. The chance in achieving a successful negotiation can be achieved by avoiding withdrawal. The ability to identify its potential happening is therefore useful. In this connection, three basic ideas were investigated in the paper. The first concerns the possible causes of negotiation failure. The second discusses withdrawal in the context of negotiation failure and its catastrophic effect on negotiation outcome. The third idea is a corollary of the second. The possible identification of withdrawing behavior in a real life case is given. The wages negotiation between the Hong Kong Construction Industry Bar-bending Workers Union (CIB-BWU) and the Hong Kong Bar-Bending Contractors Association (BCA) provide anecdotal evidence of withdrawing behavior and its symptoms. The presences of dysfunctional contracting behavior, divergent view among project team members and process slowing down are three powerful antecedents of withdrawal. These three cues are analogous to the concept of catastrophe flags proposed by [Gilmore's \(1981\)](#) work in explaining catastrophic phenomena, thus adding the instrumentality of the proposed use of withdrawal signals for future research. Means to restore the negotiation momentum would be a logical follow on research topic.

5. ACKNOWLEDGEMENT

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6. TABLES AND FIGURES

Table 1. Possible causes of negotiation failure.

Cause
Contract zone conundrum
-Issue management and dilemmas in concession-making
-Nature of issue
-Strategic barrier
-Reactive devaluation of compromises and concessions
-Many solution concepts; many, many possible equilibrium
-Often, the game's structure, rules, and possible moves are not common knowledge
-Widely scattered negotiation outcomes in practice
-Uncertainty
-Inaccurate information
Selection of negotiator
-Union preference, politics and internal structure
-Principal/Agent problem
Political pressure
-External pressure on the corporation
-Politically inadequate solutions
Withdrawal
-Cognitive barrier
-Significant departures from full game-theoretic "rationality"
-Insensitivity to behavioral expectations

Table 2. A list of critical events in the negotiation between CIB-BWU and BCA in 2007.

Date	Events
01 August	Supposed date of wages negotiation
08 August	Strike at a construction site in To Kwa Wan (Kowloon)
09 August	Sit-in protest outside the Chief Executive's official residence
10 August	Strike at a construction site in To Kwa Wan (Kowloon)
11 August	March from To Kwa Wan to Tsim Sha Tsui then to the Central Government Offices on Hong Kong Island
12 August	An un-announced meeting between CIB-BWU and BCA
12 August	BCA's offer: HK\$850 backdated to 1 August, HK\$950 started from 1 September, 8.5 work hours with 15-minute break at work
	CIB-BWU's demand: HK\$950 backdated to 1 August, 8 work hours
12 August	Failure to resolve divergent views within CIB-BWU and negotiation withdraw
13 August	Assembly in Kowloon and Cordon off two nearby streets
13 August	Extensive media report on the negotiation issues
23 August	Resumed negotiation
23 August	Bar-benders hold divergent views on protest
23 August	Negotiation process slowing down
25 August	A number of bar-benders accepted an improved pay offer
28 August	Only one major developer agreed to pay wage of HK\$950 a day and negotiation collapsed
31 August	Resumed negotiation
02 September	Negotiations paused
05 September	A minor strike
05 September	Negotiation process slowing down
12 September	Final round of negotiation

Figure 1. Withdrawal cycle.

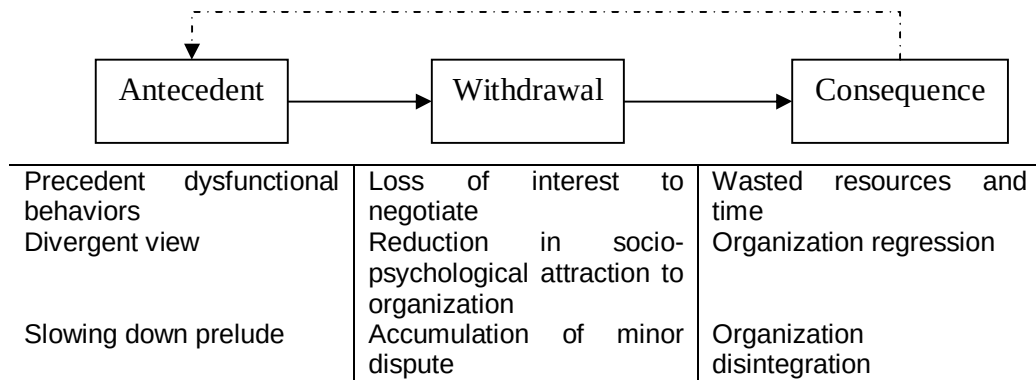


Figure 2. Contract zone.

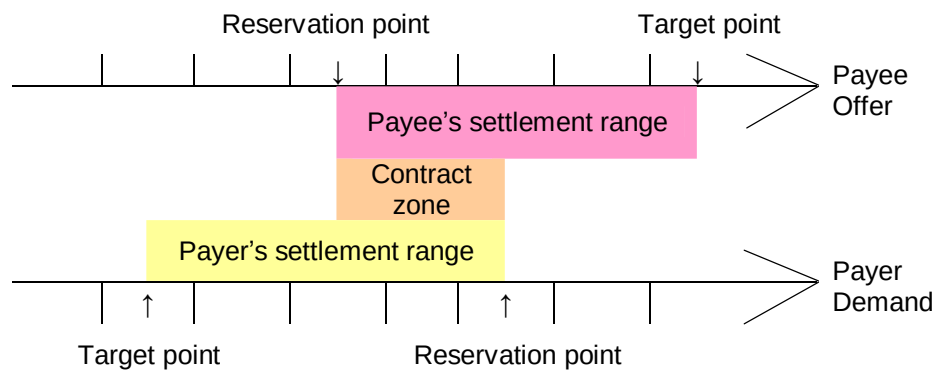


Figure 3. Structure of representative negotiation.

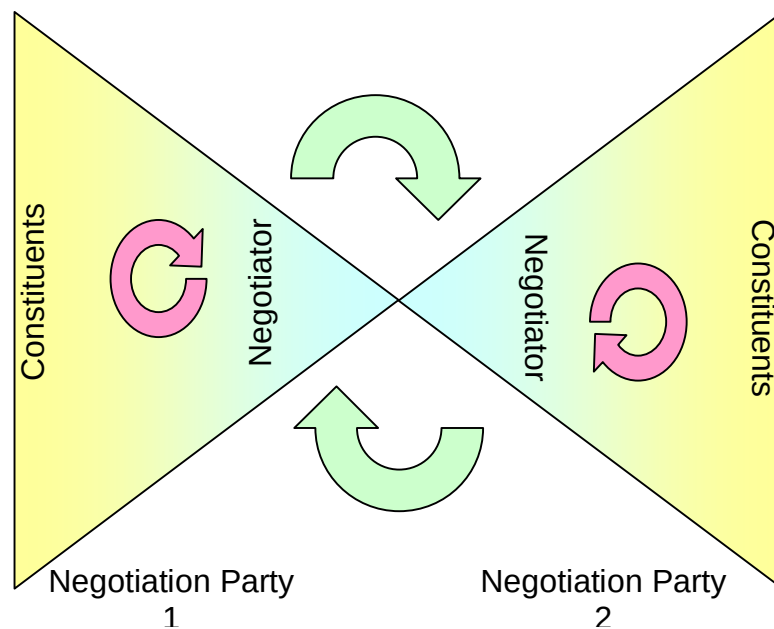
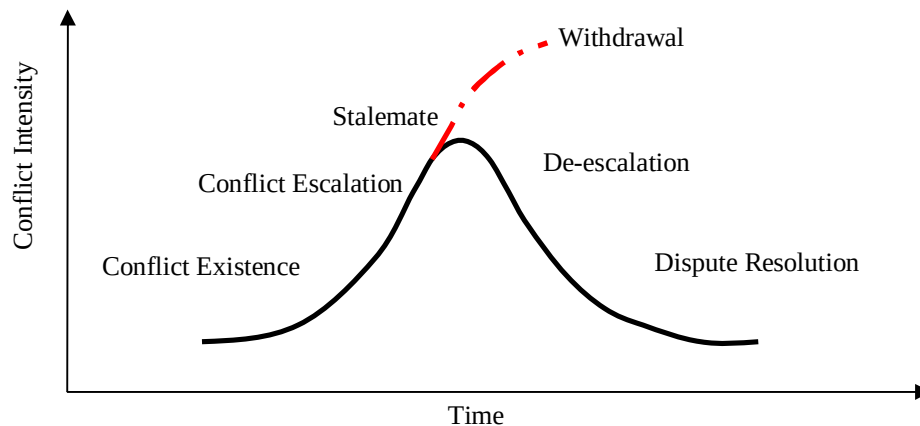


Figure 4. Conflict intensity during negotiation.



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Partnering: A good approach to dispute resolution in construction management

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ABSTRACT

The main objective in the construction industry is to deliver a high quality project within the schedule, on budget, safe manner, and with the least number of conflicts, disputes, claims and litigation. However, due to the risky, uncertain and competitive nature of construction industry, conflicting goals among the different participant parties involved in a project are bound to cause them only think for their own interests and benefits, in many instances this may leads to the number of disputes rise, and then maybe the expensive claims and costly litigations, so to a great extent the projects can not be completed within time and on budget. In recent years, many projects had adopted the approach called “partnering” to make a good relationship within all participant parties so as to collaborate well to manage or resolve the disputes. The partnering approach indicates the fact that the best dispute resolution strategy is to prevent disputes or conflicts from occurring, and to resolve conflicts at the lowest possible levels. Therefore, one of the main benefits of partnering is to encourage all parties to change their relationships from traditionally adversarial to cooperative, and facilitate the dispute resolution by some useful mechanisms. This change in relationships requires changes simultaneously in attitudes to achieve mutual trust, respect, and open communication among all parties involved in the project. This paper reviews the partnering literature within the construction field and tries to make a comprehensive picture of benefits of the partnering practice, presents and describes how partnering approach facilitate the dispute resolution process.

KEYWORDS: Partnering; Dispute resolution; Construction Management.

1. INTRODUCTION

Construction industry is a fast growing sector of every country's economic development, and there have been more and more large and complex construction projects under construction around the world, it is evident that construction industry around the world has become more and more important for economic fast growth. But the nature of construction industry is competitive, high-risk, uncertain, so construction management is very important and crucial for construction industry's fast growth and success. The main objective in the construction industry is to deliver a high quality project within the schedule, on budget, safe manner and with the least number of conflicts, disputes, claims and litigation.

Due to the nature of construction industry referred above, there are always many issues happened unforeseeably and lead to some disputes arise, if the disputes can not be resolved properly, it maybe resorts to the litigation and arbitration after the completion of the project, but these resolution methods will influence the cost and schedule of projects significantly, and further cause the relationship between those parties to a much more confrontational and intense situation. According to the opinion of Crowley and Karim (1995), they thought that current contracting and procurement practices, especially the most prevalent procurement method—low bid procurement makes all the contracting parties in adversarial situations. And Abudayyeh (1994) held the similar opinion that contracting in the construction industry is so competitive and high-risk that the existing conflicting objectives among those participant parties involved in the projects lead to adversarial, confrontational and unfriendly relationships, and such bad relationships will lead to many disputes happen and fundamentally influence project success, so the main objective of delivering projects timely and effectively will be jeopardized.

To achieve to manage a project successfully, new attitudes and new construction management patterns need to be introduced to change current adversarial and confrontational situation between all the contracting parties. So the concept of partnering

relationship emerged for about two decades and it has been developing quickly and adopted in more and more countries and projects.

2. PARTNERING RELATIONSHIP

Construction management has many facets, partnering relationship or partnership is one of these important facets. There are so many pieces of research of partnering in the developed construction markets have been reported in recent ten years (Conley and Gregory, 1999; Green, 1999; Kwan and Ofori, 2001; Li, Cheng, and Love, 2000; Li, Cheng, Love, and Irani, 2001; Wong and Cheung, 2004), it indicates that partnering relationship and partnership in the field of engineering especially in the construction sector have been becoming a more popular and significant topic, so many researchers have published many relevant papers and reports to present their opinions in the concept of partnering and partnership during the last two decades.

2.1 Definition of partnering

Concept of partnering has developed for many years in different countries and industries, and a good number of researchers had tried to make a universal definition for partnering, but till now there is still not an agreement and a precise definition of partnering, but there are some famous and most frequently cited definitions existed. For example, The Construction Industry Institute (CII, 1991) in the United States developed a definition which is cited widely by many scholars, it considers partnering as “a long-term commitment between two or more organizations for the purposes of achieving specific business objectives by maximizing the effectiveness of each participant resources. This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based on trust, dedication to common goals, and an understanding of each other’s individual expectations and values.” Another important and classical definition was presented by

Bennett and Jayes (1998), they concluded partnering as “a set of strategic actions that deliver vast improvements in construction performance. It is driven by a clear understanding of mutual objectives and co-operative decision-making by a number of firms who are all focused on using feedback to continuously improve their joint performance.” Naoum (2003) also suggested a relatively newer concept of partnering, it is that “partnering is a concept which provides a framework for the establishment of mutual objectives among the building teams with an attempt to reach an agreed dispute resolution procedure as well as encouraging the principle of continuous improvement” (Naoum, 2003, pp.71).

Although there is still not a precise definition for partnering, but many similarities can be concluded from these definitions, such as it is a long-term dynamic process, it will create a trust-based and harmonious environment, it needs all parties to make commitment to joint objective of the whole project, and so on. Chan, Chan and Ho (2003) pointed out that the fundamental elements of partnering are commitment, trust, mutual respect, communication and equality. So even there is not a sole definition for partnering, it also can be seen as an agreement on the definition has been reached. In the recent few years, researchers and scholars had transferred their interests to the benefits and mechanism of partnering, the question that how partnering facilitate or influence the project performance has been paid much more attention and investigated frequently.

2.2 Benefits of partnering

Refer to the benefits of partnering, many papers and reports from a wide range of researchers can be found and make a good picture of the benefits. Many aspects can be concluded, partnering can foster trust and open communication between the contracting parties, these are the most important two issues. Crowley and Karim (1995) stated that partnering can create cooperation, avoid adversarial confrontation, develop an attitude of rapid dispute resolution and develop the integrated evaluation system of project performance, it is a good means of resolving interorganizational disputes. Abudayyeh (1995) indicated that the new approach “partnering” will lead to establish a dynamic process for conflict resolution, and

common commitment, trust and mutual respect are important determinants for project success. Ng (1997) presented his opinion on the benefits of partnering in the construction sector that the avoidance of some cost and quality problems due to sharing risk between those participant parties. Black, Akintoye and Fitzgerald (2000) believed that partnering can compress the normal learning curve and so as to reduce the normal costs of developing and sustaining a fine relationship. In brief, partnering is a new and good management pattern to change the current adversarial and confrontational situation in the construction industry.

3. THE MECHANISM OF DISPUTE RESOLUTION

In the construction industry, there are really many disputes and conflicts existed and need to be solved properly, otherwise the main objectives of construction projects—cost, time, quality, will be influenced. All parties involved in the project must recognize that each party is a part of both the dispute and the resolution of the problem, only the parties acknowledge this principle, they can make a commitment to dispute resolution.

Crowley and Karim (1995) indicated that, in the approach of partnering, trust can develop confidence between the participant parties, encourage and facilitate open communication, improve idea exchange, and knowledge and technology sharing, in addition, long-term commitment fosters continuous improvement of technology and methods, strengthens the mutuality of the parties, meanwhile, also reduces the confrontational and adversarial relationship and the attractiveness of litigation and arbitration, so friendly relationship among the parties can be brought up.

In the current time, due to the confrontational relationship between the parties, the disputes and conflicts can not be solved in a friendly and open environment, they are usually resorted to litigation and arbitration after the project is completed, which are cost-consumed and time-consumed. These two methods of disputes resolution are significantly harmful to the project

performance and project success. However, the partnering approach indicates the fact that the best dispute resolution strategy is to prevent disputes or conflicts from occurring, and to resolve conflicts at the lowest possible level and at the earliest possible time.

Partnering is not a formal contract among the contracting parties, it is an informal one which has some good techniques and mechanisms in facilitating the project implementation. First, the partnering workshops and regularly periodic meetings will provide the parties good opportunities to communicate with others in a friendly and cooperative environment, and the problems can be reflected timely to all the parties and all parties have duty and commitment to join in the process of dispute resolution. In the regular meeting, whatever weekly, monthly or quarterly, honest, open, frank communication and conflict resolution is encouraged to let all practitioners participate in the process and share their opinions and good ideas.

Second, Anvuur and Kumaraswamy (2007) pointed out that, the problem in the construction sector is a lack of recognition rather than the absence of functional interdependence. Partnering approach tries to reinforce recognition of interdependence, so the partnering charter and the joint decision-making procedures are totally required, to offer a testimony to the joint recognition of interdependence among all the members. They are necessary supplements of the project contract which places the parties in the adversarial and confrontational situation and hinders the relationship develop towards the real direction. Pettigrew (1998) also emphasized that mutual responsibility can naturally grow out of working together with a joint objective and a shared goal within all the members.

But there are also some debates and arguments on whether partnering can really bring the supposed benefits and project success. Bresnen and Marshall had several papers to present their opinion on partnering relationship. Bresnen and Marshall (2000a) pointed out that partnering and other related forms of cooperation had been considered as an important way to deal with the fragmentation and lack of cooperation in the construction industry, but the research and reports just remained at a prescriptive level, and empirical evidence about the implementation of partnering in practice were still very few and anecdotal. So it is difficult to

measure actually how much observed disputes well resolved are related to partnering directly (Barlow, Cohen, Jashapara and Simpson, 1997). Bresnen and Marshall (2000a) also indicated that most of the literature on partnering had focused mainly on experiences in some developed countries, such as UK, USA and Australia, and suggested the intention to investigate partnering in other national contexts should be cautious. Partnering requires the organizational culture transformation to suit for the mutual objectives, but the problem is that the organizational culture is well established and it is difficult to make changes within organizations, let alone between them, organizational culture is not simply a variable that can be manipulated in the way that structures or other systems can be changed (Bresnen and Marshall, 2000a, b). Bresnen and Marshall (2000c) debated that whether or not single project partnering is feasible, so whether it is applicable in dispute resolution in a single project is worth of making more investigation on it. Through these papers, it can be found there are some different opinions on the real benefits and limitations of partnering, so the research on partnering should consider these important views, and have critical thoughts on all of the literatures.

4. CONCLUSION

The dispute resolution strategy of partnering is to focus on the conflicting parties instead of on the organizational interface where the conflict emerges. However, partnering can be considered as a new organizational structure that steps over the current interface between the participant parties in the construction project (Crowley and Karim, 1995). The very intention of dispute resolution in the approach of partnering is to lead the members engage in the confrontational relationships to reorganize the interface and radically improve their ability to handle with the inter-organizational conflicts (Crowley and Karim, 1995). But partnering can not solve all the conflicts and disputes directly, it tries to build a trust-based and harmonious environment in the project which is vital to dispute resolution, and provides some informal mechanisms to facilitate the contract implementation.

This paper is most like a literature review and a descriptive picture of how partnering can facilitate the process of dispute resolution, but in this paper there is no empirical data to prove the extent partnering can bring to project performance. Whether the disputes are settled well is crucial to project performance and project success, such as fundamentally cost performance, time performance and quality performance, so more attention should be put on this field and much more empirical evidence are required to confirm the truth of that partnering can really have a good impact on and facilitate dispute resolution, and further promote project performance.

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Prospects of relationship contracting in China – lessons learned from Australia

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ABSTRACT

There are many studies blaming traditional procurement approach and its associated confrontational relationships to be responsible for the poor performance of the construction industry. Relationship contracting is one of alternative procurement approaches that are designed to improve this situation.

Relationship contracting was introduced to the Australian construction industry in 1999. Since then, more and more construction projects have adopted this alternative procurement approach.

An alliance culture, featured with trust, co-operation, mutual support and respect are essential for the success of relationship contracting projects. These features are in line with Chinese culture. Therefore, relationship contracting has great potential to be introduced to Chinese construction industry.

This paper firstly briefly reviewed the history of relationship contracting and its practice in South Australia. Secondly a Chinese project which has incorporated principles of partnering was studied and compared with its counterparts in South Australia.

The results showed that foreign practitioners with experience in relationship contracting play a key role in the implementation of relationship contracting in Chinese construction industry. Therefore, it is suggested that these experienced practitioners can be invited to participate in the first ever relationship contracting project in China. Meanwhile, impacts of culture should not be under-estimated in this multi-national context.

Recommendations were made to facilitate the implementation of this innovative delivery approach in China.

Keywords: Relationship contracting, construction industry, China, Australia.

INTRODUCTION

Construction projects are traditionally procured via a competitive approach. Under such approach, the clients deal with risks adopting a risk transfer strategy whereby they try to transfer as much of the risk as possible to the non-owner parties (ACA 1999). It is not unusual that contractors submit a bid with a very low price in order to win the contract. Then contractors try to put in as many claims as possible in order to cover the loss or get more profit. Consequently the industry has suffered from poor performance, adversarial atmosphere, and notorious disputes (Barlow 2000; Love et al. 2001; Dulaimi et al. 2002; Humphreys, Matthews & Kumaraswamy 2003; Winch 2003). Rwelamila et al. (2000) pointed out that the traditional procurement approach, which is characterised by a 'win-lose' scenario with adversarial attitudes of the project participants, is responsible for the industry's poor performance (Chan, Chan & Ho 2003).

Relationship contracting is one of alternative procurement approach which is deigned to target above issues. The Australian Constructors Association (ACA), a group whose member companies are all leading construction industry organisations, recommended a risk embrace approach to target the ill-apportioned risks in construction projects (ACA 1999). In such an approach, all parties share both risks and rewards. This joint risk management approach can be facilitated by the principles of relationship contracting (Rahman & Kumaraswamy 2005).

The objectives of this paper are to:

- Review the benefits and success factors of relationship contracting;
- Review the practice of relationship contracting in South Australia;
- Investigate a Chinese project which adopted principles of relationship contracting;
- Discuss the prospects of relationship contracting in China:

RELATIONSHIP CONTRACTING – BENEFITS AND SUCCESS FACTORS

Relationship contracting has been defined by the ACA as: "a process to establish and manage the relationships between the parties that aims to: remove barriers; encourage maximum contribution; and allow all parties to achieve success." (ACA 1999, p.4)

As the name suggests, the most important element of relationship contracting is the relationship between the parties involved in the project. Reasons to develop and sustain a good relationship between the participating parties include: a) to remove the barriers (to outstanding outcomes) that exist in a conventional contract; and b) to encourage maximum commitment and contribution from all parties and individuals.

The McKinsey study of the Australian construction industry (cited in Lewis et al. 1996) highlighted the importance of close working relationships as follows:

"Construction firms should seek collaborations with their large customers, especially industrial firms, to reduce capital expenditure and improve project economics in such fields as mining and new factory development. Close working relationships of this kind have the potential to boost both capital productivity and profitability."

The most important facet of relationship contracting is to enable (or at least aim to enable) all parties to achieve success. In relationship contracting arrangements, the risks are embraced rather than transferred. All parties share the risks and rewards.

Alliancing is one form of relationship contracting. Developed in the early 1990s, alliancing achieved huge success in the UK's Oil & Gas industry by delivering projects at a lower cost (Quick 2002). The first project using the new procurement approach was the Wandoo B Oil Platform, which was built by Ampolex (Ross 2001). Since then, alliancing contracts have been used to deliver diverse projects, especially major infrastructure projects, in both the public sector and the private sector.

The National Museum of Australia (NMA) is the world-first building project to adopt this alternative approach. Previous applications are all engineering projects. NMA has been praised for its excellent achievements in relation to innovations, design integrity and risk management, etc (ANAO 2001).

The benefits of adopting relationship contracting in construction projects were illustrated in Table 1.

	Benefits to all participants	Benefits specifically to non-owner participants
Time	Certainty of project time Reduced design and delivery time	Potential for very good returns within acceptable limits of risk
Cost	Optimum project life cycle cost Reduced capital expenditure costs Acceptable financial results for both clients and contractor. Contractors will own inputs and the risks undertaken by each party	Enhancement of reputation to increased prospects of repeat and referral work
Risks	Improved operating performance Better management of inherent risks Clearly defined risk allocation (sharing at times)	
Relationships	Enhanced business relationships Established and achievement of common aligned goals Improved behaviour of the parties to the contract, especially where the contract experience is protracted and/or financial difficulties A general personal satisfaction for all project parties Avenue for repeat business with resulting benefits to clients and contractor	Strengthening of relationship with owners of the other participants Greater insights into project delivery from an owner perspective, resulting construction and design to better understand and service their needs
Flexibility	Increase flexibility to match changing project requirements "cost of change" curve will be significantly flatter	Increased job satisfaction for staff with increased benefits to overall organizational success
Technology / innovation	Greater acceptance and encouragement to innovate in design, technology, systems, processes and techniques Greater acceptance and encouragement to apply the latest technology	Significant increase in communication and general project management skills
Optimum standards	Optimum standards of quality, safety, industrial relations, community relations and environmental performance during the project execution and in operation Increased industry research and development as a result of improved financial certainty	Opportunity to use the success of the project as a catalyst to improve the performance of the wider organization

Table 1 Benefits of relationship contracting, Source: ACA 1999, p.15; Ross 2003, p.18-19

The following actions are necessary for relationship contracting to be successful (Ross 2003; Chew 2005; Thomas & Thomas 2005):

- Ensure the client has a good understanding of the principles underlying alliancing and why it has succeeded on other projects;
- Select the "right" partners using appropriate criteria;
- Develop a collaborative project culture;
- Ensure all key stakeholders are committed to achieving or exceeding the project objectives;
- Put the right risk profile for a project in place;
- Have a well drafted contract that clearly articulates the risk allocation and / or sharing negotiated by the parties and on which the parties can rely as a safety net to protect their prospective rights;
- Align various team objectives; and
- Ensure top management and client's support.

RELATIONSHIP CONTRACTING PRACTICE IN SOUTH AUSTRALIA

In South Australia, two major public projects that employed relationship contract (Alliance contracting) were the Adelaide Convention Centre extension and the Lyell McEwin Health Service Redevelopment Stage A.

In South Australia public sector context, it is called 'collaborative contracting', which can be seen as on form of relationship contracting. It is not a pure alliance approach. The consultants have been selected before the tending of contractors.

Both projects were completed with outstanding performance and the State Government decides to adopt this procurement approach in more public sector projects. These projects include the second stage of the redevelopment of the Lyell McEwin Hospital and the second stage of the redevelopment of the Queen Elizabeth Hospital. In addition, there are a few more non-Government projects in South Australia incorporating principles of relationship contracting into the delivery process. These projects include: University of South Australia 3B and Adelaide Oval redevelopment. The success stories and lessons learned from the relationship-based contracting projects in South Australia were documented in other publications (e.g. Carr and Exton 2004; Zuo, Ness & Zillante 2006; Zuo and Zillante 2006).

Zuo, Ness & Zillante (2006) interviewed a number of people involved in relationship contracting practice in South Australia. They pointed out that the features of culture of construction projects that were procured via relationship contracting are quite similar although there were various statements. These common features of the project culture include (see Figure 1):

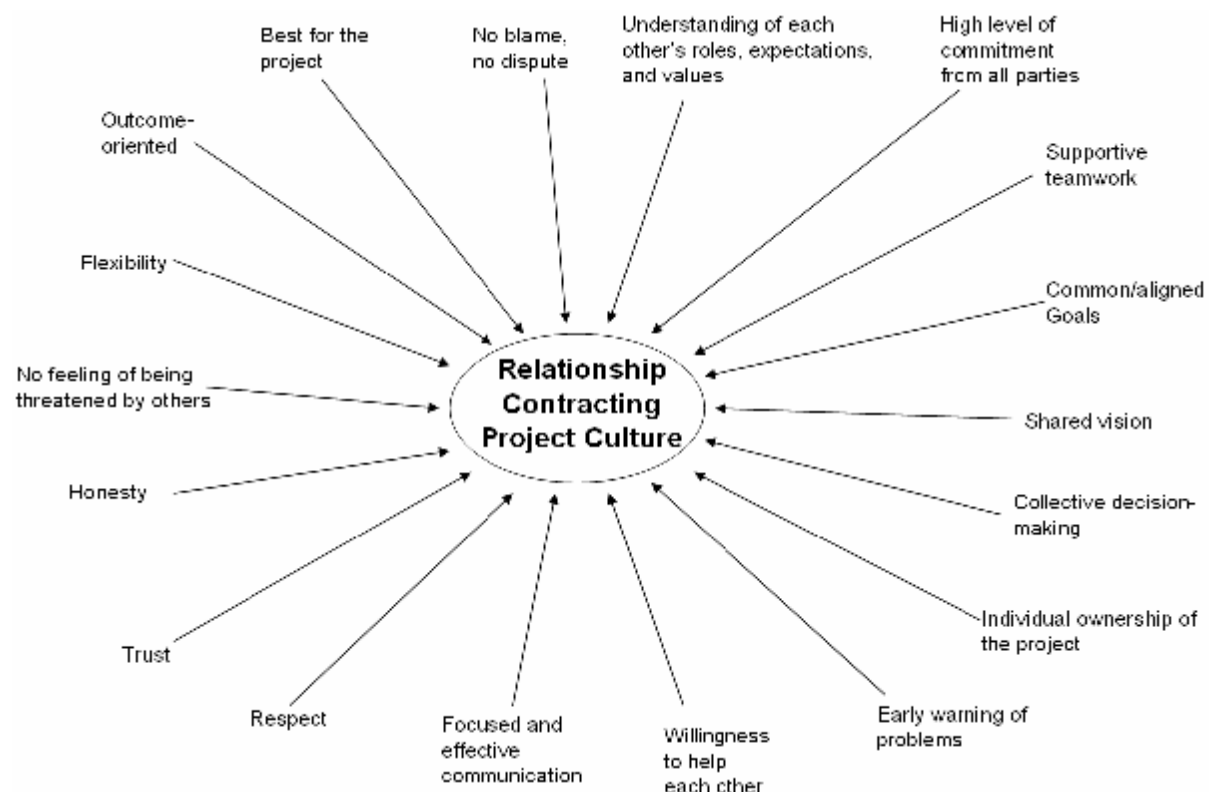


Figure 1 Common features of the project culture in RC projects

In these projects, a collaborative consultant was engaged from very early on to facilitate the relationship contracting process. For instance, this consultant involved in the tendering process where the capabilities of the tenderer to co-operate the rest of the team was given

higher priority. This consultant also facilitated a series of workshops to develop a positive project culture and maintain it throughout the project.

CHINESE PRACTICE – A CASE STUDY

Currently no project in China has used relationship contracting as the procurement approach, at least not adopted formally and systematically. However, there are some projects that have incorporated some principles of relationship contracting during the delivery process.

Ling'ao nuclear power plant project is located in Dapeng Peninsula in Guangdong, China. It is 1.2km away from the Daya Bay nuclear power plant. As one of major projects listed in the 'Ninth Five-year' strategic plan, the total investment reached more than 4 billion US dollars. The objective of the plant is to meet the growing demand of energy from the Guangdong province.

The principles of relationship contracting have been applied in this project successfully. Some examples are listed as below:

- All parties have common goals – “good quality, finish within budget by the due date, efficiency” and “better than the previous stage of development”. It is clear to all parties that the operation of the power plant will be used to evaluate the performance of the project. All parties will benefit if the capacity indicator¹ is not less than 80%.
- All participants were trained to communicate with each other effectively and efficiently. They were urged to raise questions and concerns, and deal with any enquiries from other team members in the short timeframe. A total of 26,000 questions and concerns were raised by participants. More than 23,000 of these enquiries were dealt with satisfactorily.
- A specific committee was established to coordinate participating parties. This committee mainly coordinated the client and contractors to fix issues like variations, the defects of equipments and delays in the supply of equipment.
- Risk assessment meeting was called if it was found that any delay of activities in the critical path or the contractor was not prepared. All parties were well-prepared in the meeting of risk evaluation and assessment. After thorough discussion, an action plan to deal with risk was agreed to by all parties.
- All parties were encouraged to propose innovations in order to achieve better value for money. A single innovation on the drainage system design saved a cost of RMB 60million.
- There was smooth and efficient communication among project participants. The client invested more than 3million US dollars to establish a cost-effective network and database platform in order to manage the project information. This platform was used for coordinating the supply of equipments, handover of design documents, handover of construction works, etc.

The reasons of adopting principles of relationship contracting in Ling'ao nuclear power plant project include:

- Long-term plan
The client has a plan on ongoing investment. From non-owner participants' (i.e. designer, contractors and suppliers) perspective, their performance in this project will to very much extent determine whether or not they can secure the contract for next project. The contractors and suppliers might be able to take advantages of the knowledge and skills developed in this project to gain further benefits in next project. This motivates the project team to co-operate each other in order to achieve optimum outcome.

¹ Capacity indicator = the amount of electricity generated / the maximum amount of electricity can be generated from the plant (designed capacity) × 100%

- Trust based relationship
All parties involved in Ling'ao nuclear power plant project have worked together in Daya Bay nuclear power plant project. Therefore, project team members know each other very well. A trust based relationship has been established and maintained across all stage of the project.
- Government initiatives
Government has clearly pointed out that the performance of Ling'ao nuclear power plant project should be better than that of Daya Bay nuclear power plant project (in terms of budget, schedule, quality, etc.). This set up a clear benchmark to evaluate performance of Ling'ao nuclear power plant project. The pressure has pushed the project team to try every effort to have a common goal and work together towards achieving that goal.
- In-house skills
Both client and contractors have sufficient in-house skills to manage such complex project. There is a high quality project team with project management competencies where teamworking is constantly encouraged.
- Culture
There is a strong culture to emphasis the safe and quality of the project. In nuclear power plant projects, safe and quality are given highest priority. This drives all participating parties to work together closely to deal with any arisen issues. In such culture, every project team member does not hesitate to raise any concern on the project. A clear mechanism is in place to ensure the transparent and efficient communication.

There are some foreign firms participated in this mega project by providing design and installation services:

- Framatome Inc. (France)
- GEC Alsthom (France & UK)
- Electricité de France (EDF) (France)

Foreign firms are very keen to maintain the relationship with local firms. For instance, Framatome devotes special attention to the relationship with Dongfang Electrical, which worked with Framatome on nuclear steam supply systems (SPG 2008). This reflects the collaborative project culture within this mega project.

These are different from the practice in South Australia in terms of:

- There is no formal and systematic process to implement relationship contracting (e.g. workshops, trainings);
- There is no consultant to be engaged to facilitate the implementation;
- Government initiatives play a key role to drive the co-operation among all parties; and
- The client has sufficient in-house skills and therefore is able to commit significant resources to the project.

The practice in South Australia shows the specialist consultant play a key role in relationship contracting projects. This consultant will help to run the implementation process formally and systematically. Therefore, it is recommended that these should be adopted in future projects in China that are procured via relationship contracting.

In addition, sufficient in-house resources will create an opportunity for Chinese clients to run relationship contracting projects smoothly.

CONCLUSION

Even through some criticism on the suitability of relationship contracting, it is generally accepted that its advantages outscore disadvantages. There are many studies introducing the success stories of construction projects adopting this innovative procurement strategy.

The National Museum Australia, Adelaide Convention Centre Extensions, Lyell McEwin Hospital redevelopment just name a few.

So far there is no construction project in China has been procured via relationship contracting formally and systematically. However, a certain percentage of practitioners in China has realised the benefits and the critical success factors of partnering as one form of relationship contracting (Tang, Duffield & Young 2006). In addition, the values of Chinese culture are generally in line with the fundamentals of relationship contracting (Zuo & Ma 2006; Kwan & Ofori 2001). Therefore, there are great potential to implement relationship contracting in the construction industry in China.

Ling'ao project has adopted principles of relationship contracting (partnering) from very early on. Certain factors (e.g. established trust-based relationship, long-term investment plan, government initiatives) have facilitated the partnering practice in this mega project. The case study also reported some example of such practice. This project has achieved optimum performance.

The similar complex projects can serve as the 'show case' of how to implement relationship contracting in China. These projects normally involve foreign participating parties, e.g. architect, engineers. The experienced foreign practitioners can offer services help on the implementation. In such multi-national context, it is important to recognize the impacts of culture.

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TOWARDS A MODERN CONSTRUCTION CONTRACT: PARALLEL DEVELOPMENTS IN THE UK AND CHINA

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ABSTRACT

Disputes arise because of the opposition of interests, values or objectives when parties perceive that these are incompatible. In the construction industry, these differences in interests and objectives are illustrated by the multi-parties involvement in the project development process. These inherent potential conflicts are ideal for disputes to flourish and can be caused by poor communication and a lack of trust in the relationship between the parties. Most disputes arise out of the contract. The purpose of contract law is to formalise transactions. Contract planning accommodates this mechanism for dispute resolution and is viewed as a means of ‘gap-filling’ in the neo-classical contract system. The choice and form of contract can play a significant role in the governance of relationships between parties to a contract. Two processes are essential to contract planning, namely, defining goals (along with related costs of their attainment) and communication. It is suggested in the Latham Report of 1994, entitled “Constructing the Team” in the UK, that the construction industry should embrace a “Modern Contract”. The New Engineering Contract (“NEC”) is widely believed to include virtually all the principles of such a contract. This paper sets out the principle ingredients and changes made since Latham 1994 to demonstrate whether or not the NEC is truly compliant. This paper also reviews the parallel progress towards a modern contract in China, comparing such progress being made on the Chinese Model Contract with that of NEC. This paper also briefly identifies that steps are being taken to avoid adversarial standard forms of contract but, perhaps more importantly, touches on a common desire for culture change in the management of construction projects and may result in convergence between China and the UK.

Keywords: disputes, contract, culture change

INTRODUCTION

Construction contracts in the UK have been procured, in the main, using standard forms of contract prepared by various contract drafting bodies. The placing and management of contracts within the UK construction industry have been the subject of a number of government reports over the last 70 years. Regular suggestions and comments were made within the various reports calling for culture change away from adversarial relationships towards more cohesion and more recently towards an integrated team. The mechanism of the contract can play a significant role in the formation and culture of relationships. Sir Michael Latham set out in his 1994 landmark report "Constructing the Team", Latham (1994) what he believed were ingredients towards a Modern Contract for construction. The 1st Edition of the New Engineering Contract, The Institution of Civil Engineers (1993) was acclaimed as containing virtually all the necessary ingredients for such a Modern Contract. Other standard forms of contract are still in use in the UK but the 3rd Edition of the New Engineering Contract, renamed as the Engineering and Construction Contract, NEC (2005) contract was reviewed for the purposes of this paper to identify how it complies with the ingredients of a Modern Contract on a clause by clause, requirement by requirement basis.

The first signs in China that a model construction was required to regulate the activities of contracting parties in the Chinese construction market arose out of the transition towards a market economy in the 1980's. The first edition of the Model Construction Contract (GF-91-0201) was issued jointly by the Ministry of Construction ("MOC") and the China State Industry and Commerce Administration. Updated editions followed in 1999 (GF-99-0201) and in 2003 (GF-2003-0201) to adapt to changes in the construction market and the enactment of relevant laws. Encouraged by the need to integrate contract documentation across all ministries and administrations involved in construction the latest edition (GF-2007-0201) was released in 2007. The content and form of the above editions of the Chinese Model Construction Contract were analysed to show how the form has developed.

TOWARDS A MODERN CONSTRUCTION CONTRACT IN THE UK - THE LATHAM RECOMMENDATIONS

The first major broad based report into construction in the UK was in 1944. This report, Simon (1944), looked into the placing and management of contracts focusing mainly on procurement routes and labour. Emmerson (1962) reported a lack of cohesion between all parties to a construction contract. Emmerson (1962) also urged consideration being given to "the possibility of adopting a common form of contract for both civil and building engineering work". Further suggestion was made that the standardization should also apply to subcontracts.

Banwell (1964) iterated that the most urgent problem with the construction industry was the "necessity of thinking and acting as a whole" with attitudes and procedures needing to change but also suggesting that such changes would be "of no avail until those engaged in the industry themselves think and act together". The changes to practice and procedure included a limited aim "first step" towards a common form of contract for building and a common form for civil engineering. Once this first step had been achieved, which, the report also argued required goodwill to do so, a final step should be taken to "agree a joint form for building and civil engineering conditions of contract.". The report also expressed strongly that the "tendency of some contracting firms to seek to impose their own form of subcontract" was not conducive to efficiency and mutual cooperation and that discussions on revising and unifying the subcontract conditions should proceed concurrently with main contract discussions.

Latham (1993) focused on the relationship between "Trust and Money" and was largely concerned with the interaction between the main contractor and the subcontractor. The report highlighted that contractors tended to create and impose "tailor made" contracts with the effect of stepping down onerous liabilities onto the subcontractor and permitting unfair practices. Latham (1993) also called for agreed subcontract terms amongst the contract writing bodies and mandatory use of them unamended.

Latham (1994) expressed the continuing concern at the proliferation of standard forms being used in the industry and the problems associated with them. The report went on to suggest that one of the options of dealing with the associated problems could be to “try to define what a modern construction contract ought to contain” and then either amend the standard forms to include the requirements or to introduce a new contract. Latham (1994:37) listed 13 requirements for a most effective form of contract in modern conditions – A Modern Contract. The report also went on to suggest that the recently produced 1st Edition of the New Engineering Contract, The Institution of Civil Engineers (1993) was the closest standard form of contract “containing virtually all these assumptions of best practice” Latham (1994:39). To facilitate full compliance with the principles of a Modern Contract, the report recommended 7 specific recommendations to the New Engineering Contract Latham (1994:39,40). At that time, the New Engineering Contract was only in its first edition. The second edition was issued in 1995, The Institution of Civil Engineers (1995) following publication of the Latham report, Latham (1994). A further edition was issued in 2005 and renamed The Engineering and Construction Contract but commonly referred to as NEC3, NEC (2005).

Egan (1998) identified five key drivers for change including “integrated processes and teams”. One of the enablers of improvement was identified as being substantial changes in the culture and structure of UK construction that would affect the “relationships between companies”. Egan (2003) reporting on progress since 1998, stated that the UK Office of Government Commerce (“OGC”) recommended integration of the project team as an enabler of change with the proposal from the OGC of the adoption of forms of contract that encourage such team integration. Egan (2003) also indicated the delivery of the vision for integration required collaboration between the various players in the construction industry including the legal profession and contract writing bodies in order to prevent an adversarial approach.

This section of the paper sets out the requirements for a Modern Contract cited in Latham (1994:37) and compares them with the findings of the authors’ review of the NEC3 contract.

Requirement 1 – duty of fair dealing with all parties

“A specific duty for all parties to deal fairly with each other, and with their subcontractors, specialists and suppliers, in an atmosphere of mutual co-operation” Latham (1994:37). Specific changes to the NEC, The Institution of Civil Engineers (1993) to include this duty were recommended to Core Clause 1 and to the Core Clauses in the Subcontract, The Institution of Civil Engineers (1993) with a further recommendation that the subcontractors and suppliers be treated in a similar atmosphere, Latham (1994:39). As part of that fair dealing principle, it was also recommended that express provision be made to ensure none of the Core Clauses could be amended by either party to the contract, Latham (1994:39). It was also suggested that an NEC form of contract be utilized for subcontracts.

Core Clause 1 was amended to include a specific obligation on all parties named in this clause to act “in a spirit of mutual trust and co-operation.”. Core Clause 1 of the Subcontract was similarly amended.

In respect of the Contractor being required to act in a similar way with his subcontractors, specialists and suppliers the Contractor is required to submit the proposed conditions of contract for each of the subcontractors to the Project Manager for acceptance unless an NEC contract is proposed (see core clause 26.3). In the absence of subcontracting under an NEC contract and the Contractor submits proposed subcontract conditions that do not contain any requirement to “act in a spirit of mutual trust and cooperation” the Project Manager can use that as a reason for non-acceptance (see core clause 26.3). Thus true compliance with the specific recommendation that subcontracting on an NEC form should be mandatory cannot be demonstrated. At best the position is highly persuasive and will, to a greater extent, depend upon the exercise of discretion by the Project Manager whether to accept an alternative form of subcontract or not.

There are no express provisions preventing the parties from amending any of the Core Clauses. In essence, this would be difficult to achieve as the parties could be considered largely free to negotiate the final contract terms.

Requirement 2 – teamwork and win-win solutions

“Firm duties of teamwork, with shared financial motivation to pursue those objectives. These should involve a general presumption to achieve “win- win” solutions to problems which may arise during the course of the project Latham (1994:37)”. A specific recommendation was made that Core Clause 16.3 should be strengthened to give effect to this principle of such solutions being devised in a spirit of partnership Latham (1994:39).

The introduction of a Risk Register (see Core Clause 11.2), comprising a list of the risks set out in the Contract Data and those which the Project Manager or the Contractor have notified during the currency of contract as an early warning matter assists the parties to share in problem solving. The Risk Register is reviewed at risk reduction meetings where, amongst others, the parties who attend will cooperate in “seeking solutions that will bring advantage to all those who will be affected” (see core clause 16.3).

Requirement 3 – integrated package of documents

“A wholly interrelated package of documents which clearly defines the roles and duties of all involved, and which is suitable for all types of project and for any procurement route.”, Latham (1994:37). The NEC contract required specific amendment to include a full matrix of consultants’ and adjudicators’ terms of appointment interlocked with the main contract, Latham (1994:40). It was also suggested that standard tender documents and bonds would be desirable, Latham (1994:40).

Different types of project and procurement routes are catered for. In addition to simply providing the Works, the Employer states which parts of the Works the Contractor is to design (see Core Clause 21.1). Further flexibility is introduced by selection from one of 6 Main Option Clauses (A to F) covering: lump sum pricing through either activity schedules or a traditional bill of quantities; target cost pricing again through the use of either activity schedules or bill of quantities; cost reimbursement or; under a management contract.

The roles and responsibilities of all parties to the contract are clearly set out including those of the Employer, the Project Manager, the Supervisor and the Contractor. Whilst the Contractor’s main responsibilities are set out in Core Clause 2 other responsibilities are set out for the Contractor and the other parties at strategic locations throughout the contract.

The NEC3 suite of contracts include the: Professional Services Contract to engage or appoint consultants, NEC (2005); Engineering and Construction Subcontract and the Short Subcontract to engage or appoint subcontractors, NEC (2005); and the Adjudicator’s Contract to engage the Adjudicator, NEC (2005).

Standard tender documents are provided in the form of a Sample Form of Tender in Appendix 2 and a Sample form of Agreement in Appendix 3 of the Guidance Notes to the Engineering and Construction Contract, NEC (2005). Sample forms of bonds or guarantees are not included and the parties remain free to negotiate and agree their own terms.

Requirement 4 – simple language and guidance notes

“Easily comprehensible language and with Guidance Notes attached.”, Latham (1994:37).

One of the original drafting aims of the NEC contract was that it should be in ordinary language thereby being a model of “clarity and simplicity”. This would have the benefit of making it easier to understand by people who are not used to formal contracts and by people whose first language is not English. The Engineering and Construction Contract, Guidance Notes indicate that its use of ordinary language would also make it easier to translate into

other languages, NEC (2005). It is understood that the 2nd Editions of the Engineering and Construction Contract and the Professional Services Contract, The Institution of Civil Engineers (1995) have already been translated into Mandarin with plans in hand to do so with the latest edition.

Guidance Notes and Flowcharts have been produced for all the documents in the NEC3 package apart from the Subcontract and the Short Subcontract, NEC (2005).

Requirement 5 – role separation

“Separation of the roles of contract administrator, project or lead manager and adjudicator. The Project or lead Manager should be clearly defined as client's representative.”, Latham (1994:37).

The roles of the Project Manager and Adjudicator are clearly separated. The Project Manager is appointed by the Employer and his identity notified to the Contractor by an appropriate entry in the Contract Data. The Employer may replace the Project Manager by notifying the Contractor of the name of the replacement (see core clause 14.4). The Project Manager whilst being the principal point of contact with the Contractor under the contract and being able to give instructions, acceptances, issue certificates, assess amounts due for work done to date including assessment of Compensation Events amongst others, Eggleston (2006) notes the Project Manager has no express requirement to act impartially nor to act in the interests of the Employer citing the English case of Costain Ltd and Others v Bechtel Ltd 2005, Eggleston (2006:89).

The Adjudicator can be named in the Contract Data. There appears to be an obvious intention that the role of the Project Manager and Adjudicator be separated as the Adjudicator has jurisdiction to resolve disputes which may involve an action or inaction of the Project Manager or the Project Manager's assessment of a Compensation Event as set out in the Adjudication Table at main Option W1, NEC (2005).

Requirement 6 – risk allocation

“A choice of allocation of risks, to be decided as appropriate to each project but then allocated to the party best able to manage, estimate and carry the risk.”, Latham (1994:37).

The base position in terms of risk allocation is set out in Core Clause 80.1. Within this clause the Employer's risks are clearly set out and, by the provision of Core Clause 81.1 all other risks are carried by the Contractor. If there are additional risks taken on by the Employer these would be set out in the Contract Data Part 1 as being “included in the Risk Register”, NEC (2005). If any of the Employer base risks are taken on by the Contractor or further risks identified as being best managed by the Contractor, these could appear as amended or additional clauses under Option Z.

Whoever carries the risk, whether they be allocated 100% to one of the parties or shared on a proportionate basis between the parties, the risks would be included in the Risk Register for regular discussion and solution until they can be removed from the register.

Requirement 7 – variations

“Taking all reasonable steps to avoid changes to pre-planned works information. But, where variations do occur, they should be priced in advance, with provision for independent adjudication if agreement cannot be reached.”, Latham (1994:37).

The NEC3 contract envisages the pre-planned Works Information being as complete as possible. Nevertheless the contract also envisages changes being made to the Works Information by instruction from or a change in an earlier decision by the Project Manager (Core Clause 60.1 (1)). The contract also provides for the Contractor to submit quotations so that the Project Manager and the Contractor are fully aware before the instruction is

implemented of its effect on time and the cost of the works (Core Clause 61.1). There is also further provision for further discussion in order to identify different ways of dealing with or implementing such changes to the Works Information and for submission of alternative quotations (Core Clause 62.1). It is to be noted that any event giving rise to cost and/or time implications of the project is identified as a Compensation Event as opposed to a claim for an extension of time or money (Core Clauses 60 to 65 inclusive).

If there is a dispute on the assessment of the time and/or cost attributed to a Compensation Event the contract provides a mechanism for independent adjudication. This is invoked by incorporating Main Option Clause W1 outside the UK or by Main Option Clause W2 within the UK.

Requirement 8 – mechanisms for assessing interim payments

“Express provision for assessing interim payments by methods other than monthly valuation i.e. milestones, activity schedules or payment schedules. Such arrangements must also be reflected in the related subcontract documentation. The eventual aim should be to phase out the traditional system of monthly measurement or re-measurement but meanwhile provision should still be made for it.”, Latham (1994:37).

The process for interim payments is initiated by assessing the amount due to be paid from the Employer to the Contractor periodically during the contract. The period being governed by the pre-agreed “assessment interval” (Core Clause 50.1) set out in the Contract Data part 1 provided by the Employer. With the assessment interval stipulated as being no longer than 5 weeks, it is expected that the traditional approach of monthly valuations is likely to be followed especially if Main Options B and D are used. A slight departure from the traditional approach is available if Main Options A and C are used which incorporate valuing by use of activity schedules but again, the period is likely to retain the monthly cycle. Whichever Main Option is selected, the Project Manager assesses the Price for Work Done to date.

The Subcontract documentation and the Professional Services Contract follow similar procedures to the main contract.

No provision appears to have been made to allow payment methods using milestones or payment schedules.

Requirement 9 – payments

“Clearly setting out the period within which interim payments must be made to all participants in the process, failing which they will have an automatic right to compensation, involving payment of interest at a sufficiently heavy rate to deter slow payment.”, Latham (1994:37).

The timetable for payments under Core Clause 51 proceeds from the assessment process set out in Core Clause 50. Essentially, the Project Manager is required to provide a certificate of the amount to be paid within one week of the assessment date which occurs at the end of each assessment interval. The Employer is then normally required to pay the certified amount within three weeks of the assessment date. The three week payment period following certification can be amended by changes to the Contract Data.

Payments made late (whether they arise by a failure or delay by the Project Manager to certify or the Employer simply failing to pay on time) attract interest at the pre-agreed rate set out in the Contract Data Part 1 and calculated on a daily basis with interest being compounded each year, Core Clause 51.2 and 51.4.

The net effect of the assessment and payment provisions under Core Clauses 50 and 51 is that the Contractor is normally expected to be paid no later than 8 weeks after carrying out the work.

Requirement 10 – trust funds

“Providing for secure trust fund routes of payment.”, Latham (1994:37). Also a specific recommendation for the NEC contract suggested it should be included “as a Core Clause” with further recommendations that the trust fund should be arranged “into which the client deposits payments for each milestone, activity schedule or interim payment period before the commencement of the relevant period.” with the perceived benefits of providing greater confidence for contractors and subcontractors, Latham (1994:39).

NEC2 included an Option clause V which permitted the setting up of a trust fund to meet the needs of this clause with sample Trust Fund documentation and a sample Trust Deed being included in Appendix 7 of the Guidance Notes to NEC2, The Institution of Civil Engineers (1995). Perhaps due to the lack of take up of this particular option, the provision for a trust fund disappeared following the drafting of NEC3 in 2005.

With the enactment and implementation of the Office of Government Commerce Model “Fair Payment Charter” in 2007, the NEC drafting committee responded by producing an Option Z clause to allow users to implement the fair payment practices into NEC contracts which included the creation of a Project Bank Account with beneficiaries of the Account being designated by execution of a Trust Deed and subsequently a Joining Deed, NEC (2007).

Requirement 11 – speedy dispute resolution

“While taking all possible steps to avoid conflict on site, providing for speedy dispute resolution if any conflict arises, by a pre-determined impartial adjudicator/referee/expert.”, Latham (1994:37).

“The adjudication procedures [for NEC] may need some amendment to bring them within the principles of Chapter 9 of this Report.”, Latham (1994:39)

Steps have been introduced to avoid conflict on site by the introduction of a Risk Register with regular reviews and discussions taking place at risk reduction meetings. Parties attend the risk reduction meetings with the aims set out in Core Clause 16.3 which include how risks can be avoided or reduced, seeking solutions to the advantage of all affected, what actions should be taken and by whom and to update the Risk Register itself with the aims set out in Core Clause 16.3.

If any disputes arise, the contract provides a mechanism for independent adjudication. This is invoked by incorporating Main Option Clause W1 outside the UK or by Main Option Clause W2 within the UK. The timetable for a decision from the independent and impartial Adjudicator after having received notice of the dispute from either party is speedy and normally within four weeks under Main Option Clause W1.3 or W2.3 (8). Main Option clause W2.3 (8) permits the decision period to be extended but by no more than 14 days.

Requirement 12 – incentives

“Providing for incentives for exceptional performance.”, Latham (1994:37)

The use of Target Pricing under Secondary Options C and D could encourage good performance and, provided the pain/gain share is appropriate would therefore provide incentives for exceptional performance. Further incentives may be implemented by the use of Key Performance Indicators (“KPI’s”). KPI’s are an integral part of Secondary Option X12 where the parties to the project have chosen this Partnering Option. Where the Partnering Option is not used, Secondary Option X20 can be used to invoke a pre agreed Incentive Schedule where the Contractor is paid a stated amount if a particular KPI is achieved or exceeded.

Bonuses can also be won for early completion of the works if Secondary Option X6 is used.

Requirement 13 – advanced mobilisation

“Making provision where appropriate for advance mobilisation payments (if necessary, bonded) to contractors and subcontractors, including in respect of offsite prefabricated materials provided by part of the construction team.”, Latham (1994:37).

The Employer can agree to make an advanced payment (including for mobilisation purposes) by invoking Secondary Option X13. The Employer then sets out in the Contract Data how the advanced payment is to be made by inclusion of the stated instalments to be included in the amounts assessed to be due to the Contractor until the advanced payment is repaid.

NEC Specific Requirements

The Latham report set out some specific alterations to the NEC form of contract, Latham (1994:39,40) and, where they are not mentioned above, are set out as follows:

name change

“Its name should be changed, since it can equally be used for building projects. I suggest the ‘New Construction Contract’.”, Latham (1994:39)

The Guidance Notes indicate that the name of the contract was changed from the New Engineering Contract to the New Engineering and Construction Contract to reflect the fact that it was intended to apply also to construction works, NEC (2005).

payment cycle

“Subcontractors have expressed concern about the potential length of payment times under the NEC procedures, these concerns are set out in Table 6 prepared by the SECG.....I recommend however that the payment periods be reviewed in conjunction with clients, contractors and subcontractors. This may allow for agreement on an alternative timescale which is acceptable to all.”, Latham (1994:39)

The NEC drafting committee took on some of the concerns with the payment cycle by reducing the time periods between assessment, certification and payment by the Contractor to the Subcontractor. Under Core Clauses 50 and 51 of the NEC3 Subcontract, the certification and payment dates fall one week behind similar dates in the main contract. The net effect is that the expected timetable for payment for the Subcontractor is no later than 9 weeks after completing relevant work, one week longer than the Contractor.

minor works

“Provision should be made for a simpler and shorter minor works document.”, Latham (1994:40)

The first edition of the NEC Engineering and Construction Short Contract was published in 1999 with the second edition being issued in 2005 subject to reprint in 2007. This contract is an alternative form of contract for use for straightforward work with low risks to the parties and not requiring sophisticated management techniques. The contract conditions themselves are written in the same language and style of the main form of contract but with significantly reduced content (i.e. 12 pages down from nearly 60 pages), NEC (2005).

THE DEVELOPMENT OF A MODEL CONSTRUCTION CONTRACT IN CHINA

Before 1990s, although China began to introduce a free market economy to the previous “planned economy” the formal relationship between the contracting parties in such a mixed economy“ was still largely governed by the “administration relationship”. The parties looked to their “working relationship” and not to the contract. For the *Yifang* (construction

enterprises/contractor), the motivation to become efficient and/or to turn a profit was hindered by the fact that losses were reimbursed by and profit was returned to the government or *Jiafang* (the project investor/employer).

The contract eventually signed by the two parties could be only few pages or even limited to a single page which was simply put aside or locked in a safe throughout and after execution. Over time, effected by further economic reform and open policy, the planned economy gave way to market economy and the construction enterprises began to find themselves having to act as businesses with financial responsibility for themselves.

Rationale behind the 1st edition of the Chinese Model Contract (GF-91-0201)

In the late 1980s, the need arose for formalization of the contractual relationship in the construction market so in 1991, the Ministry of Construction ("MOC"), in conjunction with the China State Industry and Commerce Administration issued China's first model construction contract (GF-91-0201, the "91 version"). The form was prepared by MOC officials with advice from construction management professionals. The 91 Version was divided into two parts encompassing the Contract Conditions and Negotiable Clauses. The Contract Conditions were further subdivided into 41 clauses categorized into the following 10 sections: definitions and documents; general responsibilities; construction site organization and method statement; quality control and acceptance; contract price and payment; supply of materials and equipment; variation; completion and final payment, dispute resolution; default and claim, and others. The Negotiable Clauses were blank clauses that were left to be completed by the two parties upon agreement through negotiation. The release of such a model construction contract was also an answer to the call by the China State Industry and Commerce Administration towards the standardization of "economic contracts".

The next steps: 1999 Edition (GF-99-0201) and the 2003 Edition (GF-2003-0201)

Although the 91 Version assisted the contracting parties to prepare the construction contract, deficiencies in this version unfolded as it was applied (Yin and He, 1997; Li and Ren, 1997). Such deficiencies affected (1) the Engineer's Role in supervising the project; (2) unclear responsibilities and/or risk allocation; (3) priority of contract documents; (4) no provision for employer nominated subcontractors; (5) lack of claims procedure; (6) unclear dispute resolution procedure. Such deficiencies taken together with the changing regulatory landscape which included introduction of: the Arbitration Law (1994); the Insurance Law (1995); the Construction Law in 1998 and with further reference to international practice led to modifications being implemented to create the 1999 version. The 1999 version was extended to include three parts: the Contract Agreement; General Contract Conditions and Particular Contract Conditions.

The prominent changes implemented in the 99 Version were the addition of working procedures that focused on standardization of the working relationships of the parties (Clauses 2, 3.3, 5, 7, 9, 10, 16, 19, 24, 26, 27, 29, 32, 33, 36, 38, 44, 45). Terms and roles such as project manager, Engineer and Supervision Unit were introduced. A mutual "performance bond" was also introduced. Health and Safety also received some emphasis by its incorporation within a separate section on its own (see the three clauses in Section 6) rather than being listed as a minor subject in the catch all section 10 of the 1991 Version.

Further regulatory change including the introduction of the Contract Law in 1999 and the Bidding Law in 2000 implied further modifications were required to the 1999 version. Minor drafting changes were also implemented resulting in GF-2003-0210 ("the 2003 version") being issued by government officials with guidance and input from practitioners and scholars.

A step change?: the 2007 version (GF-2007-0201)

The early versions of the Chinese model construction contract greatly assisted regulation and governance of behavior of the contracting parties. However, even though behavioural change was facilitated, practitioners considered the model contract became prescriptive in nature

lacking the flexibility to meet modern needs for complex projects, particularly projects of heavy engineering.

Different model contracts were thus prepared and being used by other ministries including: the Ministry of Water Resources; the Ministry of Communications; the Ministry of Railway; Broadcasting and TV General Administration and the Civil Aviation General Administration. However, the China National Development and Reform Commission set out to prepare a unified model form of construction contract in 2005 drawing together these other ministries and general administrations.

To that end a Drafting Committee of experts across the industry were drawn together with China National Association of Engineering Consultants ("CNAEC") being the coordinator. Members of the Committee consisted of both government officials and industry professionals. Their first meeting was held in July 2005 in Beijing. Whilst no formal notes were prepared from the meeting the following drafting principles were generally agreed:

- Y Conformance to Chinese laws: Contract, Construction, Arbitration, Bidding
- Y FIDIC 1999 Form as the basic reference framework
- Y Clear procedures
- Y Emphasis on specifying allocation of risks
- Y Emphasis on Health and Safety
- Y Simplicity and Clarity
- Y Introduction of Dispute Adjudication Board ("DAB") for settlement of disputes

As a result of the combined efforts of the individuals and organizations on the drafting committee, a new Model Construction Contract ("the 2007 Version") drawing on FIDIC 1999 was released officially in the joint names of ministries, commission and administrations involved.

Both structure and content changed with the 2007 version comprising three parts: General Contract Conditions; Particular Contract Conditions; and the Appendices. Within the General Conditions were 24 clauses largely following the format of the FIDIC 1999 contract clauses including: General Provisions; Employer's Obligations; Supervision Engineer; The Contractor; Materials and Plant; Construction Equipment and Temporary Facilities; Transportation and Delivery; Surveying and Setting-out; Safety, Security and Environment Protection; Programme; Commencement and Completion; Suspension of Work; Work Quality; Tests and Inspection; Variation; Price Adjustment; Measurement and Payment; Acceptance on Completion; Defects and Liability for Rectification; Insurance; Force Majeure ; Default; Claim and Dispute Resolution.

CONCLUSIONS

This paper reviewed the latest edition of the Engineering and Construction Contract, NEC (2005) against the Latham requirements for a Modern Contract, Latham (1994:37-40). Both Latham (1994) and Barnes, (1996) suggested that the NEC contract was almost fully compliant with the principles of Latham's Modern Contract. This paper aimed to draw out the principal mechanisms within the NEC3 contract to demonstrate compliance on a requirement by requirement basis. The NEC3 contract was chosen as an example on the basis that earlier versions have already been translated into Chinese with plans for further translations.

The review has identified and set out the principles of NEC3 compliance with Latham's Modern Contract requirements with the aim of considering whether such principles and requirements could be of use in the Chinese construction market.

The Chinese move towards a Model Construction Contract was largely influenced by regulatory change and, whilst a review of the Chinese Model Construction Contract against the Latham requirements was not undertaken, such a review is recommended. This is particularly relevant in the light of the variety of problems resulting from the limitations of traditional project delivery systems in construction including, the inappropriate allocation of risk and reward. Low efficiency and poor project performance have also been identified in the

Chinese domestic market (Tang et al 2008). In recent years, researchers and practitioners have drawn on international lessons in construction procurement subsequently pointing out the relevance of partnering (Zhang et al 2006). Preliminary studies have suggested that relational contracting (the NEC being one of the standard forms used in this field of contracting) could be effective in the Chinese domestic market provided appropriate countermeasures are adopted to eliminate the obstacles to such form of contracting (Gong and Wang, 2007).

Some conclusions have been drawn in this paper, nevertheless, further research is envisaged to analyse the legal and cultural framework of the Chinese construction market in order to identify whether Latham's requirements for a Modern Contract are appropriate for this market in particular for multinational projects. Dependent on the outcome of the analysis, a further and more detailed review of the Chinese Model Contract may be necessary to identify how compliant the contract is to Latham's requirements for a Modern Contract and to further identify any shortfalls with recommendations for correction.

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Renegotiation as a Risk-Benefit Rebalancing Tool in Long-Term Infrastructure Concessions

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ABSTRACT

In order to alleviate their fiscal burdens, many governments have invited international private investors to participate in infrastructure development through schemes such as PFI, BOT, and PPP. Obsolescing bargain scholars suggest *ex-ante* favourable long-term concessions benefits are often undermined by *ex-post* renegotiation initiated by the host government. Other studies have shown that opportunistic private parties can also 'hold-up' the host government and renegotiate for more favourable terms during the construction period. Studies have found that close to half of PPP infrastructure projects in Latin America from the 90's were renegotiated. Past literature has focused predominately on bi-lateral opportunism as the explanation for *ex-post* renegotiation. However, little has been written on renegotiation of long-term concession agreements based on fairness and reciprocity. This paper provides the framework for a study investigating the extent to which renegotiation is used as a tool to rebalance equity between stakeholders during the concession period. Instead of treating the contract amount as a rigid project value, real option analysis is used to determine the evolving real option values of a number of sample projects. It is hypothesized that as the risk-benefit balance of the project changes at various development stages due to progress and new information, each stakeholder re-evaluates its relative risk-benefit ratio compared to the other party. If the perceived real option value, based on the relative risk-benefit ratio, becomes excessively favourable to one side, the other party will either initiate renegotiation or change its behaviour unilaterally in an attempt to rebalance the risks and benefits shared between them. The findings of this study will provide scholars and practitioners with insights on avoiding future disputes by structuring initial contracts that facilitate fair amendments due to changing conditions. This interdisciplinary study will integrate knowledge across multiple disciplines: construction management, finance, political science, behavioural economics, and international law.

Keywords: Renegotiation, Uncertainty, Equity, Real Options

INTRODUCTION

Many governments around the world have had difficulties meeting their infrastructure needs with limited fiscal resources. As a result, governments have invited international private investors to participate in infrastructure development through schemes such as Private Finance Initiative (PFI), Build-Operate-Transfer (BOT), and Public-Private Partnership (PPP) (Lonsdale, 2005, Clarke, 2000, Gerrard, 2001). These initiatives often involve long-term concessions and impact many citizens, making these projects particularly sensitive to various financial and political risks.

Scholars have not agreed whether or when bargaining power shifts toward governments or investors in international infrastructure deals (Kobrin, 1999). On one hand, host governments often have to promise favourable concession terms *ex ante* to investors as compensation for risky deals to be financially viable. Unfortunately, on numerous occasions, the host government then failed to honour its commitments or initiated renegotiation *ex post*, with the infrastructure already built and the up-front financial resources exhausted. Asset specificity (Williamson, 1981) left MNCs with little choice but to transfer economic rent to host governments through renegotiations. Thus, many investors end up with diminished return on investment due to what they perceive as host governments' opportunistic behaviours. "Obsolescing bargain" scholars suggest investors' *ex post* vulnerability to host government's power make privately-funded infrastructure development unsustainable. Declining infrastructure foreign direct investment between the late 1990s and 2005 provides some evidence for their claim (Ramamurti and Doh, 2004).

On the other hand, governments are highly motivated to ensure the success of privately-funded projects in order to protect their own reputations. With their heavy reliance on the concessionaire bringing projects into operation, governments become vulnerable to concessionaires during the construction period. In other words, concessionaires can hold-up progress by refusing to cooperate or abandon distressed projects. High switching costs (Williamson, 1987), both in terms of time and money, lead many governments to concede more favourable terms or rescue distressed projects during the construction period (Ho, 2006).

While scholars have not reached firm conclusions about the direction and timing of bargaining power flow in infrastructure development projects, one fact is certain – international infrastructure developments often experience renegotiations during the post-contract period, leading to high transaction costs—and attendant uncertainties—for both governments and investors. One study found that 40% of PPP infrastructure projects during the 1990s were renegotiated at some point, with water (74%) and transportation projects (55%) experiencing the highest renegotiation rate (Guasch and Straub, 2006).

Partly attributed to the exceptional renegotiation rates, many overdue infrastructure development or maintenance projects are left unattended, despite the fact that population worldwide continues to climb. Both governments and investors want safeguards against their vulnerabilities after a contract is signed. Recent catastrophic infrastructure failures in the U.S.—levees in New Orleans and a highway bridge in Minneapolis—remind us how urgent infrastructure development and maintenance matters are to the wellbeing of citizens worldwide. A better understanding of the causes and process of bargaining power shift is desperately needed to reverse the trend of leaving important international infrastructure projects neglected. Sustainable strategies for developing PPP infrastructure projects deserve the attention and efforts of both researchers and practitioners.

This paper suggests a framework to analyze the relationship between project value evolution and renegotiation occurrence. It first posts a hypothesis inspired by previous works by strategic alliance scholars. The focus then moves to an in-depth discussion of the assumptions and applications of different project valuation techniques. After that, the paper discusses the methodology of the research that tests the posted hypothesis. The paper aims

to further the understanding of when and why renegotiation happens in infrastructure projects with long-term concessions.

RENEGOTIATION IN STRATEGIC ALLIANCES

During the 80s and 90s, many multinational corporations (MNCs) formed strategic alliances with foreign partners in order to expand their business into new foreign markets. As these collaborations were gaining popularity, articles on strategic alliances became more prominent in business literature. However, much of the strategic alliance literature has focused on the two ends of their life-cycles – either the very beginning (modal choice) or the fate of the alliance (stability). The “mid-life”, or the evolution process, of alliances has been left understudied (Yan and Gray 1994). Works by Ring and Van de Ven (1994), Doz (1996), and Ariño and de la Torre (1998) were notable exceptions. Ring and Van de Ven proposed that instead of staying static during the post-contract period, alliances go through an evolutionary process in stages of negotiation, commitment, and execution. Doz found that successful alliance projects were highly evolutionary and went through the cycle of learning, re-evaluation, and readjustments. Ariño and de la Torre combined these two findings and proposed an evolutionary model of collaborative ventures (Figure1). They found that if the level of equity changes substantially during this evolutionary process, alliances will “either engage in renegotiation of the terms of the contract, or to modify their behaviour unilaterally, in an attempt to restore balance to the relationship. The process feeds back until a new mutual understanding of equity is restored, or else the relationship deteriorates gradually until a point when the venture is dissolved.” (Arino and de la Torre, 1998)

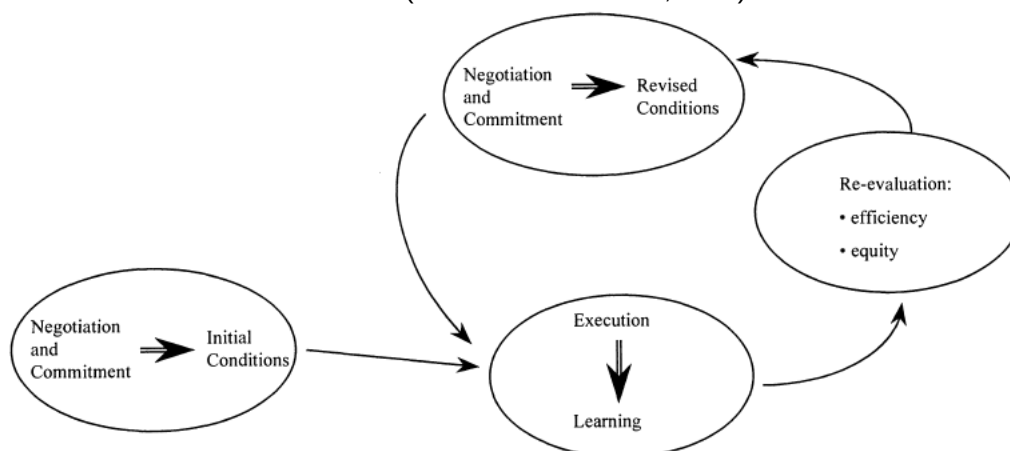


Figure 1- Model of CV Evolution Source (Arino and de la Torre 1998): Based on Ring and Van de Ven (1994) and Doz (1996)

In various ways, Public-private partnership resembles strategic alliance between private firms. Like profit-seeking businesses in equity joint ventures, both the government and investors collaborate to develop a new entity that is sustained by revenue generation. It is thus probable that the equity collaborative venture evolution cycle described by Ariño and de la Torre can also be observed in PPP projects. Specifically, the following hypothesis is made:

Hypothesis:

In infrastructure development projects, host governments and concessionaires use renegotiation as a tool to restore equity during the concession period so that risk and benefit shared among stakeholders return to a level similar to the initial agreement.

Legal scholars have suggested contracts are sometimes intended to be incomplete because it is either impossible or impractical to write complete contracts with contingency clauses covering all possible future states. However, little has been written on the negotiation process following the initial agreement in infrastructure development projects. This empirical study aims to fill that gap by investigating the applicability issues of using renegotiation to redistribute risks and benefits.

INFRASTRUCTURE PROJECT VALUATION TECHNIQUES

In order to test the hypothesis, accessing project value accurately is essential. Despite their importance and widespread academic interests, infrastructure project value determination techniques and principles remain controversial and is a work in progress. Some popular methods are listed and discussed in the following sections.

TRADITIONAL METHODS

Until recently, scholars and practitioners have used traditional quantitative techniques such as payback period method, accounting rate of return (ARR), internal rate of return (IRR), net present value (NPV), and decision tree analysis to assess the financial viability of infrastructure projects (Ho and Liu, 2002). The most popular approaches, NPV and IRR, are different versions of the discounted cash flow (DCF) method. This method estimates future cash flows to be generated by the project and discounts them to account for the time value of money. In the case of NPV, future cash flow is discounted and converted to equivalent present value. The discount rate is meant to represent the return investors require for projects of similar risks (Brealey and Myers, 2000), and is often set equivalent to the weighted average cost of capital (WACC), which is derived from the borrower's costs (ie. required return) of debt and equity:

$$WACC = R_e \left(\frac{E}{D+E} \right) + R_d \left(\frac{D}{D+E} \right) (1 - t)$$

where R_e and R_d are the required return on equity and debt, respectively. E represents the amount of equity; while D represents the amount of debt; and t is the marginal tax rate for countries, such as the United States, that give tax break on debt financing. The term $\left(\frac{D}{D+E} \right)$ is known as the leverage ratio, for it is the level of debt (D) over total level of capital ($D+E$). All of the variables in Eq. 1 can be obtained or derived directly from market data. If the NPV is positive, the project is considered profitable and thus should be undertaken.

Similarly, the IRR approach finds the discount rate that would bring the estimated future cash flow to zero NPV. That discount rate is commonly termed the *return* of a project. The project is considered desirable if the IRR is higher than WACC, also known as the *hurdle rate* – a project's return must rise above the WACC in order to receive approval to proceed. The wisdom behind both DCF approaches is the same – invest in the project if and only if the return on the project exceeds the opportunity cost of the capital.

SHORTCOMINGS OF DISCOUNTED CASH FLOW METHODS

While intuitive and easy to apply, the DCF-based approaches have their shortcomings when used to value infrastructure projects. Garvin and Cheah (2004) remind scholars that the discount rate of a project should reflect minimum return required for assets of similar risks, as first suggested by Brealey and Myers (2000). Instead, they comment that the application of discount rate is "commonly misunderstood, and a firm's opportunity cost of capital is mistakenly chosen to discount future cash flows." They further point out that infrastructure projects are not actively traded in secondary markets. Therefore, assigning a discount rate for the NPV approach based on similar projects is problematic.

In addition, the common practice of discounting all future cash flow with one single, constant discount rate is erroneous in the context of infrastructure valuation. The approach is incorrect because the cost of equity, a component of discount rate, is a function of leverage ratio, which changes from low (at the beginning of the project) to high (during construction) to low again (during operation) (Esty, 1999) (Exhibit 1). "Calculating the project's cost of equity using the point of maximum leverage – typically the project's funding mix – causes the cost of equity to be overstated for most years because leverage is overstated for most years." (Esty, 1999) To compensate for the discount rate overestimation error, Esty (1999) suggests calculating a different discount rate for each time period based on the leverage ratio at the time.

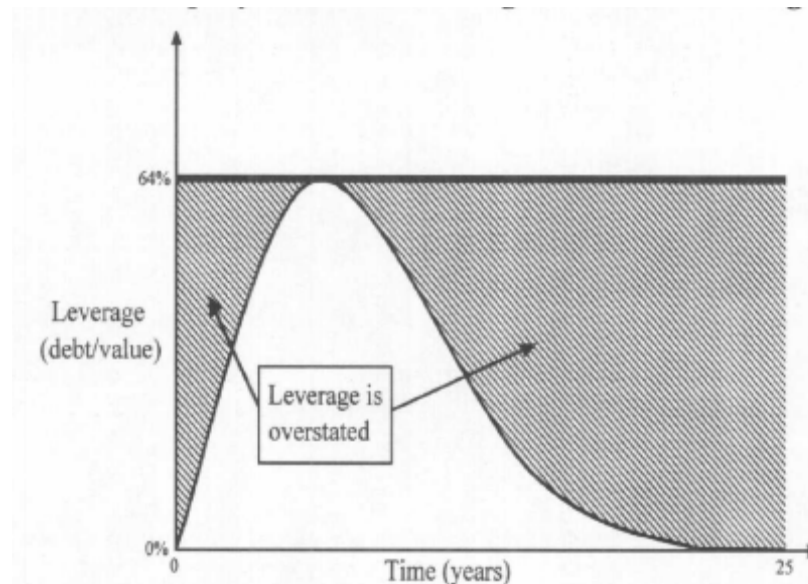


Exhibit 1 - Cost of Equity Calculated Using Maximum Leverage. Source: Esty 1999

Although Esty's proposed method adjusts discount rate to account for changing leverage ratio, doing so during the project feasibility study stage means management assume the leverage ratio will go down as expected. While the cost of capital may indeed become cheaper with project progress, the higher discount rate serves as a buffer to the project value in case events do not turn out as expected and discounting the future cash flow based on expected lower leverage ratio may prematurely inflate the project value. In other words, while traditional DCF-based approach may be too conservative and undervalue a project, modified DCF approach suggested by Esty may be too optimistic and overvalue a project.

There is another critical flaw in the traditional DCF approaches –both NPV and IRR models assume managers are passive during the post-contract period, while in fact managers are active and can respond to changing circumstances and new information. Managers and investors can expand and contract the scope of the project in response to changing economic conditions, as well as abandon failing projects. The NPV approach is not flexible enough to account for changes and revised conditions as the project moves along (Dixit and Pindyck, 1994, Myers, 1984). In order to capture the value of various flexibilities, scholars have developed an alternative valuation method called Real Options Analysis.

REAL OPTIONS ANALYSIS

In the last few years, Construction Engineering and Management (CEM) scholars have started to appraise the value of infrastructure projects using real option theory. Simply put, an option is the right, but not the obligation, to undertake some predetermined business decisions. Options were first broadly applied as derivatives of financial assets, such as stocks or commodities, with investors trading the right to buy (with call options) or sell (with put options) the asset at a price different than the spot within a limited timeframe. The most significant work on option pricing was arguably the pricing model by Merton, Black, and Scholes (Merton, 1973, Black and Scholes, 1973). Based on the core assumption of a complete market and the "no-arbitrage" principle, the model suggests future cash flow generated by a project can be replicated by a portfolio consisting of another asset and a risk free instrument such as government bond. Since the option and the portfolio will yield the exact same return in the future, they must also have the same price today, otherwise there will be an arbitrate opportunity.

While early option research focused on derivatives of financial assets such as stocks and commodities, Myers (1976) extended the application of option theory to pricing physical assets and coined the term "real option". Since then, CEM scholars have applied real option

theory to assess the value of infrastructure projects. Ford et al. (2002) applied real option theory on a toll road project and suggested the model has the potential to increase project value estimates by “explicitly designing specific uses of managerial flexibility during projects and valuing that flexibility in pre-project planning.” (Ford, 2002) Ho and Liu (2002) point out that the real option pricing model allows practitioners to take into account the value of either the debt guarantee or renegotiation option in BOT projects, something the NPV method does not price. Zhao et al. (2004) uses real options model to analyze highway development decision-making by accounting for uncertainties over traffic demand, land price, and highway deterioration.

FURTHER APPLICATIONS OF REAL OPTIONS ANALYSIS

The ability to price various flexibilities is a major advantage of using Real Options Analysis (ROA). Most of the ROA applications in the CEM literature have emphasized future decisions, such as road expansion or abandonment options, as the major flexibilities. However, the flexibility ROA values does not have to come in the form of decision to be made in the future. Flexibility can also come in the form of being exposed to a range of outcomes over which investors have no control. In this regard, ROA is a powerful tool to price uncertain future incomes. Take the example of an individual being given a call option on a stock with a certain strike price and is prohibited from selling the option before maturity. Obviously the value of the call option changes daily with the fluctuating price of the stock. In order to correctly price the value of the call option, option pricing analysis must be performed. Similarly, ROA can be a proper way to price a project even if construction has begun and options are depleting. In other words, ROA is a valuation tool that is useful to price projects with uncertain futures, even if investors are not presented with various decision points as the project progresses.

ISSUES OF APPLYING REAL OPTIONS MODEL ON INFRASTRUCTURES

Before applying the real option pricing model to infrastructure development projects, one must know the model's core assumptions and limitations and account for them to fit the context. For example, in options tied to financial assets, investors can use a small amount of money to buy derivatives of the underlying asset without committing the large sum of money up front. If the price of the asset heads in a different direction than what the investor speculates, he/she can forgo the option premium and walk away without substantial financial losses. This freedom to withdraw is usually not provided to investors in infrastructure projects for two reasons: 1) infrastructure deals are not traded in an open market where there is a group of buyers and sellers at any time; 2) the reputation damage resulting from incomplete projects is too high for both the government and investors, especially if the deal breaks down after construction has commenced. In addition, Adner and Levinthal (2002, , 2004) point out that, while option pricing on financial instruments minimizes the investors' exposure to exogenous risks, the fact that investors can affect the outcomes presents a critical problem. They may deviate from actions that are in the best interest of the projects, anticipating rescue efforts from the government. In addition to that, investors may take on higher risks than they otherwise would, because higher volatility leads to a higher option price according to the Black-Scholes model. Another important difference is that the uncertainties option pricing model deal with are the fluctuations of pre-identified parameters' value fluctuates, rather than uncertainties arising from new situations that catch participants by surprise (Adner and Levinthal, 2002). While a real option pricing model may account for variations in toll road usage, it may have less success dealing with unanticipated events such as political unrest in a historically stable country.

There are also other core assumptions about ROA that need to be carefully considered. One of which is the aforementioned risk-neutrality assumption, which hinges on the availability of a complete market. ROA assumes investors can replicate future revenue with other traded assets in the market, and thus hedge the uncertain cash flows. While it may be difficult to hedge revenue risks with other traded assets in the market, it is reasonable to assume the value of the project can be derived from other assets, when combined, provide similar future cash flow. Garvin and Cheah (2004) comment: “risk-neutral technique cannot be worse, or

more subjective, than estimating the appropriate risk-adjusted discount rate.” ROA is an applicable tool, even an improvement over traditional DCF methods, to price infrastructure projects subject to uncertain future cash flows.

Despite the important differences between applying an option pricing model to financial assets versus infrastructure developments, there are elements from the model that can improve our current perspective on the viability of a project. As Ford et al. comments, “It is surely true that strategies, for LEPs (*Large Engineering Projects*) or other types of investments, are not exactly the same thing as real options. The point is that real options thinking allows for flexibility that is often missing in more traditional approaches” (Ford et al., 2002). Traditionally, investors are considered to be locked into the deal and tied to its terms once the contract is signed. However, that way of thinking does not account for or permit flexibility in response to the dynamics of the post-contract period of a project. Miller and Olleros (2000) argue large engineering projects are “shaped”. By shaped, they mean projects can be regarded as a process of making adjustments to a series of evolving challenges during the planning phase, with investors required to make a series of real option decisions about whether to continue investing at each successive phase of the project. Since the real options pricing model shows many benefits for determining the value of infrastructure projects with uncertain future cash flows, it is chosen to track the evolving project value in this study.

RESEARCH METHODOLOGY

In order to test the hypothesis, a handful of selected case studies will be used to analyze the renegotiation dynamics between government and private investors. The sample size is deliberately kept to a small number because a thorough understanding of the political, economical, and legal dimensions of the projects is vital to accessing of the actual causes of renegotiation. The World Bank Private Participation in Infrastructure (PPI) database, the Program on Energy and Sustainable Development (PESD) at Stanford University, and project databases maintained by scholars such as Guasch (2006) provide excellent sources for identifying focus projects that did and did not undergo renegotiation.

UNIT OF MEASUREMENT

Real option pricing is used as the instrument to represent the evolving value of the project as events unfold and new information becomes available. Using a real option approach to estimate the value of infrastructure project is still a rather novel approach. Thus, it is vital first to define clearly basic elements of this calculation such as the unit of measurement.

The value of an infrastructure project to a government and an investor can be judged along many dimensions, such as the level of public acceptance, or the traffic congestion alleviation. However, in this study, the value of a project will be assessed by its equity value in monetary terms. Most public-private infrastructure negotiations involve the give and take of financial terms such as level of toll, concession period, and size of government guarantee, which are ultimately used to assess a project’s financial viability. The financial performance of a project is also one key basis on which both the private investors and the host government are judged. While the private investors obviously need a reasonable return for their investment, the government can be under political pressure if they “leave too much money on the table”. Ho and Liu (2006) point out that “the developer’s investment returns are realized and measured through equity returns, instead of the value of the firm or project, since the developer finances the BOT project by holding a significant portion of the shares of the BOT firm” (Ho and Liu 2006). Using the project’s equity value as the unit of measurement, researchers can consistently evaluate the size of the pie (total income to be generated by the project) and analyze the share of costs and benefits that accrue to the government and the private investors.

PROJECTS EXPERIENCING SUBSTANTIAL CHANGE OF RISK-BENEFIT RATIO

The next step is to identify projects that are candidates for in-depth case studies. From one of the aforementioned project databases, and discussions with Collaboratory for Research on

Global Projects (CRGP) practitioners, completed projects that experienced the highest level of risk-benefit ratio shift (and thus the highest increase or decrease of project value) after the signing of contracts will be identified. The reason only completed projects are chosen is to allow the researcher to observe the level of renegotiation of those projects. Realization of uncertainties over construction costs, future output prices (such as electricity price or toll rate), and output demand all cause risk-benefit ratio to shift.

From that list of projects, access to financial records and project documents will be sought. Many recent PPP projects have detailed project and financial records available in the public domain. In addition, CRGP partners can be valuable resources in accessing some of the project information or providing the reference to people who work on those projects.

CHANGING PROJECT VALUE WITH REAL OPTION MODELLING

After identifying projects that show significant risk-benefit ratio changes qualitatively, the next step is to quantify these changes of the project values with a real option model. As aforementioned, the three major approaches to evaluate real options are continuous-time models, discrete-time models, and Monte Carlo simulation. In order to test the hypothesis, it is sufficient to show the project value at various milestones such as contract signing, construction completion, and initial revenue collection. In addition, any sign of renegotiation due to a small number of major parameters influencing the major shift in project value will support the hypothesis. Since the number of parameter is expected to be small in this study, Monte Carlo simulation is not expected to be needed. Using a binomial lattice to show the projects' value at discrete-time is the most appropriate approach in this research project. It has the benefit of being straightforward and intuitive; providing reasonably accurate results (Luenberger 1998). The research uses a binomial lattice approach with an *ex ante* perspective from the planning stage of the project, similar to the Dulles toll road research by Garvin and Cheah (2004).

HYPOTHESIS TESTING

If the hypothesis is true, we shall observe the following phenomena from the sample:

- i. renegotiation will be initiated by the party that has a decreased share of the value relative to risks assumed, compared to the initial distribution at the signing of the contract
- ii. renegotiation will be initiated after the project value relative to risks assumed changes significantly in favour of the other party.
- iii. the renegotiation rate of these projects will be higher than the typical renegotiation rate observed by Guasch (2006)

The above three observations will be made and recorded to test the hypothesis.

REFINE THE HYPOTHESIS

After the initial observations have been made, in depth analysis of each of the project cases to understand when, why and how the renegotiation process takes place will be described in detail. It allows researcher to shed more light on the conditions and timing of renegotiation as projects are confronted with changes in project value and risk. For instance, does the concessionaire initiate renegotiation as soon as they realize construction costs escalate, or do they wait until the early operation period in case the revenue might be higher than expected to compensate them for the increased construction costs?

VALIDATION

To show that renegotiations observed in the focus cases were caused by the change of equity and risk distribution, the renegotiated level of equity distribution should be somewhere between what is agreed in the initial contract and the level when renegotiation was initiated. The logic is that either the concessionaire or the government seeks to reset the equity distribution to a level closer to the original agreement, when the value of the project changes significantly.

In addition, personal interviews will be conducted with practitioners who were involved in the case study projects. Reasons for renegotiations as well as recounts of important events will be carefully recorded. The interview data will provide a qualitative validation for the hypothesis being investigated.

PREDICTED IMPACT

Trigeorgis (1991) calls for empirical case studies with real data as the most important prerequisite for future developments of the real options model. Since his call, a number of CEM researchers have applied ROA on actual infrastructural projects. However, the list remains short. The empirical nature of this research will provide another step toward further understanding the potential and limitations of applying ROA in the context of infrastructure projects.

This research will be among the first applications of the real option pricing model on the entire lifecycle of a set of case study infrastructure projects. Other scholars have compared project values using both traditional methods and real option pricing in specific areas, such as project deferments (Garvin and Cheah 2004) or debt guarantees (Ho and Liu 2002). This research furthers knowledge of applying the real option pricing model to infrastructure projects by going through multiple phases of a project's lifecycle. It provides an empirical illustration of applying the real option pricing model to trace the evolving values of actual projects, providing other scholars a reference to capture and analyze changing project values in future studies.

In his paper that lays out a vision for Construction Engineering and Management (CEM) research for the next 50 years, Levitt (2007) calls for studies going beyond the focus of construction cost minimization that dominated the last five decades of CEM research. Instead, he urges engineering scholars to assume a bigger role in establishing economically, environmentally, and socially sound projects. Specifically, he urges CEM scholars to “develop alternative funding methods and governance approaches for public-private financing of infrastructure in emerging markets” that would “sustain their economic viability through multiple changes of government” (Levitt 2007, p.624). While that is a very daunting task that will involve scholars from disciplines of political science, economics, and engineering, this study is one small step in the collective effort to further understand the dynamics of cooperation between government and private parties.

The perspective presented in this study suggests renegotiations are necessary and efficient means to restore equitable levels of risks and benefits to both the governments and investors, instead of viewing them as opportunistic behaviour by either party. It can potentially provide practitioners alternative ways to set up governance arrangements for rebalancing risk and reward to promote private investment in infrastructure developments. In order to make private funding in public infrastructure development sustainable, both the government and the investors must agree that reasonable levels of risk and profit are shared between the two parties. This study is a modest attempt to facilitate the process of enabling mutual benefits for stakeholders in infrastructure deals. This study aims to help make the joint infrastructure development effort between governments and investors more sustainable.

LIMITATIONS AND FUTURE RESEARCH

There are a number of key limitations of the study. Firstly, the analysis on a small number of focus case studies will not warrant a high level of external validity. While consistent observations from a larger sample size would warrant stronger claims about the relationship between change of equity distribution and occurrence of renegotiations, focusing on a smaller number of cases would allow more in depth discussion of the process on how risk-benefit distribution differentials lead to renegotiations. Once the process of how risk-benefit imbalance may lead to renegotiation has been tested and understood at a project level in this research, future studies can further validate the hypothesis by performing statistical analysis on a larger number of cases.

Secondly in this research, the evolving value of a project is represented by its equity value. Although most negotiations surround financial terms such as toll limits and concession period, governments, constituents and media will also evaluate the success of a project in other non-monetary terms. Successful development of light industries in the region due to new stable electricity supply may be more rewarding to the local government than a fair distribution of financial risk and reward. Future studies can investigate ways to capture the value of price of these intangible elements into the calculation of a project's valuation.

Researchers can also apply the findings from this research to design more efficient PPP contracts. The hypothesis in this study generally suggests that renegotiation is a means for stakeholders to rebalance their risk and benefit exposure. Future studies can explore specific ways to ensure fair and effective renegotiation schemes between governments and private investors during the post-contract period. Good governance is vital to developing PPP into an effective means to address the infrastructure development needs around the world.

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Delay and its consequences in construction of Iranian petrochemical plants

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ABSTRACT

The study investigated delay in petrochemical construction projects in Iran. It identified the main causes of delay as: delay in material delivery, material shortage, lack of skilled human resource, inflation and unrealistic planning during bidding. The research also showed that 91% of these projects have suffered from delays with an average amount of 63% of the planned duration. However only 58% of the projects reported major dispute caused by delay and only 29% of them has experienced payment of liquidation damage or any other form of penalties. This low rate of litigations can be explained by some dimensions of Iranian culture, mainly high collectivism and high power gap which results in pushing all decision making processes to the top layer of management.

Keywords: Delay, Construction, Culture, Petrochemical, Iran.

1 INTRODUCTION

Delay is globally known as an endemic problem and one of the main causes of disputes and litigations in construction industry. Many scholars have been studied delay and time extension in construction industry; however most of these studies are focused on building section. From early 1990's National Petrochemical Company (NPC) of Iran invested heavily in the development of petrochemical plants. As a result production of petrochemicals increased from 2.8 million tonnes in 1990, to 15.8 million tonnes in 2005, with an estimate of reaching to 23.6 by 2007 (Aik and Adibi, 2005). The petrochemical plants capacity currently under construction in Iran is higher than those in service in the Europe (Etemadzadeh et al., 2006). However most of these projects suffer from adverse delays. Petrochemical industry is a capital intensive industry and delay in the projects can challenge viability of the projects. According to Kovac (2007) construction of a world scale ethylene plant would cost 1.5 billion USD in 2000 but the same plant will cost 4 billion today. Considering above mentioned facts, the main question of this research can be expressed as: "what are the main causes of delays in Iranian petrochemical project?"

The paper starts with a review on previous works on causes of delay, then describes the research methodology, and at the end presents the findings and discusses them according to cultural coordinates of Iranian construction industry.

2 PREVIOUS STUDIES

The concept of 'ironic triangle' indicating the dynamics of time, cost and quality is widely acknowledged as a metric for measuring project success since 1960s (Jugdev and Müller, 2005). Even though delays still occur in construction projects even in developed countries. The average time overrun for UK government construction projects for period 1993-1994 was 23.2% (HMSO, 1995). Egan report published in 1998 describes construction industry in the UK as 'Widely unpredictable in terms of delivery time, within budget and the standards of quality expected.' Another report by the National Audit Office in 2001 under title of 'Modernising Construction' states that 70% of projects undertaken of projects undertaken by government departments and agencies are delivered late. Situation in developing countries is even worse (Arditi, 1985 and Kovac, 2007). According to the World Bank cited by Bardoli and Baldwin (1998) 1627 projects supervised by world bank between 1974 and 1988 shows between 50% and 80% overrun.

Even today despite all strategies in the avoidance of delay, it is accepted as a fact with the construction industry. Gardiner and Stewart (2000) state 'It would be a conservative estimate to say that approximately 50% of construction project over run', and Wright (1997) points out 'Good rule of thumb is to add a minimum of 50% to every time estimate, and 50% to the first estimate of budget'.

Many definitions have been provided for this familiar concept, among them Stumpf (2000) defines delay as 'an act or event extends the time required to perform the works under the contract.' Callahan et al. (1992) describe delay as 'the time during which some part of construction project is completed beyond the project completion date or not performed as planned due to an unanticipated circumstance.'

Delay is a comparative concept and by definition has to be measured using benchmarks. In construction industry the benchmark is usually the as-planned schedule.

Delays affect both client and contractor of the project. Client can be affected by losing benefits attributed to the completed facility and contractor may have to spend more on labour and plant, pay penalties as per contract or even lose other profitable contract because resources for the next job are tied up.

Delays have direct and indirect costs. Direct costs such as cost related to extra payment to labour and plant due to extension of work, and indirect cost such as increase in overhead cost due to change in weather condition. Delay also affects project cash flow not allowing incomes and increasing expenditures which can make the project commercially unviable.

Etemadzadeh et al. (2005) identified some of client losses due to delay in a oil and gas project as: (1) Expiration of warranty period of equipments; (2) Costs attributed to protection and preservation of material at aggressive weather condition; (3) Changes in technology and market demand.

Many scholars investigated the causes of delay and results of these studies are summarised in table 1, below.

Table 1- Identified causes of delays in previous studies.

Scholar/year of study	Country	Main Causes of Delay
National Economic Development Office (1970)	UK-Industrial	Late delivery of material or plant; late design change; unexpected low labour productivity; labour disputes and skilled human resource short

Mansfield (1994)	Nigeria	Financial and payment arrangement factors; poor contract management; material shortage; inaccurate estimation and overall price fluctuations
Chen and Kumaraswamy (1997)	Hong Kong	Poor site management and supervision; unforeseen ground condition; speed of decision making involving all project team; client initiated variations; necessary variations of work.
Kaming et al (1997)	Indonesia	Design change; poor labour productivity; inadequate planning and shortages
Noulmanee et al (1999)	Thailand-highway	Incompetency of sub-contractors; lack of resources in involved organizations; Incomplete and unclear drawing; poor communication between contractor and consultant.
Al-Momani (2000)	Jordan	Poor design and negligence of the owner, change orders, weather condition, site condition, late delivery of material, economic condition increase in quantities
Keladinos (2001)	Greece	Obtaining required permits; bureaucracy in organizations; poor planning site location; change by owner
Oddeh and Battaineh (2002)	Jordan	Labour productivity; inadequate contractor experience; communication site management ; availability of equipment ; financing problems, delays caused by sub contractors, slow decision making by owner and improper planning.
Aibinu, A. and Jabbro, G (2006)	Nigeria	Contractor financial difficulties; Client cash flow problem; incomplete drawings; subcontractors incompetency; equipment breakdown, late delivery of material, planning problems, price escalation and subcontractor's financial problems.
Frimpong et al (2003)	Ghana - Water Projects	Financial difficulties; poor contract management; material procurement poor technical performance; and escalation material prices
Koushki, P. et al. (2005)	Kuwait	Change orders ; financial constraints; client's lack of experience in construction
Assaf and Hejji (2006)	Saudi Arabia	Change order by owner during the construction; delay in progress payment ineffective scheduling by contractor; poor site management and supervision by contractor; shortage of labours and financing problems contractor.
Faridi and El-Sayegh (2006)	UAE	Preparation and approval of drawings; slowness of owner organization decision making; inadequate early planning and lack of skill and productivity of manpower
Abdul-Rahman et al. (2006)	Malaysia	Financial problems, client influence, and resource problems and poor management; client influence, design problem, lack of resource, construction method and poor site management.

Sambasivan and Soon (2007)	Malaysia	Contractor improper planning; contractor poor site management; inadequate contractor experience; inadequate client's finance and payment problem with subcontractors; shortage in material; labour supply; equipment availability and failure; lack of communication between the parties; error in construction.

3 METHODOLOGY

This study investigates Iranian petrochemical construction projects performed during the last 15 years in Bushehr and Khuzestan provinces (by the Persian Gulf) using a questionnaire survey. Structure of the questionnaire and administration method is described below.

3.1 Questionnaire Structure

The questionnaire is designed in five sections as follows:

Section A - Project Information.

This section consists of:

- A brief description of the project
- As-planned and as-built duration of the project
- Type of contract
- Value of the contract
- Role of the respondent's organisation in the project.
- Payment mechanism
- Basis of project award

This information helped the author to identify correlations between the delay and characteristics of the project, and also can be used for assessing samples.

Section B- Main Causes of Delay

In this section a list of potential causes of delay based on literature review and comments by experts in Iranian construction industry is provided, and respondents are requested to evaluate significance of each cause. Since the responses are related to different types of the project some of the factors may not be applicable for a special project therefore "Not Applicable" choice has been considered in the questionnaire.

Section C- Delay mitigation Methods

A list of main delay mitigation techniques based on literature review are provided and, and respondents are asked how frequently they use each technique.

Section D- Consequences of Delay:

The questions in this section try to identify how severe the consequences of delays are. Respondents are asked if the delay has led to a major dispute or payment of liquidation damage, and also the delay analysis technique which has been adopted.

3.2 Questionnaire Distribution and Rate of Response

The questionnaires were distributed between clients and first class contractors who are engaged in oil, gas and petrochemical projects. Table1 shows rate of responding for different groups

Table 2- Rates of response

	Number of submitted questionnaires	Number of respond	Rate of Respond
Contractors	45	30	66.6%
Clients	20	4	20%

4 ANALYSIS OF THE RESULTS

As mentioned in the methodology chapter the questionnaire was distributed among 40 design and construction contractors, out of which 30 contractors and 4 clients responded. These responses form the basis of the analysis.

4.1. Amount of Delay

The survey shows that 31 projects out of 34 projects (i.e. 91% of total) have experienced delay and the average of delay in the projects is 63.4% of the estimated duration.

4.2. Value of Contracts

In order to decrease commercial sensitivity, range of contract values has been asked instead of the exact value. All Prime contracts have values over 100 million USD, however secondary construction contracts have lower values. Table 3 shows range of value for studied projects:

Table 3 - Value of the projects

	1 to 10M USD	10 to 50 M USD	50 to 100M USD	Over 100M USD
Number of Projects	7	5	1	21
Percentage	20.6%	14.7%	2.9%	61.7%

4.3. Project Award Basis

The result of the survey shows that 76.5% of the project have been awarded based on minimum price and the remaining 23.5% have been awarded based on negotiating bidding. Two out of three projects which have not experienced delay had been awarded on negotiation bidding basis.

4.4. Payment Mechanism

It is believed that type of contract can influence the efficiency of work (Burke, 2003 and Murdoch, 2006). There are three major types of payment in construction projects which are cost reimbursable, fixed price and unit price. In order to investigate this matter the respondents have been questioned about mechanism of payment in their project. The results are as follow:

This study shows that the 28 projects have fixed price, and the 6 remaining are based on unit prices. None of the projects was cost reimbursement.

Table 4 - Correlation between types of payment and amount of delay in the studied projects

Payment Mechanism	Number of projects	Ratio to Total Number of Projects (%)	Average delay percentage
Fixed Price	26	76.5	58.68
Unit Price	8	23.5	79.89
Cost Reimbursement	0	0	0

Despite the fact that unit price projects are all relatively small projects with contract value below 50 million USD it can be seen that the average of delay in this type of contracts are higher than that of fixed price contracts.

4.5 Causes of Delay

The significance of causes of delay was quantified by calculating Relative Importance Index (RII). Many researchers among them Sambasivan (2007), Al-khalil (1999) and Kometa et al. (1994) have used this procedure before.

A three point scale, 1, 3 and 5 relatively for Low significant, medium significant and high significant, was used and Relative Importance Indices for each factor was calculated using following equation:

$$RII = \frac{\sum W}{A \times n}$$

Where W is the weighting given by respondents to each factor, A is the highest weight (i.e. 5 in this case) and n is the total number of respondents. The value of RII ranges from 0 to 1 and the higher value shows more importance of the related factor.

Previous studies such as those made by Chen and Kumaraswamy (1997), Oddeh and Battanieh (2002) and Assaf (2006) show that clients and contractors have different views regarding significance of delay factors. Therefore in this study responds of these two groups were analysed separately.

Figure 1 compares importance of each factor from client and contractor's perspective. It can be seen that in both rankings 'delay in material delivery', 'material shortage', 'lack of qualified human resources' and 'unrealistic Unrealistic estimation and imposed duration at bidding stage' are among the top five causes of delay. More over in both lists 'language barrier' and 'software shortage' are the least important factors.

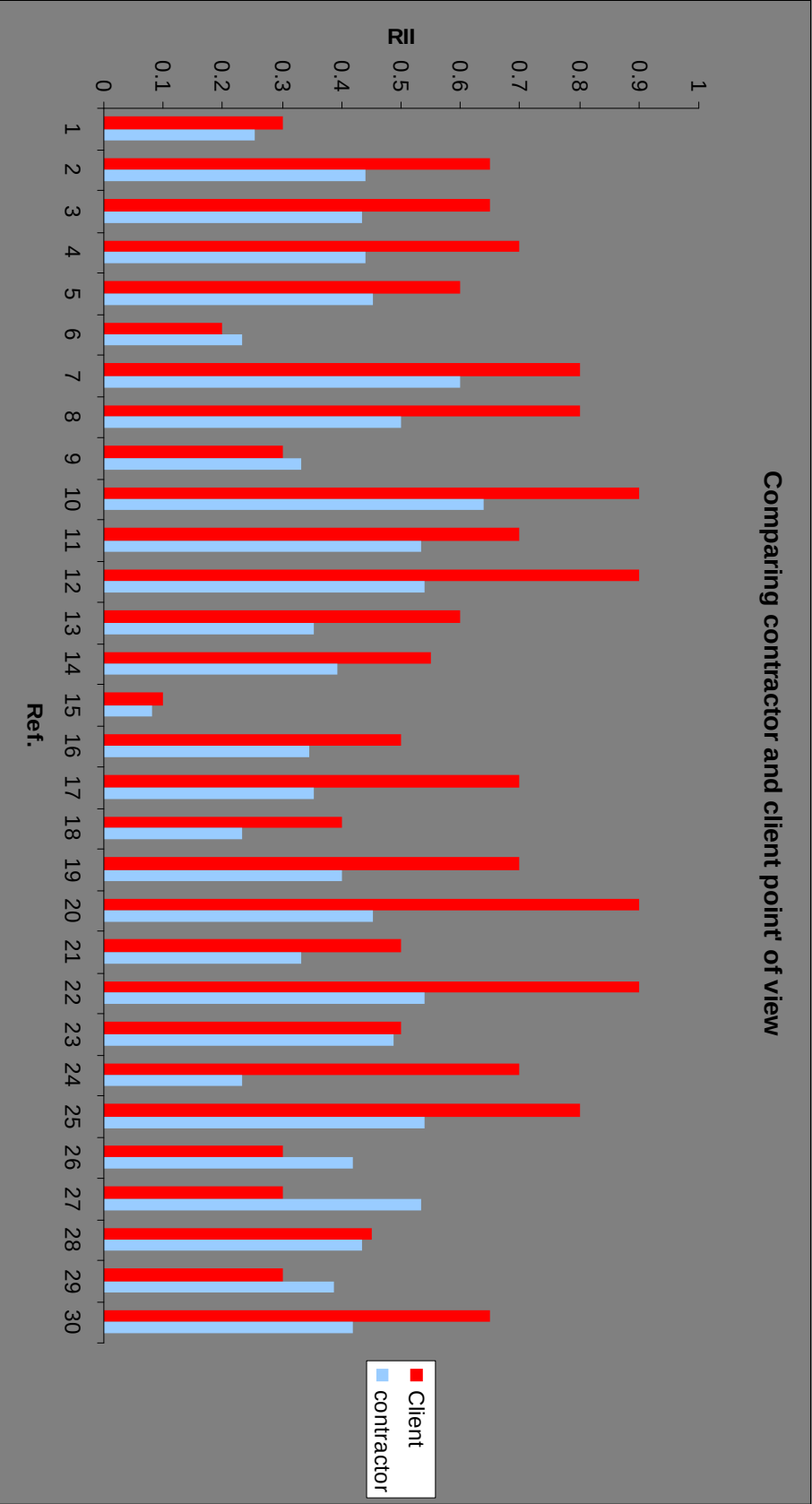


Figure 1. Comparing client and contractors points of view on significance of delay factors. (1) engagement in other projects; (2) control; (3) planning; (4) intra communication problems; (5) communication problem with others; (6) language barrier; (7) material shortage; (8) unavailability of material in local market; (9) procurement errors; (10) delay in material delivery; (11) subcontractors' problems; (12) lack of qualified human resources; (13) Design change by consultant; (14) design errors; (15) software shortage; (16) construction errors; (17) equipment shortage; (18) Unavailability of Common facilities at site; (19) Weather condition; (20) Ambiguity in contract and poor contract Management; (21) legal disputes between project parties; (22) unrealistic estimation and imposed duration at bidding stage; (23) delay in payments by client; (24) delay in payment to suppliers and subcontractors by contractor; (25) inflation and increasing costs; (26) unavailability of project fund; (27) owner interference; (28) design change by owner; (29) rules, regulations and bureaucracy; (30) waiting time for document approval.

5 DISCUSSION

5.1 The main causes of Delay

The results of this survey show that delay in material delivery, lack of qualified human resources, unrealistic estimation and inflation are the most significant causes of delay in Iranian petrochemical projects. These will be discussed in the following sections.

5.1.1. Material Shortage at Site

There are two main reasons for significance of material supply problem in the studied projects:

Type of Projects

The variety of materials required for construction of a petrochemical plant cannot be compared with that in a building project. Also many of materials are not shelf items and should be ordered and manufactured specially for a particular project. The lead time between order and delivery times for such materials may exceed a year. Therefore procurement of these items is a complex process and must be in accordance with project schedule. Any change in quantity or specification of long delivery items can lead to major delays in material delivery and subsequently completion of the project.

Rules and Regulations

In March 1996 the act of 'maximising exploitation of national engineering and industrial capabilities in major project' has been passed by the Iranian parliament. Article 3 of this act states:

"All engineering and construction contracts shall be awarded to Iranian contractors, or to a joint venture of Iranian and foreign companies in which the Iranian party(s) own at least 51% of the total share."

And the 1st proviso adds:

"The contractor shall procure all materials, equipments and services which are or can be available in the country locally. In any circumstances at least 51% of contract value shall be procured locally".

However in some cases local manufactures have not enough capacity to cope with demand of market, therefore they cannot meet committed target dates for material delivery.

5.1.2. Lack of Qualified Human Resources

During the past decade establishment of foreign- Iranian joint ventures had a great role in transfer of technical and management knowledge to Iranian contractors and many people have been trained in different levels of engineering and management in jointly performed projects, however the lack of skilled people and qualified contractors is still a problem.

(Hariharan et al., 2005)

5.1.3. Unrealistic Estimation

According to [Lowsley and Linnet \(2006\)](#) there are two general approaches for setting the construction period:

- Assessing how long a project with degree of complexity of the considered project will take to complete based on historical data related to similar projects and norms of industry.
- The duration is set by simple calculation of difference between earliest possible date for starting the project and the target date for completion required by the client.

Competitive biddings are usually a combination of these two approaches, the more competitive the market the more weight can be put on the second approach. In Iranian construction industry almost all of the contracts are awarded on competitive bidding basis, therefore contractors usually accept the clients' construction period but try to collect evidences for time extension request from the outset.

5.1.4. Inflation and Increasing Costs

Inflation and increase in the cost of materials and services can cause disputes between contractor and client. Although escalation clauses are usually foreseen in the contracts reaching agreement takes time and can affect project duration. The same can happen between contractor and material suppliers who provide long delivery items (such as steel structure and mechanical equipments) and subcontractors. In cases where contractor, subcontractor or material suppliers are financially stable they can withstand change in prices and continue work while discussing the issue with client however those who are not financially stable cannot tolerate price changes and have to stop the work.

5.2. Consequences of Delays

Section D of the questionnaires is about consequences of delay Analysis of this part shows that despite the fact that more than 91% of the studied projects are suffered from delays and average amount of delay is 63.4%, only 58.8% of the projects reported major disputes and only 29.4% of them have experienced payment of liquidation damages or penalties. This might be explained from two different perspectives: Technical perspective and cultural perspective.

5.2.1. Technical

Some of the contractors which have been questioned believe that this fact by itself shows that most of the delays are client-caused, and the clients accept this issue indirectly by not requesting liquidation damage or penalties.

Other causes for not requesting compensation for delays can be lack of project management knowledge and experience and problems with record keeping during the project execution phase.

5.2. 2. Cultural

Hofstede (2001) and Yeganeh (2007) show that Iranians are characterized by high degree of collectivism. According to Yeganeh (2007) the collectivistic orientation of Iranian culture may

also be related to the importance of the family, which is the primary building unit of the Iranian society. In Iranian culture family is not limited to wife, children and siblings; it may extend to friends and acquaintance and make very complicated networks.

According to Yeganeh (2007) Iranian society tends to operate on interpersonal human based relations rather than dehumanised institutions. Personal connections and informal channels are considered more practical than formal ineffective channels (Schramm-Nielsen et al., 2002).

Another outcome of Hofstede study is relatively high power gap in Iranian organizations. Yeganeh (2007) supports results of Hofstede (2001) in this regard and describes power distribution in Iranian organizations as 'top-down authority'. In such a condition most of decisions are pushed upward and taken care of by top management.

By combination of 'authority' and attitude toward developing 'interpersonal relations' it will not be strange to see that the most complicated problems will be resolved in so-called '*Top Management meetings*' in the absence of middle managers on a tit-for-tat basis. In most of the investigated projects client was NPC (or its subsidiaries) and major contractors usually have several project in hand at the same time, it is highly probable that in an Alternative Dispute Resolution (ADR) process client waived his right to claim for delay and in return contractor accepted to provide client with a service such as implementing variations or performing an out of scope activities in another project free of charge.

Schramm-Nielsen et al. (2002) points to this point and state:
'Through a system of exchanging favours in informal relationships Iranian are used do each other favours to an extent far beyond what is common among most westerners.'

6 CONCLUSION

This study identified main causes of delay in construction of Iranian petrochemical plants as material Shortage at Site, Lack of Qualified Human Resources, Unrealistic Estimation and Inflation. It also showed that despite high rate of delay in the projects only small portion of them have experienced payment of liquidation damages or penalties. This observation can be explained in two ways: first, lack of experience in management of major projects and problem with record keeping, and second high degree of collectivism and power distance in Iranian organizations which can be a good foundation for ADR.

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The Partnership Risks and Management Strategies of International Joint Ventures of Turkish Contractors

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ABSTRACT

Contractors take advantages of forming international joint ventures (IJVs) in several ways. Although an IJV has significant advantages, it also consists of several risks. A study is carried out in order to ascertain the partnership risks, which appear in an IJV, Turkish contractors generally confronted with and to define management strategies implemented against these risks. In order to achieve these purposes a field survey is conducted to the Turkish contractors which have been operating / had operated in an IJV. This paper presents the most significant results from the field survey and focuses on the partnership risks and management strategies of IJVs of Turkish contractors.

Keywords: Turkish contractors, international joint ventures (IJVs), partnership risks, risk management strategies.

1. INTRODUCTION

Today, construction projects have gradually become more complicated and extensive, requiring more technical specialization. While risks caused by this complexity added to the basic risks inherent in the unpredictable nature of the construction activities, contractors collaborate to create joint ventures (JV) to complement each other's weaknesses. Contractors take advantages of forming JVs in order to enter new international construction markets. To form a JV not only gives the opportunity to the foreign partner to enter new markets that would not be individually accessible, but also reduces the significant risks which totally affect the project. On the other hand, international joint ventures (IJVs) enable domestic partners to reach an advanced technological level through collaboration with international firms possessing superior technology.

However, IJV projects do not always succeed at the expected level. One of the most important reasons of this failure is the risks that caused by the partnership of firms which differ from each other in terms of economic situation, specialty, resources, technology, management techniques and culture. To minimize the disadvantages caused by these risks; it is necessary to define partnership risks correctly, to develop management strategies against these risks and to take into consideration all these solutions beginning from the planning phase.

This paper presents the results of a field survey which applied to the Turkish contractors which have been operating / have operated in an IJV. The aim of the study is to ascertain the partnership risks that Turkish contractors are generally confronted with and to define management strategies implemented against these risks.

2. CHARACTERISTICS AND ADVANTAGES OF INTERNATIONAL JOINT VENTURES

JV is a partnership structure that is formed between two or more firms by establishing a permanent or temporary firm in order to perform new activities and supported by financially, technically and commercially. This new structure is called as “International Joint Venture” (IJVs) if one of the partners is from a different country.

Changes in the global economy provide new opportunities in the architecture, engineering and construction industry and also allow domestic construction firms to compete with international ones. In the construction industry, contractors associate their resources not only to adapt themselves to the changing conditions, but also to compete in the global construction industry. On the other hand, construction projects have gradually become more complicated and extensive requiring a higher level of technical specialization. As the risks caused by this complexity add to the basic risks lie in the unpredictable nature of the construction activities; it is really difficult for a contractor to confront these risks alone. For these reasons, contractors which posse different strengths form IJVs by complementing each other's weaknesses in order to collectively bid and conduct projects (Kumaraswamy, 2000).

The number of the IJVs has been increasing day by day over the world. Especially in developing countries, IJVs develop the national economy in terms of preventing the dominance of foreign investors on the economy (Mohamed, 2003). Contractors take advantages of forming IJVs in order to enter new international construction markets. Moreover, to form IJVs gives the opportunity to the foreign partner to enter new markets that would be inaccessible on an individual basis (Gillespie, 1990). Advantages of forming IJVs can be listed as:

SHARE OF RISKS: IJVs allow contractors to share risks in projects that need considerable responsibility. IJV partners can divide the project into phases that can easily be managed and each partner can be responsible in its own phase.

ASSOCIATE RESOURCES: Contractors aim to take advantage of IJV by associating their resources, experiences and capabilities in order to bid for international projects (Becker and Herzog, 1992). An IJV formation facilitates the achievement of required aims by associating strengths of partners. Moreover, an IJV partnership allows small and middle sized contractors to bid for an extensive project and increase their chance being the preferred bidder in an international project (Haley, 1994).

TECHNOLOGY TRANSFER: Generally domestic contractors take the advantage of technology transfer by forming IJVs. Domestic contractors can reach the required technology by operating with international contractors which use excellent technology (Gillespie, 1990).

ENTER NEW CONSTRUCTION MARKETS: In construction industry contractors form IJVs in order to enter a new construction market. In an IJV international partner not only has the chance of entering a new market, but also gains the opportunity to overcome the cultural differences and language barriers (Harrigan, 1986).

INCREASE OF R&D ACTIVITIES: Economic and technological changes have shown a very high speed and this speed has rendered Research & Development (R&D) activities cost and risk prone. Contractors want to work together and form IJVs in order to share these costs and risks that arise from R&D activities.

POLITICAL ADVANTAGES: International partner provide political support by working with the domestic one. Especially when the bureaucracy is slow and government policies are uncertain, good relations of domestic partner with the government is an important factor that influences the success of the IJV. Increasing economic nationalism in several countries causes some formal or informal restrictions to the international contractor. On the other hand, problems of importing foreign machines and equipments to the domestic country and tax problems can be solved (Gillespie, 1990).

3. RISK MANAGEMENT IN INTERNATIONAL JOINT VENTURES

As a result of the formation of IJVs, contractors which differ from each other in terms of their culture, organizational structures, management methods, technical knowledge, specialities, financial possibilities and resources, have to collaborate. Although these different characteristics provide advantages for them, they consist of several risks. In this context, it is really important to analyze these risks which arise from the IJVs and risk management techniques for the success of IJVs.

3.1 Studies on the Risk Management in International Joint Ventures

Several studies have been made on risk management in IJVs of different countries such as in China (Zhi, 1995; Shen et al., 2001); East Asia (Bing et al., 1999); Australia and United Kingdom (Mohamed, 2003); Egypt (Maged and Mohamed, 2004).

A case study in China was made in order to develop a method of managing various risks for overseas construction projects. A useful risk assessment technique is determined and the means of effectively identifying the vital risks in overseas projects is discussed (Zhi, 1995). Another study in China was made to establish a risk significance index to show the relative significance among the risks associated with the JVs in the Chinese construction industry (Shen et al., 2001). The study examined real risk cases and investigated several practical risk management strategies which can be used in the business of JVs. Moreover, a study was conducted to identify the most critical risk factors in IJVs in East Asian countries and to investigate the most effective management strategies in mitigating these risks (Bing et al., 1999). The risk factors associated with IJVs are identified and are grouped into three main groups as internal, project-specific and external. Moreover, eight appropriate strategies were developed to mitigate these risk factors. Another study was made on IJVs formed by Australian and British contractors in order to examine the relationships between reported risk / success factors and the performance of IJVs. The study examined the effect of key processes such as partner selection, venture formation, and operation on venture performance and advocated that selecting a suitable complementary local partner and adopting a proactive risk management strategy are vital antecedents to successful venture performance (Mohammed, 2003). The study that was undertaken in Egypt aimed to determine the risks cause failure of IJVs. In this study, several risks arise from the IJVs operated in Egypt, were analyzed in terms of their effectiveness (Maged and Mohammed, 2004).

3.2 Risks of International Joint Ventures

Risks which arise from the IJVs can be grouped as follows:

PARTNERSHIP RISKS: Partnership risks are can be grouped such as; incoordination caused by the wrong choice of the partner, managerial incoordination between the partners, financial problems of the partner, conflict on the budget planning and allocation of profit / loss, lack of confidence between the partners' employees, lack of technical knowledge of the partner, insufficiency of resources (material, equipment and so forth) of the partner, conflict on the

allocation of employees' positions, exorbitant intervention of each partners' main offices, conflict on the allocation of the tasks, incoordination caused by the different social, cultural, religious characteristics of the partners, managerial changes at the partners' main office, technological incoordination and problems related to technology transfer between the partners, problems caused by insufficiency of legal issues about JV partnerships.

FINANCIAL RISKS: Financial risks cause increases of expected costs on construction projects. These risks are caused by the economic structure of the domestic country, owner and the construction work itself. Financial risks can be grouped as; currency fluctuations, interest and inflation rate fluctuations, currency restrictions, cash flow and progress payment problems.

MANAGERIAL RISKS: Each project is almost unique and there are a large number of project participants with different specialties and multiple interrelated work flows in the construction industry. This renders the project complex and fragmented. In this complex and fragmented structure, construction projects management becomes a really important issue. In this context, any breakdown in the project management process can give rise to important risks. On the other hand, in case of an IJV project operated by contractors from different characteristics; project management issue becomes much more critical because; the number of project participants increases and construction process is more complicated. Managerial risks can be grouped such as; insufficiency of the project management team, insufficiency of the coordination between project participants, wrong or insufficient feasibility studies, wrong project and budget planning, organizational changes in the domestic partner, and weakness of the relationship between government and partners.

POLITICAL AND ECONOMIC RISKS: Political risks consist of changes on the government policies, laws and regulations; restriction on the capital repayments and imports. Moreover, political and economic crisis damages the political and economic stability of the country. These risks affect construction projects in terms of legal licences, permissions, specifications, employees' wages, taxes, imports of materials and project finance. On the other hand, one of the most important problems is the adaptation of the international partner to the local market and industrial conditions. Political and economic risks can be grouped as; changes of the political staff, cost increases due to the political changes, changes on the laws and specifications, war, embargo, loss caused by bureaucracy and restriction of foreign capital.

CONSTRUCTION RISKS: Construction risks are the risks which arise during the performance of construction project process. These risks prevent the project from being completed in the expected time, budget and quality. Construction risks can be grouped such as; design changes, design, specification and material / equipment defects, material / equipment shortage, supply chain breakdown, lack of the quality of materials, construction site accidents, lack of reliability of subcontractors, lack of qualified employees, lack of coordination during the conduct of construction process, problems caused by different application techniques of the partners and incoordination between the design and the construction technology.

SOCIAL AND CULTURAL RISKS: Social risks consist of factors such as language, culture and religion barrier, security problems, and problems on the system of justice of the domestic country. One of the most important problems is the adaptation of the international partner to the social and cultural system of the domestic country. Social and cultural risks are, losses caused by insufficient laws, uncertainty of the system of justice, problems caused by culture differences, language and religion.

ENVIRONMENTAL RISKS: Environmental risks can be grouped such as; natural disasters (earthquake, avalanche, landslide, storm, lightning, flood and so forth) and environmental pollution.

Although IJVs consist of several risks, it is necessary to deeply analyze “Partnership Risks” as they are the specific ones for the IJVs. As a result of this, a field survey is conducted in “The Partnership Risks and Management Strategies of International Joint Ventures of Turkish Contractors”.

4. FIELD SURVEY ON THE PARTNERSHIP RISKS AND MANAGEMENT STRATEGIES OF INTERNATIONAL JOINT VENTURES OF TURKISH CONTRACTORS

4.1 Purpose and Methodology

Turkish contractors form IJVs not only to associate resources, share risks in extensive projects, but also to enter international construction markets. They have to cooperate with firms have different cultures, organizational structures, management methods, technical knowledge, specialities, financial possibilities and resources. This situation presents several risks. In this context, a field survey is conducted to ascertain the risks that Turkish contractors generally confronted with and to analyze the solutions generated to cope with these risks.

A questionnaire has been developed to collect data from participants of the field survey. Firstly, an electronic mail included an explanation of the study objectives, instructions and the questionnaire itself were sent to the Turkish contractors which have been operating / have operated in an IJV. Besides, questionnaires were filled with participants who have been performing / have performed in an IJV. The total response number is 29 and 11 of them face-to-face and one-on-one interview.

The questionnaire is divided into four parts. The first part consists of questions about the personal information of the survey participant. The second part of the questionnaire concerns structure of the IJVs which the participant performed in. In the third part of the questionnaire, the participants are asked to ascertain the partnership risks through their grades of importance. The last part of the questionnaire aims to determine management strategies implemented against these risks.

4.2 Field Survey Findings

As a result of the field survey, 62% of the IJVs have two partners and 38% of them have more than two partners (Figure 1).

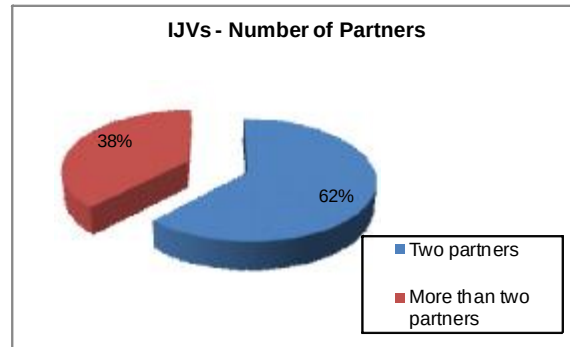


Figure 1. IJVs – Number of partners

86% of IJVs have a pilot partner and 14% of them have not (Figure 2). Moreover, 79% of the field survey participants agree with the existence of a pilot partner (Figure 3).

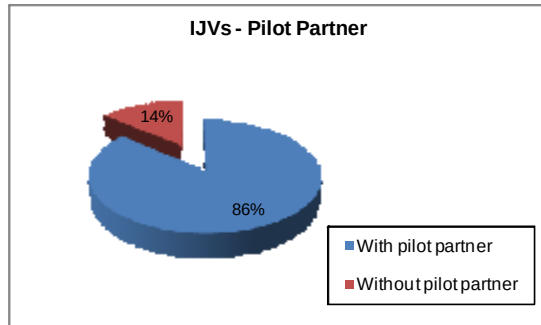


Figure 2. IJVs – Pilot Partner

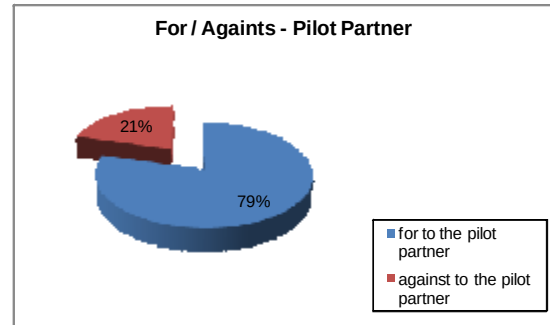


Figure 3. For / Against – Pilot Partner

The field survey participants emphasized that partnership risks increase with the number of partners. They also determined that if one of the partner acts as a pilot partner, it could prevent management conflicts, could provide more effective management and problems could be quickly solved.

4.3 The Partnership Risks and Management Strategies of International Joint Ventures of Turkish Contractors

A Likert scale of 1-5 was used in order to determine the partnership risks and their grades of importance. A list of partnership risks are given to the field survey participants and they are asked to determine their grades of importance (1- not important, 5- the most important). Furthermore, participants are also asked to arrange the risk management strategies due to their priority ranks (1- least preferred, 5- the most preferred). The ranking of the 14 partnership risks are shown in Table 1.

Table 1. Partnership Risks

Rank	PARTNERSHIP RISKS	Mean
1	Incoordination caused by the choice of the inappropriate partner	4,48
2	Managerial disorganization between the partners	4,14
3	Financial problems of the partner	4,13
4	Conflict on the budget planning and allocation of profit / loss	3,86
5	Lack of confidence between the partners' employees	3,52
6	Lack of technical knowledge of the partner	3,38
7	Insufficiency of resources of the partner	3,21
8	Conflict on the allocation of employees' positions	3,14
9	Exorbitant intervention of each partners' main offices	3,13
10	Conflict on the allocation of the tasks	3,04
11	Incoordination caused by the different social, cultural, religious characteristics of the partners	2,83
12	Managerial changes at the partners' main office	2,82
13	Technological incoordination and problem on the technology transfer between the partners	1,93
14	Problems caused by insufficiency of legal issues	1,90

According to the Table 1 out of 14 partnership risks; 3 of them are evaluated as the most important with the mean score of over 4, 7 of them are evaluated as important with the mean score of over 3, 2 of them are evaluated as less important with the mean score of over 2 and 2 of them are evaluated as unimportant with the mean score of over 1.

Contractors have to determine their risk management strategies due to the grades of importance of these potential risks. The most important risks are the risks which have to be mostly considered and prevented. However, the probability of the emergence of less important and unimportant risks is really low. In this context, notice of the grade of importance of potential risks is essential for an effective risk management.

This paper only focuses on the risk management strategies developed against partnership risks which have high grades of importance. Besides, other strategies are only given by a list.

4.3.1 Risk Management Strategies Developed Against the Most Important Risks

Risk 1 - Incoordination Caused by the Choice of the Inappropriate Partner: According to the field survey, this risk is evaluated as the primary and the most important one with the mean score of 4.48. The choice of the partner is essential for the formation and life-cycle of the IJVs. Especially this choice is critical when the IJV is operated in a country which has a dynamic and complicated economic structure. In such a country, the right choice of the partner facilitates the adaptation of the IJV to the circumstances and decreases uncertainties. Table 2 shows the first three risk management strategies developed against the case of incoordination caused by the wrong choice of the partner.

Table 2. Risk Management Strategies for Risk 1

Rank	RISK MANAGEMENT STRATEGIES	Mean
1	Choosing a partner that complement technical knowledge and resources	4,58
2	Choosing a partner that has coherent objectives	4,31
3	Choosing a partner that has collaboration culture	3,97

1st Strategy - Choosing a Partner that Complement Technical Knowledge and Resources:

This strategy is the most preferential one in order to prevent the case of incoordination caused by the wrong choice of the partner. Partners should complement each other in several ways. Choosing a partner that complement technical knowledge and resources is crucial for the success of the JV. For this reason, it is necessary to analyze the candidate partners in depth..

2nd Strategy - Choosing a Partner that has Coherent Objectives:

Partners should not have different competitive strategies when they have been operating through the same objectives. In other words, partners should have coherent objectives and these objectives should not compete with each other.

3rd Strategy - Choosing a Partner that has Collaboration Culture:

The main aim of IJV formation is collaboration. JV can be successful only if there is collaboration with partners in terms of technical knowledge, financial possibilities and resources. Otherwise the performance of the JV decreases, if partners have problems in collaboration. It is more difficult to create collaboration culture among partners which are from different countries because; the culture difference affects the relationship and collaboration with the partners.

Risk 2 - Managerial Incoordination between the Partners: According to the field survey, this risk is evaluated as the second most important one with the mean score of 4.14. This risk is generally caused by the difference between management and control methods of the IJV partners. Table 3 shows the first three risk management strategies developed against the case of managerial incoordination between the partners.

Table 3. Risk Management Strategies for Risk 2

Rank	RISK MANAGEMENT STRATEGIES	Mean
1	Contractual clauses concerning JV management	4,48
2	Determining procedures in the case of conflicts	4,35
3	Managerial dominance of a partner	3,69

1st Strategy - Contractual Clauses Concerning JV Management: As JVs are managed by the administrative board and its sub-units elected amongst managers from partners; it is necessary to determine the structure and tasks of this board and its units in the contract.

2nd Strategy - Determining Procedures in Case of Conflicts: There can be several conflicts between JV partners so; there is a need about determining procedures and strategies in the case of conflicts. Contractors mostly prefer arbitration to litigation. In such a case, there

should be clear contractual clauses which explain which resolution methods are used, how the conflicts are resolved by arbitration or litigation, liabilities and fees.

3rd Strategy - Managerial Dominance of a Partner: In a JV management, one of the partners needs to be dominant in case of a conflict resolution. The dominant partner is also called as pilot partner or leader and generally holds the largest share. Pilot partner can prevent disagreements.

Risk 3 - Financial Problems of the Partner: According to the field survey, this risk is evaluated as the third most important one with the mean score of 4.13. This risk is crucial in the case of a bankruptcy, cash flow problems and so forth. Table 4 shows the first three risk management strategies developed against financial problems of the partner.

Table 4. Risk Management Strategies for Risk 3

Rank	RISK MANAGEMENT STRATEGIES	Mean
1	Choosing a partner that has credit worthiness and strong financial possibilities	4,41
2	Providing financial support from banks or other associations	3,13
3	Supplying extra capital from main office to the JV	2,35

1st Strategy - Choosing a Partner that has Credit Worthiness and Strong Financial Possibilities: It is necessary to deeply analyze the potential partner's credit worthiness and financial possibilities. Collaboration with a partner who has strong financial possibilities and credit worthiness are effective methods in decreasing financial risks.

2nd Strategy - Providing Financial Support from Banks or Other Associations: Providing financial support from banks or other associations is one of the mostly used methods in financing IJVs. However, this situation causes extra expenditures.

3rd Strategy - Supplying Extra Capital from Main Office to the JV: Although supplying extra capital to the JV provides solving financial problems; it causes extra expenditures to the supplier partner. Besides, it causes a capital increase for the supplier partner, while decreases the other partner's share.

Table 5 gives a list of partnership risks and their associated management strategies which were not ranked as high important according to the field survey.

Table 5. Risk Management Strategies for Other Partnership Risks

Rank	RISKS AND MANAGEMENT STRATEGIES	Ave.
4	Conflict on the budget planning and allocation of profit / loss	3,86
Str. 1	Correct and sufficient documentation, clear determination of works done and shared	4,34
Str. 2	Determining profit / loss allocation and budget planning in the contract process	4,21
Str. 3	Assigning an independent expert for profit / loss allocation	3,00
5	Lack of confidence between the partners' employees	3,52
Str. 1	Allocating employees' tasks and making definite job descriptions	4,48
Str. 2	Choosing employees carefully	3,76
Str. 3	Providing employees join with each other	3,34
6	Lack of technical knowledge of the partner	3,38
Str. 1	Collaborating with specialized firms when there is a need of technical specialization	4,44
Str. 2	Allocating tasks according to the partners' technical knowledge	4,11
Str. 3	Choosing the partner according to its past success	3,97
7	Insufficiency of resources of the partner	3,21
Str. 1	Determining the quantity of resources transferred by the partners in the contract	4,20
Str. 2	Choosing a partner that can provide required resources	4,07
Str. 3	Allocating tasks according to the partners' resources	4,07
8	Conflict on the allocation of employees' positions	3,14
Str. 1	Clear determination of employees' positions in the contract	4,35
Str. 2	Determination of employees' positions by JV management	3,13
Str. 3	Negotiation when there is a conflict	3,10
9	Exorbitant intervention of each partners' main offices	3,13
Str. 1	Defining authorities and responsibilities clearly in the JV contract	4,35
Str. 2	Allocating tasks and responsibilities according to the capability of each partner	4,22
Str. 3	Granting autonomy to the CEO / general manager of the JV	3,97
10	Conflict on the allocation of the tasks	3,04
Str. 1	Determining allocation of tasks in the contract	4,34
Str. 2	Determining allocation of tasks according to the capability of each partner	4,24
Str. 3	Determining allocation of tasks clearly	4,24
11	Incoordination caused by the different social, cultural, religious characteristics of the partners	2,83
Str. 1	Working with unprejudiced and experienced employees	4,17
Str. 2	Accepting and understanding each others cultural and social differences	3,83
Str. 3	Training employees	3,41
12	Managerial changes at the partners' main office	2,82
Str. 1	Defining the support and policies of each partners in the contract	4,38
Str. 2	Protecting the JV's autonomy by the contact	3,93
13	Technological incoordination and problem on the technology transfer between the partners	1,93
Str. 1	Determining how technology is transferred and which technology is used before the project begins	4,17
Str. 2	Choosing right employees learn and use the new technology	3,90
Str. 3	Renew the technology transfer periodically	3,07
14	Problems caused by insufficiency of legal issues	1,90
Str. 1	Implementing international laws	4,20
Str. 2	Implementing neutral law and judgement systems which have accepted in common	4,10

5. CONCLUSION

In the construction industry, construction projects have gradually been more complicated and extensive requiring more technical specialization. In this situation, contractors collaborate not only to adapt to market and industry conditions, but also to compete in the global construction industry. When the risks caused by this complexity add up to the basic risks that lie in the unpredictable nature of the construction activities; it is really difficult for a contractor to carry out these risks alone. For these reasons contractors, those have different strengths form IJVs to complement each other's weaknesses. IJVs provide several advantages such as; sharing risks, associating resources, transferring technology, possibility of entering new markets, increasing R&D activities, political and social advantages. As a result of the formation of IJVs contractors; which differ from each other in terms of their culture, organizational structures, management methods, technical knowledge, specialities, financial possibilities and resources, have to collaborate. Although these different characteristics provide advantages for them, they also create a number of risks. In this context, it is really important to analyze these risks and their management strategies for the success of IJVs.

Although there are several risks in IJVs, partnership risks are the main risks which are discussed for JVs. In consequence, it is really important to deeply analyze partnership risks and determine management strategies developed against these risks in order to reach the expected aims of the IJV project.

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STATUTORY ADJUDICATION THE INTEGRITY OF THE NSW BUILDING AND CONSTRUCTION INDUSTRY SECURITY OF PAYMENT ACT 1999

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ABSTRACT

Subcontractors of the New South Wales (NSW) construction industry of Australia lobbied for over 10 years for industry wide payment regulation. Payment regulation was actively resisted by head contractors, who were happy with the payment leverage they held; the public sector bureaucracy who were opposed to the idea of regulation; and a Government who for a while listened to these influencers.

The NSW Government's response was the *Building and Construction Industry Security of Payment Act 1999 (NSW)* (the Act). Ten years on, the Act has been copied by other Australian jurisdictions and is widely acclaimed as reforming the payment practices of the NSW construction industry. Benefits include:

- Speedy low cost resolution of payment issues with most adjudication decisions extinguishing the dispute
- Cash can no longer be rationed by those in a position of power to do so
- The need to resort to formal dispute resolution processes is often avoided because the dispute settled speedily.

However, there is also a body of opinion that the adjudication process in the NSW Act is unfair. This opinion has emerged because of instances where head contractors have mounted large and complex claims against clients. Their practice is predatory and their motivation is commercial expediency. This paper examines:

- What key Court decisions have meant in terms of the role and jurisdiction of Adjudicators
- The extent to which Respondents are disadvantaged by the NSW Act's timeframes and the adjudication process
- The need for a review process for adjudication decisions
- The potential for 'unfair' or 'predatory' use of the Act to encourage a return to more adversarial forms of contract behaviour.

The industry should not lose sight of the lobbying power of major clients. If clients continue to be ambushed, they are likely to seek to have key features of the Act rolled back. The industry's own behaviour will have diminished the worth of arguably the best reform that the construction industry itself has sought.

Keywords: Adjudication, Success, Commercial Advantage, Fairness

1. INTRODUCTION

The construction industry in Australia is primarily focused on the domestic market with around 200,000 businesses, which represents 20% of the total number of companies in Australia. The industry contributes more than 10% to the country's gross domestic product (GDP) and over 9% of the national labour force.

The value of construction work done in Australia was \$A126.5 billion in 2007 (\$US121.008 billion), corresponding with a 1.5% rise in GDP growth (2.9% in 2006 and 4.4% in 2007) and a CPI increase of 0.1% (from 2.9% in 2006 to 3.0% in 2007). The industry is expected to grow by 3.1% per year, each year, to 2012-13.

The industry is comprised of residential building (houses, flats and alterations to existing dwellings), non-residential building (shops, offices, hotels, factories, educational facilities and hospitals) and engineering construction (roads, sewerage, energy, etc). It includes architectural and engineering services and construction trades (bricklaying, plumbing, electrical, etc). The industry is extremely diverse, and activity is highly cyclic. The engineering construction sector is highly concentrated and features increasing foreign investment in the larger end of the market.

New South Wales (NSW) is the largest state, has the largest population, the largest economy and approximately one third of Australia's construction industry. The NSW industry represents about 10% of Gross State Product and about 8% of the total workforce of the State. In most years half the construction expenditure in NSW is in the residential building sector, a quarter in the non-residential building sector and the remaining quarter in engineering construction.

The NSW industry employs 260,000 people, which is about 33% of the national industry total. Businesses in NSW employ on average 2.5 people, with a turnover \$A278,100 (\$US268,189) and a profit margin of 10%. Subcontractors provide 90-95% of the labour for construction work. Head contractors provide between 5-10% of the labour, but manage the construction process.

During the 1980s, the Australian construction industry was at a low point in its performance. In NSW it was characterised by unethical and sometimes illegal activities and conduct, lack of customer focus, organisational fragmentation, lack of co-ordination and communication between key parties, adversarial relationships, reduction in skills in critical areas for example inexperienced site management, inferior working conditions, hostile industrial relations, poor payment practices, fragmented practices and processes that were found to significantly affect productivity and efficiency.

Since the early 1990s considerable attention has been focussed on improving the efficiency and operation of the construction industry in Australia. The poor payment practices in the industry were identified from the outset as a major impediment to industry efficiency. This was identified in the NSW Government's Royal Commission into Productivity in the Building Industry in NSW (Gyles Royal Commission) and again by the Federal Government's Royal Commission (Cole Royal Commission into the Building and Construction Industry). The ways in which poor payment practices militate against efficient industry performance include:

- Adversarial contractual relationships – parties spending resources that should be directed on getting the job done, rather than fighting for the recovery payments which are due
- Project disruption – poor payment practices become rapidly known with contractors unwilling to participate on those projects
- Inflated prices – subcontractors often factor in the additional cost of doing business with clients of contractors with poor payment practices

- Financial failure – the financial failure of any one party in the contractual chain can cause a domino effect on other parties with those at the bottom most at risk in the event of a client or contractor defaulting. The collapse of one element of the contractual chain or the failure to pass on monies owed can create enormous financial strain on the other parties.

Despite the obvious central part the payment practices play in industry performance, all Australian jurisdictional governments were reluctant to intervene in industry in any regulatory way to resolve the payment practice problem. The bureaucratic response was to rely on implementing a public sector payment regime based on 'setting' the standard of good practice on government projects. Despite this approach failing the subcontract chain of the industry, it preserved in the face of a sustained period (years) of industry lobbying. Ultimately it took the findings and recommendations of a NSW Parliament Standing Committee on Small Business to achieve legislative based payment practice reforms. These reforms put in place statutory adjudication, and effectively created an industry 'culture' safety net.

2. STATUTORY ADJUDICATION IN NSW

2.1 What is Statutory Adjudication?

It is easier to say what it is not. It is not litigation, nor arbitration, nor mediation. Statutory Adjudication in NSW can best be explained as:

- A new layer of dispute management which is being applied to the building and construction industry
- It neither displaces nor replaces litigation or arbitration or negotiation
- Instead it is an option available at the unilateral choice of a Claimant to a construction contract (whether written or oral) to call for an independent impartial outsider (the Adjudicator) to fairly decide and determine a disputed payment claim
- That determination must be complied with until any eventual modification or change is finally decided in arbitration or by a court.

Adjudication had its beginnings in the United Kingdom (UK) which introduced a specific form of statutory dispute resolution when it enacted the Housing Grants, Construction and Regeneration Act 1996. This Act created a default scheme of adjudication to be incorporated into most construction contracts. This approach has been replicated to some extent in the Building and Construction Industry Security of Payment Amendment Act 1999 (NSW), (the Act) and more recently in similar Acts in the Australian state of Queensland, Victoria, Western Australia and the Northern Territory. In this form Adjudication is:

- Intended to be quick and more cost effective than litigation or arbitration
- An interim decision, subject to final resolution through the dispute resolution processes available under the contract or through litigation. In the majority of adjudicated claims, the Adjudicator's determination is not challenged and the payment dispute is settled on that basis.

2.2 Building and Construction Industry Security of Payment Act 1999 (NSW)

In September 1998, the Joint Standing Committee on Small Business tabled a report in Parliament entitled *Security of Payment for the New South Wales Building Industry*. The NSW Government's response to the report was to enact the *Building and Construction Industry Security of Payment Act 1999 (NSW)* as a key component of the Government's reform program for the building and construction industry.

The NSW Act was assented to on 5 October 1999 and commenced operation on 26 March 2000. The Act covers all contracts (written and oral) for building and construction work, and/or the supply of related goods and services, within NSW with the main exception of direct contracts with homeowners that are covered by the Home Building Act.

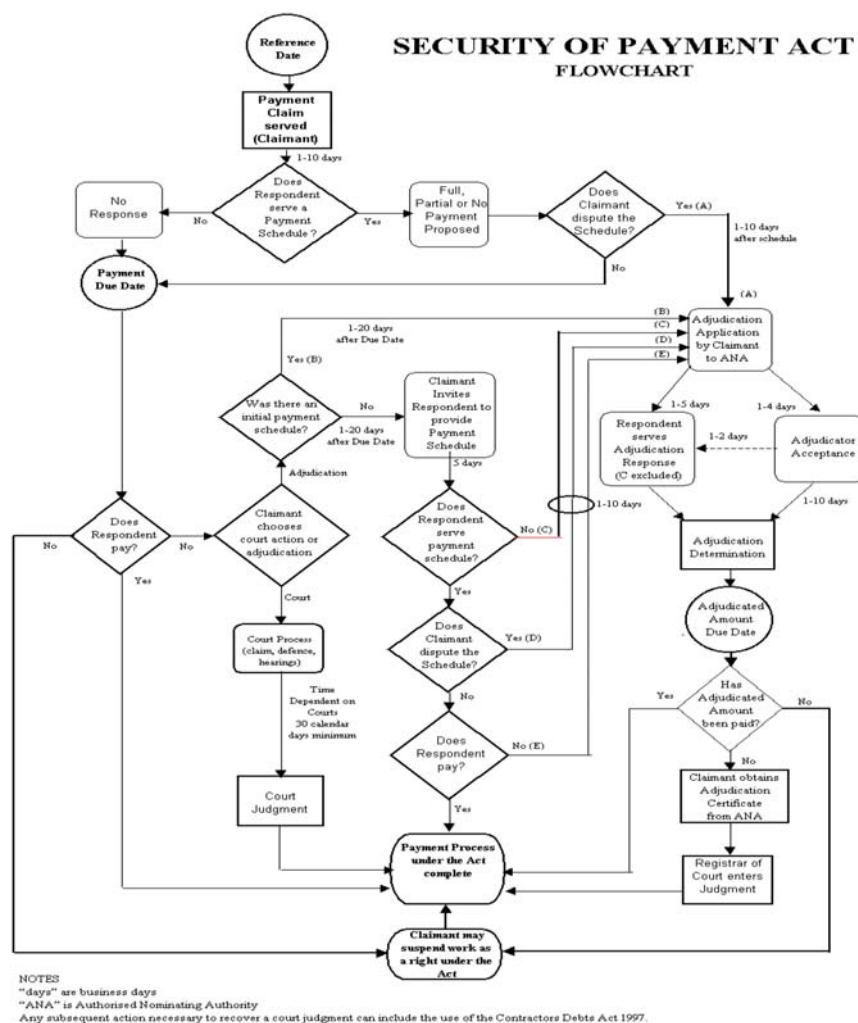


Figure 1: Statutory Adjudication Flow Char¹

The Act was reviewed in 2002 and amended by the *Building and Construction Industry Security of Payment Amendment Act 2002 (NSW)*, which commenced on 3 March 2003. A key aspect of the amendments were the removal of the ability of a *Principal* to provide security for an adjudicated amount in lieu of making payment, and the prohibition on raising defences and cross-claims in response to proceedings to enforce an entitlement to payment under the Act.

Since the 2002 amending Act the number of adjudication applications has increased with 994 adjudication applications recorded from March 2003 to August 2004 and a further 759 from August 2004 to June 2005. This upsurge in the use of the Act is significant when it is considered that in the first three years of operation of the Act there was only 116 applications. This means that the use on the Act has increased tenfold since the 2002 amendments. There are also now over 80 court decisions which have established a body of law about the operation of the NSW Act.

2.3 Resounding Success of the NSW Act

The NSW Act has been widely acclaimed as reforming the payment practices of the industry. The benefits include:

¹ NSW Government Building and Construction Industry Security of Payment Act 1999 NSW Information Kit March 2003

- Speedy low cost resolution of payment issues
- Cash can no longer be rationed by those in a position of power to do so
- The need to resort to formal dispute resolution processes is often avoided because parties are brought together early and the dispute settled.

Equally, there is a body of opinion that the adjudication process in the NSW Act is not just. This is based on instances, usually involving large and complex claims, where the motivation for using the Act has been more as a commercial weapon, even to the extent of exerting commercial contracting blackmail.

Before we explore this issue any further it is important to state that far greater commercial injustice was done without the Act and the availability of statutory adjudication. This most particularly applied when subcontractors were driven to the wall by contractors who use their position and financial muscle to delay or refuse payment and legal resolution avenues are too slow to save the subcontractor from going under.

3. POSITION TAKEN BY THE COURTS

3.1 Support for Statutory Adjudication

In the early days of the Act, the Courts appeared willing to intervene in the determination of jurisdiction. However, with a body of case law now available, it is clear that decisions by both the NSW Supreme Court and the Court of Appeal have supported, and in many ways extended the application of the Act and thereby, the role of Statutory Adjudication. In doing so, the Court has sought to uphold the NSW Parliament's intention that the Act apply broadly within the construction industry.

The landmark NSW Court of Appeal decision in *Brodyn v Davenport* [2004] NSWCA 394, meant that the grounds for challenging an Adjudicator's determination were quite limited. In *Brodyn* it was held that in NSW the only circumstance where a determination was void was if:

- an essential pre-condition to the determination or a basic and essential requirement of the Act was not satisfied
- there was a substantial denial of natural justice, or
- the determination was not a bona fide attempt by the Adjudicator to exercise the power granted under the Act.

3.2 Essential Pre - Condition

Jurisdiction is the most common pre-condition test that Respondent's frequently challenge in adjudications. In the initial implementation of the Act, this was often seen as a key area for challenging an Adjudicator's decision that an essential pre-condition to the determination or a basic and essential requirement of the Act had not been satisfied. However, the Courts soon demonstrated a reluctance to entertain these types of challenges. By way of example Windeyer J, (NSW Supreme Court) in *Errol Investments v Taylor Projects Group* [2005] NSWSC 1125² concluded:

- 'Whether or not a payment claim is a payment claim complying with the requirements of the Act is a matter for the adjudicator to determine', and further
- That it is 'an impermissible jump to reach a conclusion or infer that, because' the Adjudicator did not refer to a relevant document, the Adjudicator failed to take it into account.

Further, in *Downer Construction (Australia) Pty Ltd v Energy Australia & Ors* [2007] NSWCA 49 the NSW Court of Appeal concluded:

² Determination by Ted Smithies

'There is good reason for leaving determination of the scope and nature of the payment claim to the adjudicator, apart from the purpose of the Act earlier mentioned. The scope and nature of the payment claim will often be, and in the present case was, open to be elucidated and evaluated with the benefit of the adjudicator's specialised knowledge.'

Accordingly, I am unable to agree with the trial judge's conclusion that the adjudicator failed to determine Downer's payment claim, but instead determined a different claim. The adjudicator determined the payment claim, and the court should not by judicial review engage with the questions decided by him in doing so.'

These two decisions mean that the Adjudicator has significant latitude in their consideration of jurisdiction, including the extent that they are required to consider all submissions presented by the parties.

3.3 Natural Justice & Good Faith

Natural justice and good faith remain an area where the courts are willing to intervene. To demonstrate, in *Trysams Pty Ltd v Club Constructions (NSW) Pty Ltd* [2007] NSWSC 941, it was found that the Adjudicator had decided not to consider a report provided by Trysams Pty Ltd (the Respondent). Hammerschlag J (NSW Supreme Court) concluded:

'Despite the interim nature of an adjudication, natural justice nevertheless clearly required the adjudicator to consider the report unless (even if erroneously) he determined that it was, or was part of, a submission not duly made. In this case, he made no such determination. This amounted to a substantial failure to afford natural justice which worked practical injustice on the plaintiff and rendered the whole adjudication void'.

A further area of successful natural justice challenge is where an issue was not canvassed in the adjudication application or adjudication response (or in the underlying payment claim or payment schedule); and the Adjudicator had not given the parties any opportunity to put submissions on the issue.

The foregoing creates simple 'rules of thumb' for Adjudicators. These being:

- It is best to consider all submissions. Even if there is some doubt that they have been legitimately made under the Act, it is prudent to cover the issues if at all possible, thereby locking out any avenue to a natural justice challenge
- Give the parties an opportunity to make supplementary submissions, if a matter that has not been raised by either party is likely to be a key to the adjudication determination.

3.3 Wide Application of Statutory Adjudication

A critically important aspect of the Act is the form of contracts or agreements captured by the Act and thereby subject to adjudication. The importance relates directly to the varied and apparently informal arrangements which exist down the contract chain. In comparison to the sophisticated contracts between major clients and contractors, the bulk of the contract arrangements can, at best, be described as crude or rudimentary. Without a wide interpretation, the relevance of Statutory Adjudication would be limited.

The courts have supported the Act by a broad interpretation of what is a contract or agreement for the purposes of the Act. In *Okaroo Pty Ltd v and Joinery Pty Ltd Vos Construction* [2005] NSWSC, Nicholas J [41] concluded that the context of the Act, *'in my opinion the term arrangement in the definition is a wide one, and encompasses transactions or relationships which are not legally enforceable agreements. The distinction in the definition between a contract and other arrangement is intended by the legislature to be one of substance so that under the Act construction contracts include agreements which are legally enforceable and transactions which are not.'*

Further, in [42] Nicholas J states that *'in deciding whether a contract or other arrangement is within the definition of construction contract the only matter for consideration is whether it is one under which one party undertakes to carry out construction work, or to supply related good and services, for another party'*.

This reasoning was reinforced in *Over Fifty Mutual Friendly Society Ltd & Anor v Smithies & Ors* [2007] NSWSC 291. In this determination, Over Fifty Mutual Friendly Society Ltd (the Respondent) had been the project financier and sought exclusion from the Act, due to their loan agreement. However, the determination found that the Respondent had, by stepping into the shoes of the developer, established a new *arrangement* with the project contractors for the purpose of completing the project. The Court found that the *arrangement* did not arise from the financial arrangements, but from written and oral statements and from actions of the Respondent. These were considered by the court to be outside the loan agreement and the provisions of the Act therefore applied.

4. SOME EMERGING TRENDS – POSITIVE & NEGATIVE

Despite the resounding success of the NSW Act some trends are emerging related to the manner in which the NSW Act is operating. These trends raise a number of issues which include:

- Adjudication determinations favour the Claimant. The NSW Government statistics indicate that this is approximately 70:30 in the Claimant's favour. The question posed is this a bias or a redress of historically adverse payment practices
- Confusion and uncertainty regarding procedural requirements under the NSW Act by both Claimants and Respondents and by many Adjudicators
- Confusion in risk allocation due to the dual payment regimes (i.e. the Act and the contract). The default provisions of the NSW Act do not override terms of contract, however, tandem operation of the contractual and statutory payment regimes can change the risk allocation on which a contract was based and agreed.

Consideration of these trends is best dealt with under the following themes. Within each theme, a number of key issues have been identified. Reference to approaches taken to security of payment legislation in other jurisdictions and internationally have also been used in identifying a range of issues. The key themes are:

4.1 Coverage of the NSW Act and wider dispute resolution processes

If the NSW Act is becoming a de facto dispute resolution process, should more safeguards be introduced commensurate with this wider role?

The NSW Act is aimed at maintaining cash flow on the basis of interim progress payment decisions. In practice, many adjudication decisions are now being accepted as final payment decisions, suggesting that the Act is increasingly being seen as an appropriate dispute resolution process. This is consistent with the NSW Parliament's objectives for the legislation.

4.2 Disadvantage

Is the Respondent disadvantaged by the NSW Act's payment claim timeframes and adjudication process?

The NSW Act requires the Claimant and Respondent to serve documents within very short timeframes. There are two arguments:

- Is it onerous on the Respondent if the payment claim is complex, particularly in view of the consequences for the Respondent if he/she fails to meet deadlines, or
- The Respondent should not be surprised by the content of a payment claim as he/she has full knowledge of the project and progress and the timetables set by the NSW Act are thereby fair.

The authors of this paper have completed over 200 adjudications and by way of observation note that a Claimant or a Respondent can mount an adjudication 'ambush':

- The Claimant can do this by preparing a payment claim and adjudication application over an extended period and submitting it giving the Respondent only 10 business days to Respondent
- The Respondent can do this by introducing claims in the payment schedule which have previously not been mentioned. These typically include claims for defect, set-off and liquidated damages.

4.3 Adjudication Process and Authorised Nominating Authorities (ANAs)

ANAs are independent organisations with the power to nominate Adjudicators under the Act. An ANA must be appointed by the NSW Government Minister for Commerce in order to provide this service.

Should Respondents have a right of reply?

After a Claimant submits an application for adjudication, a Respondent has an opportunity to submit a response where a payment schedule was issued. However the NSW Act does not allow the Respondent to deal with new reasons or information which the Claimant might have introduced in the adjudication application

Should there be a process for review of adjudication decisions?

Does this means 'rough justice' is occurring without appropriately available mechanisms for review? It is clear that some Adjudicators simply get the decision wrong. While this has been used as a basis by some to lobby for changes to the Act, it must be remembered that the determination is an interim decision. The decision is one that is still subject to the dispute resolution process of the contract, and ultimately the court.

Suggestions that challenge the validity of Statutory Adjudication on the basis that the cost of a legal challenge may be prohibitive is answered on a simple cost benefit basis, having regard to the value of the payment claim.

Are lawyers taking over the payment claim and adjudication process?

While this may sound contentious, the increasing involvement of lawyers in the security of payment process is adding to the cost and expanding the scope of the submissions (in adjudication applications and in adjudication responses) beyond the original expectations of the NSW Act. This approach results in a focus away from the core of the payment issue into a legal debate on matters such as jurisdiction. The folly of this approach is that either party can but particularly the Respondent can be so pre-occupied with the jurisdictional challenge that they forget to deal with the merits of the payment claim. This can mean that they do not provide reasons in their response as to why payment of the claim should be denied. Needless to say where that occurs the determination will not be in the Respondent's favour.

4.4 Risk Allocation

Is contract risk allocation changed by the Act's dual statutory and contract payment regime?

The default provisions of the NSW Act do not necessarily override terms of contract, however, tandem operation of the contractual and statutory payment regimes can change the risk allocation on which a contract was based. For example:

- Many contract payment regimes are aligned with the preferences of the contract Principal (the Respondent) and not with the requirements of the NSW Act

- Project management attitudes and practices are aligned with the contract requirements and traditional position of the Principal having the financial upper hand or bargaining position.

The Act has challenged these cultural paradigms. The Act establishes a fair payment regime in terms of timing when payment claims can be submitted and requires that reasons be given for non payment in a payment schedule (i.e. in response to the claim).

4.5 Behaviour and Relationships

Are we seeing an emergence of predatory payment claim practices by some contractors?

The Act can be used in a predatory manner which is designed to ambush or surprise the Respondent. This is done by using the timetable imposed by the NSW Act to limit the Respondent's ability to deal with all of the issues raised in the payment claim. Examples include:

- Presentation of complex/extensive payment claims. These claims are often of excessive volume developed over an extensive period by the Claimant
- Including new issues and/or ambit claims.

The overall objective of the Claimant is to achieve interim payment well in excess of its entitlement and leave it to the Respondent to attempt recovery i.e. there are some Claimants who deliberately by-pass contractual arrangements on the basis of 'pay now argue later'.

Will the unfair use of the Act encourage a return to more adversarial forms of behaviour?

At the peak level, sophisticated clients have moved to cooperative contracts including the introduction of innovative forms of contract such as Alliancing. This requires a concessional and flexible approach to issue and payment claim management.

These clients might rightly feel aggrieved by predatory payment claim practices. However, it must be remembered that subcontractors provide 90-95% of the industry's work. It is this group that are still subject to adversarial contract behaviour and which the Act therefore seeks to protect. These contractors are rarely privy to the cooperative contract initiatives of the peak of sophisticated clients.

5. IMPROVEMENT OPPORTUNITIES

There are a number of options available to improve the operation of the NSW Act. These can be done by way of Regulation to the Act rather than changes to the Act itself. Administrative improvements requiring no amendments to the NSW Act include:

- Provide guidance for parties and Adjudicators on what is acceptable from both a Claimant and Respondent
- Provide guidance for Adjudicators on procedural/process requirements and interpreting the obligations of the adjudicator
- Issue a Code of Practice on how Authorised Nominating Authorities (ANAs) should manage the adjudication process
- Review ANAs performance, including Adjudicator decisions and fees when renewing the accreditation of ANAs.

Improvements requiring minor Amendments to the NSW Act include:

- Give Adjudicators the discretion to extend the time for the determination by up to 20 business days, if satisfied that it is not possible to fairly make a determination because of the complexity of the matter

- Give Adjudicators more discretion to consider reasons even if they were not in the payment schedule, similar to the UK Act
- Allow supplementary submissions by the Claimant in response to new reasons in the Respondent's adjudication response
- Extend the adjudication normal period from 10 business days to 15 business days, with the adjudication not to start until the 5th business day when both the Claimant's application & Respondent's response are received.

6. CONCLUSION

In his paper *The Court view of security of payment legislation in operation*³ by Robert McDougall, Judge of the Supreme Court of New South Wales, McDougall J. concluded:

The Court's role within the dispute resolution system created by the Act is an ancillary one, but essential nonetheless. It is essential for two reasons. Firstly, the availability of judicial review ensures the integrity of the adjudication process. Secondly, the involvement of the Court is needed because the Act is only designed to resolve disputes in the interim. The parties' contractual rights (subject to s 34) remain unaltered by the Act and any dispute at the completion of the construction process will be resolved, if all else fails, by litigation or arbitration.

Justice McDougall's conclusion supports the sustainability of the Act and the importance of Statutory Adjudication in resolving payment disputes. The impact on these disputes has been significant and far reaching, extending beyond previous attempts to reform the underlying culture of the industry.

By way of example, the NSW Government has funded a reform program aimed at fundamental change in the culture of the building and construction industry. This included using its power as a major client and its regulatory responsibilities to bring about reform in both the public and private construction sectors. The strands of the program were:

- Re-establishment of the rule of law; and
- Use the Government's buying power to force change, in other words become a demanding client.

Central to the buying power strategy was to impose 'standards of behaviour' through the NSW Government Code of Practice and Code of Tendering for the Construction Industry (the Codes). The Codes established the minimum standards of behaviour required of service providers (i.e. contractors, subcontractors, consultants and suppliers) seeking to do business with government. The Codes were supported by a compliance regime in which the NSW Government pursued its right as a client to choose with whom to do business.

The critical problem was that while the NSW Government was collectively the single largest industry client, it only exerted influence on those organisations that it immediately did business with. It did not directly impact on the subcontract supply chain which is responsible for over 90% of the actual work completed on the government's projects, let alone the projects of private sector clients.

The *Building and Construction Industry Security of Payment Act 1999 (NSW)* stands apart from all previous reform efforts because it targets the contract supply chain. It imposes minimum standards of payment practice, not previously available to contracts traditionally at the behest of those holding the purse strings. In establishing Statutory Adjudication, the NSW Government has effectively set in place a safety net that is genuinely achieving cultural change. Its effects have been far greater than the architects of the Act could have imagined.

³http://www.lawlink.nsw.gov.au/lawlink/Supreme_Court/ll_sc.nsf/pages/SCO_mcdougal310805
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CONSTRUCTION REGULATORY PROBLEMS FACED BY FOREIGN AEC FIRMS IN CHINA

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ABSTRACT

As more foreign architectural, engineering and construction (AEC) firms are venturing into China's construction market, the Chinese government has reformed a number of regulations and measures to attract and supervise these firms in compliance with international practices under the WTO framework. However, some foreign AEC firms have considered the newly-established construction regulatory system governing them as unsatisfactory or even hindering them from undertaking projects in China. This paper presents the possible construction regulatory problems faced by foreign AEC firms and identifies the significant regulatory factors that affect such foreign firms. Data were collected by structured questionnaires from industry professionals working in foreign AEC firms in China. The results of questionnaires are presented and analyzed, which serve as a basis for further research on the impact of the regulations on foreign AEC firms in China.

Keywords: China, Construction Industry, Foreign Firms, Regulations.

1. INTRODUCTION

With China's accession to WTO in 2001, a large number of laws and regulations governing Chinese construction industry have been changed to meet the requirement of WTO and fulfil China's commitments. Foreign architectural, engineering and construction (AEC) firms carrying out business activities under this regulatory framework will have to understand the local construction regulations and adapt them if they want to succeed in China. However, a number of foreign AEC firms pointed out that the new regulations established after China's WTO accession were very restrictive and controversial and this required them to substantially restructure their business activities in China to remain compliant (Kosmvtatz, 2004). It was also found that one of the most important factors considered by investors as they decide on the investment location is a predictable and non-discriminatory regulatory environment and an absence of undue administrative impediments to business more generally (OECD, 2003). Therefore, a better understanding of construction laws and regulations governing foreign AEC firms in China will enable them to better compete in this fast developing market. The views of foreign AEC firms are critical in identifying the key regulatory factors that affect their entry and

operations. This research can benefit both foreign AEC firms and the Chinese construction authorities and further improve the business environment in China's construction sector.

This paper first presents the potential problems in existing construction regulations governing foreign AEC firms based on a comparative study and extensive literature reviews. To investigate the views of foreign AEC firms on the above problems of the regulations, questionnaire survey were conducted and the results are discussed in this paper. One of the most important objectives of this research is to identify the regulatory factors that affect foreign AEC firms in China.

In this research, foreign architectural, engineering and construction (AEC) firms refer to non-Chinese firms that are currently working in China. The services they provide should include any combination of separate architectural consultancy, engineering consultancy, and construction. The type of these foreign firms covers joint venture (JV) and wholly foreign-owned enterprise (WFOE).

2. CONSTRUCTION REGULATORY PROBLEMS FACED BY FOREIGN AEC FIRMS IN CHINA

In China's construction sector, there are some regulations that specifically target foreign AEC firms who want to enter and operate in China's market. Most of these regulations emphasize on the market entry requirements for foreign firms. After establishing their China office, foreign firms are provided with the national treatment as the local firms. Nevertheless, they still face a lot of regulatory problems as China's construction market is emerging but still far from the developed market practices. To identify all the regulatory problems, both the comparative study on regulations and the review of literatures are conducted.

2.1 CONSTRUCTION REGULATORY REFORM UPON CHINA'S WTO ACCESSION

As China became a member of WTO in 2001, it promised to open the construction market to the outside world and carry out reform on its construction laws and regulations to meet the requirements of WTO agreements. Following this, the Ministry of Construction (MOC) established a special working team to check the laws, administrative regulations, departmental rules and other relevant standard documents and to assure the requirements of general principles of WTO are met. In this regulatory reform, a number of construction regulations have been abolished and replaced by newly-established regulations and measures. As shown in Table 1, the current major Chinese construction regulations on foreign AEC firms are included in the level of Departmental Rules and Relevant Measures and Circulars. This research focuses on these regulations that specifically target foreign AEC firms in China, and also extends to cover more relevant regulatory factors that may significantly affect foreign AEC firms.

Under the new regulatory framework as in Table 1, some outdated regulations established before China's WTO accession have been abolished and replaced by the new regulations (Chew and Ding, 2007). Through the comparative studies between the new and old regulations on foreign firms, the major regulatory changes that may result in problems for foreign firms reside in four aspects: (1) entry mode; (2) establishment of entity; (3) application of Skill Qualification Certificate (SQC); (4) scope of business activity (Chew and Ding, 2006).

It can be found that China has been removing the restrictions on foreign AEC firms to meet the requirements of WTO provisions and to provide the national treatment to foreign participants. These regulatory changes in the construction sector result in foreign AEC firms having to face a new business environment where they must modify their business behaviour.

Level	Titles of Laws and Regulations (Decree No.)	Date of Promulgation	Date with Effect
Departmental Rules	Regulations on Administration of Foreign-invested Construction Enterprises (113)	2002-09-27	2002-12-01
	Regulations on Administration of Foreign-invested Construction and Engineering Design Enterprises (114)	2002-09-27	2002-12-01
	Supplementations on Regulations on Administration of Foreign-invested Construction Enterprises (121)	2003-12-19	2004-01-01
	Supplementations on Regulations on Administration of Foreign-invested Construction and Engineering Design Enterprises (122)	2003-12-19	2004-01-01
	Regulations on Administration of Foreign-invested Construction Services Enterprises (155)	2007-01-22	2007-03-26
Relevant Measures and Circulars	Implementation Measures on Administration of Skill Qualifications in Regulations on Administration of Foreign-invested Construction Enterprises (73)	2003-04-08	2003-04-08
	Circular on Administration of Foreign Enterprise Skill Qualifications for Contracting Construction Works within the Territory of China (193)	2003-09-28	2003-09-28
	Tentative Regulations on Administration of Foreign Enterprise for Undertaking Engineering Design Works within Territory of China (87)	2004-05-10	2004-06-10
	Circular on Administration of Skill Qualifications of Foreign-invested Construction Enterprises (159)	2004-09-06	2004-09-06
	Implementation Rules to the Administrative Regulations on Foreign-invested Construction and Engineering Design Enterprises (18)	2007-01-05	2007-01-05

Table 1. Chinese Construction Regulations on Foreign AEC Firms as in 2008

2.2 OTHER REGULATORY PROBLEMS IDENTIFIED IN PREVIOUS LITERATURES

A number of literatures written by the Foreign Business Councils and law firms express their dissatisfaction on the newly-established construction regulatory framework in China. Highlighted in one report of Engineering News-Record (ENR), foreign AEC firms working in China are reeling from two new Chinese regulations that greatly change the way they do business and threaten the short-term operations (Tuchman, 2003). As the construction law expert in Masons Thelen Reid LLP, Hew concluded that the construction regulations established after China's WTO accession appeared to have made it more difficult for foreign contractors to undertake projects in China (Hew, 2004).

Besides the above four observations identified through comparative study, some potential problems in contracting and design code and standard are also pointed out. Howlett pointed out in his book numerous obstacles that may be encountered by foreign AEC firms both in general contracting and sub-contracting of projects in China (Howlett, 2006). The problems in design code and standard were also pointed out in the working paper of European Business Council and in the business guide of a foreign law firm (European Chamber, 2006/2007).

2.3 SUMMARY OF THE REGULATORY PROBLEMS

The following list provides a summary of the regulatory problems identified through review of construction regulations and literatures. This list serves to categorize the problems into six groups (A to F) upon which input from foreign AEC firms in China are gathered through the questionnaire survey.

A. Entry Mode

1. Direct contracting is not allowed for foreign contractors, who have to establish a

- Chinese entity as the first step of entry into the China's market.
2. Direct contracting is allowed for foreign design consulting firms under the condition that they must select at least one Chinese design institute as partner.

B. Establishment of Local Entity

1. Foreign-owned firms who want to apply for special grade construction qualification (an unlimited qualification to undertake projects of all types and values) must pay at least US\$36 million as registered capital.
2. Foreign equity ownership in Sino-foreign JV is limited to less than 75% of the registered capital.
3. Registered capital in full must be paid before obtaining the construction license.
4. Bonding or financial guarantees from the parent company outside of China are not recognized as registered capital.

C. Application of Skill Qualification Certificate (SQC)

1. Problem arising from the annual review of qualification by the regional construction authorities.
2. Problem arising from the approval of higher qualification grades by the regional construction authorities.
3. Firms engaged in project management must obtain at least one SQ certificate from any of the following areas: construction, design, surveying, construction supervision, tendering agent and cost consulting.
4. Firms must obtain the relevant SQ certificate in construction, design, supervision, survey, costing advisory and tendering agency to offer the respective service.
5. Residency requirement: foreign staff in a foreign-owned construction firm must stay for at least 3 months per year in China.
6. Residency requirement: foreign staff in a foreign-owned design consulting firm must stay for at least 6 months per year in China.
7. Foreign-owned construction firms are required to maintain at least 200 to 300 professionals, and 12 to 20 project managers registered with the relevant construction authorities to apply for Class 1 SQC of main contractor.
8. Overseas track record can be taken into account only if the experience involves a project co-contracted with or sub-contracted to a Chinese enterprise.

D. Scope of Activity

1. Wholly foreign-owned company in construction is limited to four types of projects.
2. Unless for foreign firms with special grade qualification, the contract amount is limited to five times of the registered capital.

E. Contracting Problems

1. Inconsistency between contract documents for official registration and for other purposes.
2. Ambiguity in construction law and contract document over the liability of subcontractor to project owner.
3. Problem arising from the use of standard form of contract issued by Chinese government.
4. Prohibitions on owner to "divide up" a construction project which is supposed to be undertaken by a general contractor.
5. Problem arising from the contract dispute resolution governed by China Law and presided by the People's Court in China.
6. Ambiguity over the owner's consent on appointment of sub-contractors or the works to be sub-contracted.
7. Owner's delay in issuing consent letter.
8. Prohibition of owners in nomination of sub-contractors.
9. The requirements of general contractors to complete the main part of the construction project by himself (restriction on management contracting).
10. Prohibitions of sub-sub-contracting.

F. Nature of Code and Standard

1. China's prescriptive building materials standards and design codes do not stay current with the level of product innovation.
2. Difficulty for foreign firms to obtain information on the various standards in construction.
3. Difficulty for foreign firms to participate in or influence the establishment of the standards.
4. Architectural and M&E firms are not allowed to specify products by name in their design.

3. RESEARCH METHODOLOGY

Initially, a pilot study was carried out by a structured survey interview on industry professionals in China to ensure the completeness of the above summarized problems and appropriateness of the questions in terms of rhetoric and understanding of meanings (Chew and Ding, 2007). Based on this pilot study, a formal questionnaire was created to elicit critical comments and feedbacks from foreign AEC firms on those problems summarized by extensive literature review and comparative study.

The regulatory problems that foreign firms may encounter in China can also be regarded as regulatory risks that they must pay attention to upon their entry and subsequent operation. Therefore, the method for assessing the significance of these problems can be adapted from various risk assessment tools in construction research. One approach adopted by previous researchers is to consider two attributes for each risk: the probability level of the risk occurrence; and the degree of impact or the level of loss if the risk occurs (Fang et al., 2004, Shen et al., 2001, Kaming et al., 1998, He, 1995). They suggested combining risk probability analysis with risk impact assessment, as follows:

$$R = P \times I$$

Where R is the degree of risk, P is the probability of the risk occurrence, I is the degree of the impact of the risk. The larger the value of R, the more severe the factor is. Finally, R will be used to rank the severity of all the factors.

According to He (1995), this definition of risk would be more realistic for construction practice. In overseas construction projects, the risk factors with a high probability and a high impact are not difficult to identify, but, too often, many risk factors with a medium probability or a medium impact have been neglected. They may present a considerable severity of risk and be significant to a project. Therefore, in order to assess a risk factor, it is necessary to cover both its probability and the level of impact.

In this research, such method is employed to recognize the severity of construction regulatory problems and the top significant problems can be obtained by ranking the R score of each problem. In the questionnaire, respondents were requested to rate the probability and impact of each regulatory problems on a 5-point Likert scale. For probability, "Not Applicable" was added as another option besides the 5 scales from "1: very low" to "5: very high". The relative impact of each problems are rated from "1: negligible" to "5: extreme". A mean was calculated for both probability and impact of each regulatory problem. After multiplying the value of probability and impact, the severity of each problem can be ranked according to the result. The authors believed that this process can effectively reflect the meaningful and practical problems faced by the foreign AEC firms in China.

4. DATA ANALYSIS AND RESULTS

A total of 150 questionnaires were sent out in 2007 to personal contacts and to members of foreign business chambers, especially those with previous experience in operating foreign AEC firms in China. However, since there is a limited number of large foreign-invested construction and engineering consulting firms registered in China, only 51 completed

questionnaires were returned, for a response rate of 34%. Three returned questionnaires were void because the respondents had no hands-on experience on foreign AEC firms in China. Hence, this study was based on 48 valid replies from respondents who had been involved in foreign AEC firms in China.

The questionnaire included the respondents' profile and their firms' background. As shown in Figure 1, more than 75 percent of the respondents are managers, vice presidents and presidents of a foreign AEC firm in China. The respondents also had an average of ten years experience in China's construction sector. The high level position and the extensive experience of the respondents were essential for this study to enhance the reliability of the survey results.

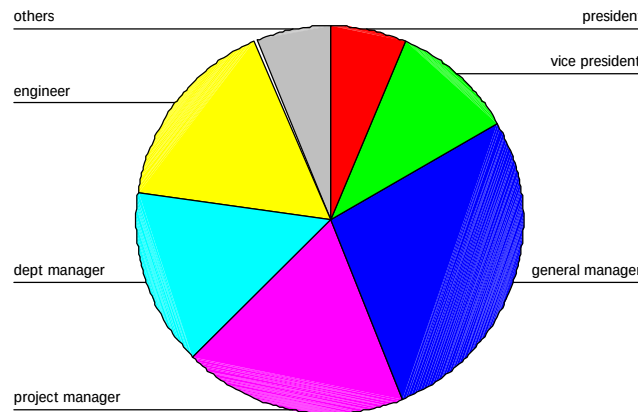


Figure 1. Summary on the Designation of the Survey Respondents

On average, the foreign AEC firms where the respondents are working for have been operating in China for more than 13 years. Interestingly, almost 90 percent of these firms are wholly foreign-owned enterprises (WOFEs). The rest are Sino-foreign equity or cooperative joint ventures. These firms came from many other countries in the world. Most of them are from US, UK, Singapore and Hong Kong as presented in Figure 2. Around 42 percent of the firms have not received any Skill Qualification Certificate (SQC) for carrying out business activities in construction sector. The rest have received one or more SQCs in services that they are providing in this sector. Among all the foreign AEC firms in this survey, over 68 percent of their projects were involving foreign investment on average.

The responses to the ratings on probability and impact of regulatory problems provided the perspectives of foreign AEC firms in China. It should be noted that a few of the top ranking problems also correlated with some other reports and articles. But it also varies with the major services that the foreign firms are providing. The current regulatory framework affects much more on foreign firms which are general or management contractors, while affecting less design and engineering consulting firms. As detailed in Table 2, the regulatory problems are ranked according to their R score as discussed earlier. The calculation of R score can be expressed as:

$$R^i = \frac{\sum_{j=1}^{48} P_j^i \times I_j^i}{48}$$

where, R^i = risk score for the problem i ; P_j^i = probability of occurrence assessed by respondent j for problem i ; I_j^i = degree of impact of problem i assessed by respondent j .

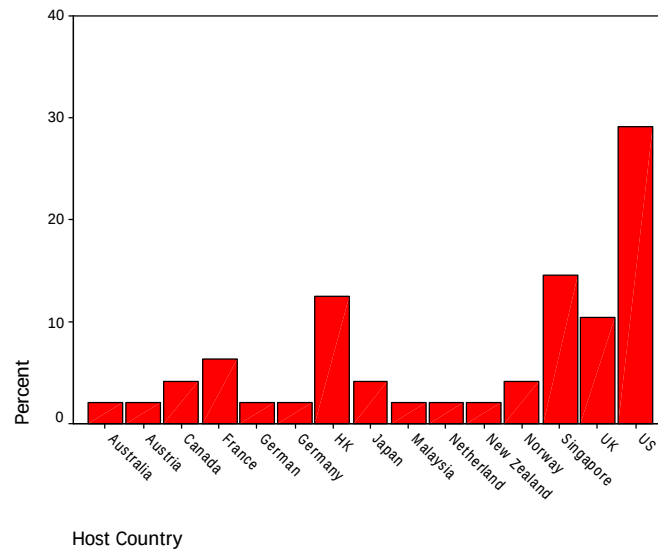


Figure 2. Distribution of the Home Country of Foreign AEC firms in the Survey

5. DISCUSSION

In the top ten regulatory problems in Table 2, three are from group C in the problem list which pertain to the SQC application. Two items in market entry mode (group A) are also ranked in the top ten problems. Besides, two items each in business activity scope (group D) and design code and standard (group F) are also inside. It can be found that the establishment of local entity (group B) may not be a major problem for foreign AEC firms in China. Most of the items in this group are ranked within the last ten problems by the respondents.

The problem of “personnel requirement” occupies the first place with the highest R score. It has the highest mean of impact degree and the forth highest mean of probability. This requirement is stipulated in the Qualification Standard of Construction Enterprises established in July 2001. Although this requirement applies to all construction firms in China including foreign firms, to maintain such a big number of qualified staff is much more difficult for foreign construction firms than for local firms. From the ratings of problem C3 and C4, it also can be seen that application of SQC is deemed as an obstacle for foreign AEC firms.

Rules in market entry mode (group A) and business activity scope (group D) are also ranked by respondents as the top problems for foreign AEC firms. “Project-by-Project” basis scheme was abolished by the new regulations on foreign-invested construction firms (Decree 113). Currently, foreign firms must register a local entity and apply for SQC before they can carry out any projects in China. The new rules definitely add more cost of time and money to the foreign entrants. On the other hand, foreign design consulting firms are not subject to a very high entry requirement as what foreign construction firms are facing. However, to find and cooperate with a Chinese partner in design consulting is not easy for them without a registration. In addition, the project type and project size are limited in the administrative regulations.

Due to China's different practice in construction contracting, foreign AEC firms must clarify all the details in contracts between various parties involved in a project. Design code and standard (group F) in China may not be able to remain consistent with the international standard. To carry out projects in China, foreign firms need to follow the local design code and standard to conform to the rules and regulations. Because of the language barrier and the short responding time set by the MOC, it is difficult for foreign AEC firms to participate or even influence the process of designing the code and standard.

7 other problems in contracting issues (group E) fall within the next ten problems. Most of the contract problems are the result from the previous centrally-planned economy. Although China has opened the door and moved towards the market economy, the construction contracting system still lags behind the international practice. The main difficulty can be attributed to the contract document and the practice of main contracting and subcontracting. To avoid any disputes and operational problems, foreign AEC firms must study each article carefully in their contract documents and the relevant construction laws to properly deal with the contractual relationship among the parties.

Code of the Regulatory Problems	Probability	Impact	R Score	Rank
C7	2.87	3.51	11.8	1
E2	3	3.51	11.4	2
F3	3.15	3.27	11.14	3
A1	2.83	3.43	10.91	4
D2	2.8	3.47	10.8	5
F1	2.88	3.11	10.52	6
C4	2.85	3.17	10.38	7
A2	2.65	3.23	10.05	8
C3	2.73	3.08	9.82	9
D1	2.42	3.42	9.66	10
B1	2.49	3.43	9.43	11
E3	2.67	3.12	9.41	12
E9	2.71	2.91	9.09	13
E10	2.63	3.05	9.04	14
F4	2.67	2.84	8.99	15
E7	2.61	3.1	8.83	16
E4	2.53	2.9	8.47	17
E1	2.25	3.25	8.2	18
C8	2.24	3.06	8	19
E5	2.16	3.11	7.46	20
C5	2.27	2.53	7.07	21
C2	2.07	2.55	6.73	22
E6	2.07	2.79	6.71	23
B4	1.91	2.91	6.6	24
C1	1.98	2.5	6.2	25
B3	1.82	2.68	6.11	26
C6	1.95	2.54	5.89	27
F2	1.9	2.45	5.83	28
E8	2.04	2.42	5.82	29
B2	1.7	2.81	5.47	30

Table 2. Summary on the rankings of regulatory problems with effect on foreign AEC firms

For the problems ranked in the bottom-ten, their R score are not high compared with the ones discussed above. Nevertheless, problems with impact of above the rating of 2.5 still warrant the attention of foreign firms although they may not likely happen.

6. CONCLUSION

This paper presents a preliminary analysis of the questionnaire to investigate the effects of the new construction regulatory framework on foreign AEC firms. The list of the problems and their rankings are important and can serve as a good reference for foreign firms which want to enter and successfully operate in China's construction sector. Foreign firms should not forget the high business risk in China while enjoying abundant opportunities. Based on the problem rankings, solutions should be proposed in future research for foreign AEC firms to overcome the obstacles and achieve good performance in China.

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UNDERSTANDING MULTI-CULTURAL PERFORMANCE IN CONSTRUCTION: A TOOL FOR DISPUTE AVOIDANCE?

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ABSTRACT

The need for increasing performance (or at least keeping the performance as specified) is an actual issue in nowadays modern construction industry. Not only on project-level, but also and especially on strategic company-level. And in conjunction with that, the increasing awareness of construction industry clients plays an important role regarding this need for increasing performance. Interesting within this development is the ‘confrontation’ of at the one hand ‘hard’ technological conditions, and at the other hand ‘soft’ human expectations within the construction-process.

This paper describes and analyses an example of an international project, in which clients and construction industry professionals play an important role regarding the organisation and processes, reflected against the background of multi-cultural (team)environments. Not just from a viewpoint of ‘critical incidents’-approach, but also focusing on the opportunities and lessons learnt. Outcomes point into the direction that understanding multi-cultural performances within (international) project-environments can be a serious tool for dispute-avoidance between the parties involved.

Keywords: *Clients, Construction, Culture, Expectations, Performances.*

INTRODUCTION

In actual construction industry there are several interesting developments going on, e.g. in the fields of (a) environment, (b) design and (c) technology. Some examples of recent developments regarding these fields are e.g.:

- (a) Environment: Think on the globalizing movements regarding the environmental awareness, leading e.g. to ‘cradle to cradle’ approaches, in which there is a plea for rethinking the production, use and re-use of the products within a broad scope [McDonough & Braungart, 2007]. Also in construction industry such a development is emerging; not in the least because construction uses a lot of primary materials, and is also introducing increasingly the re-use of such materials. In e.g. The Netherlands there has been announced a recent initiative in one of the Dutch municipalities for

developing a complete business-park based on the cradle-to-cradle approach, thus being one of the early Dutch adapters of this approach [SenterNovem, 2007].

- (b) Design: One of the recent quite remarkable developments is the introduction of 'dynamics' in architecture. E.g. the group around 'dynamic architecture' has combined natural forces like e.g. wind to fuel its buildings with energy. Thus, being also an environmental approach, it also leads towards quite astonishing architecture and construction consequences. One of the example-projects for this is the recent design for the 'rotating towers' in the United Arab Emirates. Other plans are also pending for e.g. Russia [Fisher, 2007].
- (c) Technology: There are developments also on technology-level, which are e.g. related to process-improvements. Due to the intensified increase of computer-capacity, the development and use of software is taking a big step ahead. The recent practices on project-based environments and web-based process-control and optimization are examples of such developments [Adriaanse, 2007; Aouad, 2006].

All of the mentioned examples are on the one hand influencing the participants involved in construction industry in some way, e.g. as being a developer, contractor, banker, insurer, architect, end-user, etc. This is basically the case because construction industry is still a 'people's business'. However, on the other hand they also seem to be used for convincing clients that such approaches are needed / better / cheaper etc. So, by using the credo 'change means business' they try to create or to accelerate (new) business. Regarding this assumption, it therefore interesting to put forward the following question:

- *Do such developments really improve the construction-industry's performance?*

Or in other words, from the most important party's involved perspective:

- *Do such developments really help construction-industry to fulfil the expectations of the clients?*

This paper investigates the role of improving performance of construction industry, reflected against the background of multi-cultural (team) environments.

UNDERSTANDING CLIENT'S WISHES AND EXPECTATIONS

INTRODUCTION

Just like other production-industries, construction-industry still has a strong focus on the technologies, materials and products used. Although the increasing need for a more process-driven approach, the products delivered play an important role in this branch. Looking to practices regarding e.g. the procurement systems, there are obviously still problems to solve, e.g.: reducing failure-costs, improving quality, eliminating collusion, improving price / quality, etc. [Egan, 1998; Tjihuis & Lousberg, 2000; Vos et al, 2002]. In short, these issues give the impression that there is obviously a deviation between at one hand the client's expectations, and at the other hand the delivered products / services. This *deviation* often leads to *conflicts*, which are often based on bad *communication* [Felstiner, Abel & Sarat, 1980], in general as a signal of *dissatisfaction* within the *social interaction process* between two parties [Reniers, 2007], especially and also when working within *multi-cultural* environments, with the pro's and contra's of corporate cultural differences [Fellows & Seymour, 2002; Tjihuis et al, 2001]. Especially the conflicts within multi-cultural environments are subject of this paper.

PRODUCT-DRIVEN VERSUS PROCESS-DRIVEN

If the assumption is right that the improvement of performance leads to more satisfied clients, then one ought to know at least to what 'level' the client is expecting such a performance. And this makes it quite a difficult situation, i.e.: What are the *elements* of such a performance?, and how to *measure* such a performance? Regarding the subject of *performance*, there are

published a number of papers, books, etc. As part of that, the recent special research-project on performance based building (PEBBU, initiated by the international CIB-community, within the 5th EU-framework programme) has brought several interesting results on this theme. Important is the definition, as chosen by Szigeti and Davis within PEBBU, as described earlier by Gibson: *'The performance approach is [...] the practice of thinking and working in terms of ends rather than means'*; and: *'It is concerned with what a building or a building product is required to do, and not with prescribing how it is to be constructed'* [Gibson, 1982; Szigeti & Davis, 2005]. In general, this could also be seen as:

- how to 'bridge the gap between delivery and expectation'.

And especially:

- how to 'bridge the gap between the *'hardware / technical / product'* approach and the *'software / social / process'* approach.

The product-approach has to do directly with materials etc., which are nowadays quite well predictable. Therefore they are not that difficult issue anymore, although of course on details still problems can exist.

However, especially that process-approach is a difficult one: It has to do directly with the people involved, which are often unpredictable, especially when originating from different cultural backgrounds. And not only that, also their age and education etc. can result in total different directions regarding e.g. decision-making. And not only from the 'psychophysiological' viewpoint as Crone described [Crone, 2003], but also when using e.g. electronic means in communication and decision-making; those 'technological interfaces' may at the one hand increase the speed and exactness of processing etc., but as e.g. Van der Kam describes in his research on communication-processes within the medical sector [Van der Kam, 2001], decision-making still stays in fact more or less a people's business. Also Adriaanse describes this, when stating that there should be more attention to the social systems, when introducing interorganisational information and communication technologies [Adriaanse, 2007]. And because people are still the key-elements within processes, this means that, although the help of technology for e.g. reducing uncertainty / failures, etc., the (unpredictable) human mind and its background / environment, 'feeding' the expectations, still stays the key in decision making and its result: *satisfied* or *dissatisfied* clients. Also Moreno Bragado points at this issue, when she writes : *'Besides calculative and institutional rationalities, human and organisational behaviour is characterised by intuition and improvisation as well. Such assertion implies a redefinition of rationality'* [Moreno Bragado, 2003].

This follows in fact parallel with the assumptions and findings regarding 'software of the mind', as Hofstede & Hofstede have described this regarding the (business)culture within one of their latest books [Hofstede & Hofstede, 2005], and then leading to an important question:

- *How to guarantee that (multi-cultural) clients (people) will become and stay satisfied during and after the construction and delivery process of their projects?*

The main issue here highlights the importance of focusing on the performance in a multi-cultural environment, i.e. *client's expectations (= wished output)*, parallel or even before the (existing) importance of the *specified output*. This, because the *deviation between the specified and the expected output* often leads to serious conflicts between clients and e.g. contractors and engineers, especially during the moment of delivery: 'The proof of the pudding is in the eating'.

This is represented schematically in figure 1.

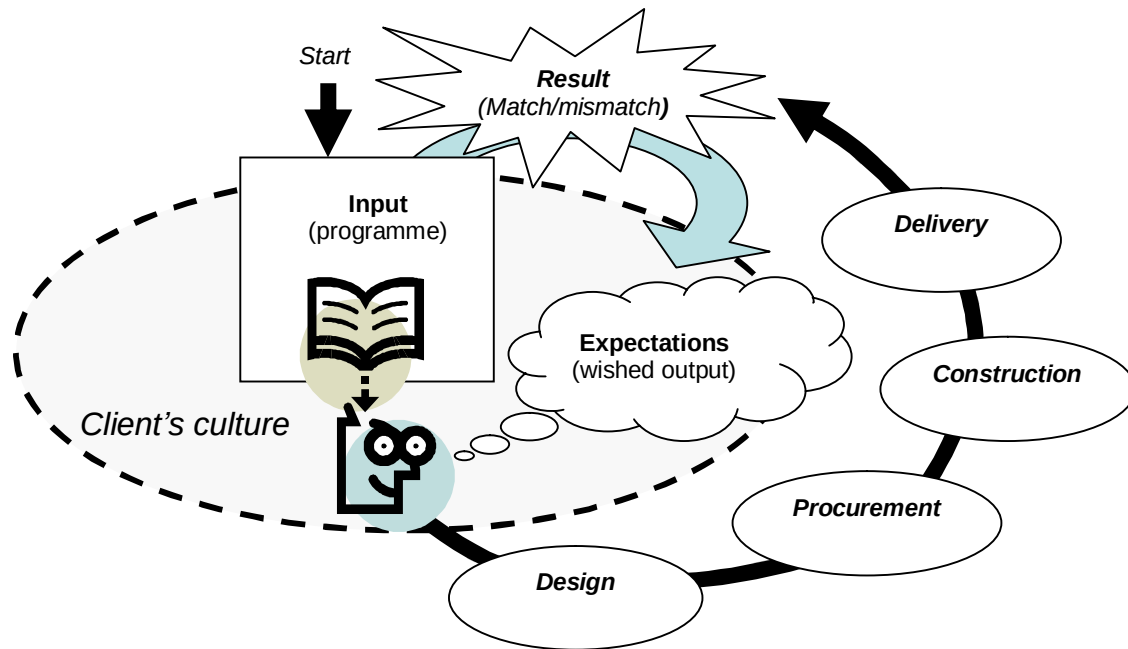


Figure 1. The influence of client's expectations in the total construction process.

The importance of *reducing the deviation* between specifications and expectations is again highlighted more into detail by Moreno Bragado: *'Apart from intuition and improvisation, or maybe because of them, individuals and organisations are not always consistent in their behaviours. When the aim of a decision is constantly changing, neither calculation nor rule-following may lead to satisfactory outcome of the decision'* [Moreno Bragado, 2003]. And she also states that the (lack of) time plays an important role within it: When decision-processes run out of time (as is often the case in construction...?) people take decisions in such a way, that they at least lead to *actions*. So, especially when time-management during these processes is going wrong, the people involved should especially be very sensitive on keeping the right performance within the (construction)process, i.e. a strong focus on the client's expectations instead on just focusing on the project-specifications. This may lead to a serious reduction of conflictuous situations. And time-delays are often occurring, especially when working in an international environment in the transfer of technology (like e.g. international construction projects), as Steenhuis described e.g. for the aircraft industry [Steenhuis, 2000].

RESUME

Highlighting the performance issue in a multi-cultural environment from the viewpoint of a strong focus on client's expectations instead on just focusing on the specifications, results into a balancing between the *'hardware / technical / product'* approach and the *'software / social / process'* approach. Especially and also when working within a multi-cultural environment, in which the expectations may even stronger vary between people / clients involved. Therefore understanding such multi-cultural environments (and the performances of the parties involved within) is considered to be a serious tool for avoiding disputes between the parties involved. The following part describes and analyzes an international multi-cultural case-study, where the expectations and specifications were quite different. This lead to a situation of dissatisfaction; not just for the clients, but for all the parties involved.

CASE STUDY: DEVELOPMENT OF A WELLNESS LEISURE RESORT

INTRODUCTION

The basis for this case-study was a location, situated in the post-communistic region of Central-Europe, on which a large project was developed as a wellness resort. This development took place in the period between ca. 2000-2005, just before the region became officially part of the EU. Because of its very nice location and natural attractive (and sensitive!) environment, including the nearby location of a thermal water source, the concept of 'wellness' was a very suitable way of development.

In general, the structure of the site-layout was as follows:

- A central 'core' with the wellness-spa and other supporting facilities, around which the hospitality-functions (hotels and appartements) were located.
- Nearby also parking-facilities were located, and the whole project could be reached quite easily by road-connections.

The layout is presented schematically in figure 2.

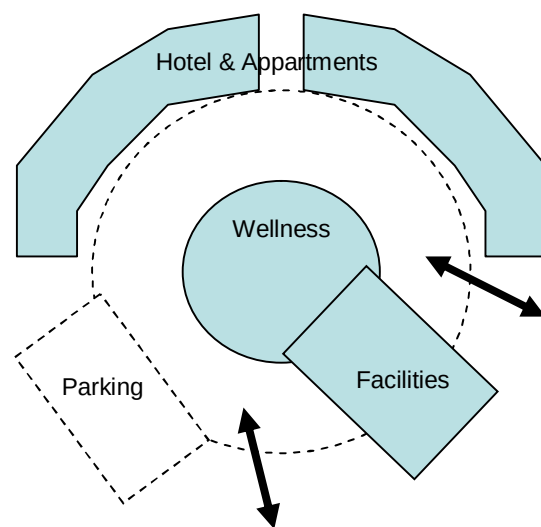


Figure 2. Schematic layout of the project-concept

THE ORGANISATION-STRUCTURE AND PARTIES INVOLVED

In fact the project was designed conform a quite clear concept, focusing on leisure, i.e. wellness / hospitality. Therefore it could still be an interesting project for an end-user / investor. And because the initiator of this project had created a special purpose vehicle (SPV) in which he was the shareholder, together with the designer of this project, it was clear that they were together acting in trying to sell it to an interested investor; however, focus was on selling it (including building-permission / legislation) already in the early planning-phase, before construction etc. had even started. The organisation-structure of the situation is represented in figure 3.

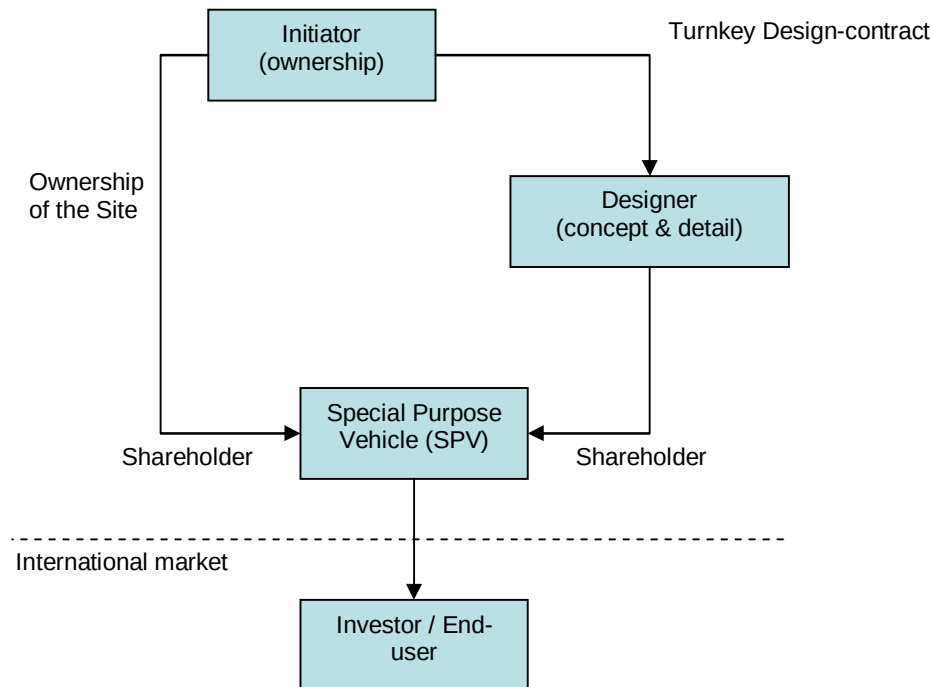


Figure 3. Basic structure of the project-organisation.

THE PROBLEM

Although the project itself had a fine concept, it still had characteristics which caused problems in the negotiations with the interested investors: It was already designed into too much detail, which caused a strong degree of inflexibility regarding changes / adaptations requested by the investor-candidates; the building-permission / legislation was already available. So it would at least cost a lot of money if one would decide to start re-designing and re-engineering the project. And that was a problematic issue of course for all the parties involved.

What was the case? Two main characteristics of the parties involved:

1. *Due to the fact that the initiator was short of money for completing the project at one hand, he had assumed he would still need a complete concept and design (including building-permission / legislation) to be able to sell the location including the project to interesting investors. At least, that was his viewpoint regarding the international investor-market.*
2. *Because the (regional) designer was not willing to work on a no-cure-no-pay basis, the initiator had offered to become co-shareholder of the SPV, in return for his 'free of charge' design-activities. And that resulted into the fact they were both responsible for the succesful selling of the project to an investor.*

These two main characteristics were in fact based on a working-approach, which was quite common in earlier days of the Central-European regions, i.e.: When designing projects in general, this meant to work into the complete –technical- detail etc. in an early stage, only taking into account the location and circumstances. However, in those times there was hardly attention for the final –private?- investors and / or end-users; this, because e.g. in earlier days such projects were generally spoken dominated by state-influence, with hardly any market interference. See e.g. also the descriptions of the detailed designs of widely used standardized concrete panel-flats in Central-Europe, Russia, etc. [Schmiechen & Kochanenko, 1986].

However, in this case there was the private capital market, focusing on their foreseen market of end-users, thus wanting to have flexibility and influence on the concept, design etc. And that was a real problem: The initiators did not recognize this approach of investors, nowadays active in such markets; thus leading to a bad performance, caused mainly by the mismatch between specifications and expectations.

These investors who were still somewhat interested into the project, had in fact two main strategies, apart from the price:

- (a) *They would accept the offer if it included complete fully-let contracts (or at least rental contracts for about 70-80% of the lettable sqm);*
- (b) *Or they would accept the offer, but then merely on the basis of the site including the zoning-permission, so that they would be able to plan themselves another for them suitable development-concept on the site (which meant they would not pay any amount for the already completed detail-designs and building-permission / legislation which, however, were not useful to them).*

And that made it difficult for the initiators to decide what to do.

A SOLUTION?

Because it was obviously very difficult to sell the project to investors for the price they had calculated (so including the designs), there existed in fact two main solutions:

- 1. *reducing the selling-price of the project;*
- 2. *or invest more into the project by themselves, trying to find end-users for the lettable space (and sell it then afterwards).*

The parties involved had chosen to act according to the second solution, so trying to raise and investing some extra capital and energy in the project, trying to get a well-established end-user later on in the development-process. At least they assumed they had a serious chance for that, because during the development-period between ca. 2000-2005 it became more and more clear that this region would become part of EU. So that was boosting the investment-climate positively at the one hand, but on the other hand also stimulated competitors to start also such kind of projects, with actualized / modernized and flexible development-concepts, thus raising the competition in this segment of the market by delivering a better performance to possible investors than this project did.

In the end the project itself was not successful after all; it pointed out that it had been too ambitious and with the wrong –inflexible– concept, not matching with the expectations of possible investors; so in fact the project ‘lost the momentum in the market’. And it may be clear that the parties involved were of course very disappointed, due to the high costs spent for design and engineering, capital, etc. However, they learnt their lessons...

LESSONS LEARNT

When analyzing this case-study more into detail, it is interesting to see some lessons in this, based on three aspects: (1) *Technology*, (2) *Process* and (3) *People*.

(1) Technology:

In this project, there was no lack of technology at all. The parties involved were professional engineering / design parties, which were experienced during their past in the local and national markets, generally focusing on the technical details. So from the viewpoint of technological solutions it was even quite sophisticated.

However, the potential investors were quite impressed by the total design etc., but did not see a profitable market at all for that concept on that location. It simply did not have any suitable ‘market performance’.

(2) Process:

Starting such a large project without having enough money to complete it, is often the case within project-developments; the initiators go and seek for investors / end-users during the development-process; however, one should be aware that the level of project / concept-flexibility should still stay quite high then during the development-process, so that potential investors still can have influence on the final concept and design. This makes it quite easy and possible to create a 'tailor made' solution with a suitable performance delivered. Thus, one should always keep 'space' for matching the specifications and expectations of parties involved.

(3) People:

Although the parties involved had good references and technological experiences on a regional and even national level, they were obviously less focused on clients with an international (multi-cultural) background. These investors were focusing different into the market, and were acting on a more 'helicopter-view' level, analyzing around other regions and developments, too. However, this was quite difficult to understand for the initiators, because during the process of development this project more or less became their 'baby', making it nearly impossible to let them change their viewpoints. And this not only from a personal point of view, but also from a process-point of view: They simply had already invested too much capital by going too much into detail-designs, before making their mind up to see what would fit best for what type of clients / investors.

CONCLUSIONS & RECOMMENDATIONS

CONCLUSIONS

1. Because a product / service / project can only be sold successfully if it meets the expectations and specifications of the client, it is of first importance that one understands the (foreseen group of) client(s), even before starting detail-designs, etc. Therefore understanding multi-cultural performances in project-environments can be a serious tool for dispute-avoidance between the parties involved.

2. A technological approach to deliver performance in projects etc. is just one piece of the case, however often practised by employees in construction industry (e.g. due to their often technical background). In this, it mainly has to do with matching the project-outcomes with the process-phase in which the client is making up his mind, i.e. working from detail-level to next detail-level, being a more psychological / process-approach.

3. Early involvement of parties involved is preferably needed, with also taking into account their (cultural) background. However, the market-dynamics still can create a situation in which one would not prefer to have all the parties involved from an early beginning; but this leads in general to a kind of power-play, which is normally not the recipe for a suitable performance on projects, because it is often the basis for raising conflicts further on in the process.

RECOMMENDATIONS

a. Working in international (multi-cultural) markets needs people, being open minded for other (working-) approaches. This indicates the need for further knowledge and experience of working in such markets, but also a need for understanding one's own approach, being able and open-minded to reflect and improve it against other and / or new (working-) approaches.

b. The description of 'the' market is a weak indicator, because 'the' market does not exist. Therefore it is needed to understand the dynamics of nowadays markets, assuming that what is right today could be wrong tomorrow; thus emphasizing the need for setting clear project-goals, but within a flexible approach towards solutions etc. during the development-process.

c. Apart from the (cultural) *characteristics* it would also be interesting and useful to explore and learn more into detail if and which patterns do exist in the *process* of overcoming objections regarding (cultural) differences between expectations and specifications in the delivered performances of parties involved in construction projects.

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Managing the Performance of Public Private Partnership Projects to Achieve Value for Money: Key Performance Indicators Selection

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ABSTRACT

Public Private Partnerships (PPPs) have been applied in global construction market. During the lifecycle of the projects, many variables affect the performance of PPPs. However, some problems are related with multiple variables in practice. The application of PPPs has its own characteristics (e.g. stakeholders' management, government regulations, transfer management, and complicated procurement system). These characteristics present a different practice in PPPs from that in traditional construction activities. Previous researches mainly focus on the planning, success measurement, and risk management, which ignore the process variables that can strongly influence the performance of PPPs. This paper puts the insights into the performance management to manage the process of PPPs aiming to improve the outputs of PPPs. Furthermore, paper investigates the characteristics of PPPs and identifies the Key Performance Indicators (KPIs) in assessing projects performance to achieve Value for Money. The KPIs are useful tools for project performance management and performance measurement in identifying the strength and weakness, thus appropriate decision can be adopted for improving efficiency, effective and economy, which will benefit both of public and private sectors.

Keywords: Public Private Partnerships (PPPs); Key Performance Indicators (KPIs); Performance management; Performance measurement

1. INTRODUCTION

A wide spectrum of options is available for the delivery of public infrastructure and services, ranging from direct provision by the government to outright privatization, with increasing responsibilities, risks, commitment, and rewards transferred from the government to the private sector (NCPPP, 2002). For example, supply and service contracts usually have a short duration. In such contracts, the private contractor performs specified tasks (e.g., material/equipment supplies, works construction and facilities maintenance) whereas it is not directly responsible for providing related services. In a lease-and-operate contract, the private contractor operates and maintains the facilities at its own risk against the payment of a lease fee. In a build-operate-transfer (BOT) project, the private contractor is also responsible for building and financing the project and it has to transfer project facilities in operational conditions and free of costs to the government at the end of the concession term. In divestiture, the ownership of existing assets and the responsibility for future expansion and upkeep are transferred to the private contractor, in addition to financing and carrying out the investments required to meet the obligations specified in the contract and/or a general regulatory framework (Zhang, 2006b).

Public/private partnerships (PPPs) are characterized by the degree to which the public and private sectors share the risks, obligations, and benefits of a project. The mix of public and private responsibilities and the risk allocation scheme used vary from project to project, and the structure of the partnership depends on the particular mix of responsibilities. The mix of financing instruments between the public and private sectors can be very diverse, as shown by the experience of certain European countries where private and public sector capitals coexist in varying proportions, according to the rules of private enterprise. The government involved may be federal, state, or local, while the specific agencies involved are often departments of transportation, energy, water, education or other independent authorities. The private parties may include firms specializing in public/private infrastructure, construction companies, equipment manufacturers, operations specialists, real estate developers, and various advisors.

However, numerous studies to date demonstrated that problems of PPPs are caused by the interaction of multiple factors during the life cycle of the projects, including cost, quality, schedule, management ability and so forth, rather than a single factor (CEPAL, 2005; Koppenjan, 2005; Li et al., 2005b; Zhang, 2005b; Askar and Gab-Allah, 2002). As concluded by Sanghi et al. (2007), the problems of PPP projects related to the public sector contains poor procurement incentives, lack of coordination, lack of skills in PPPs, high transaction cost, and lack of information etc. Therefore, how to construct a better implementation framework and how to make PPPs more efficient are interesting and attractive, which is not only limited in the stage of preconstruction, planning, or operation, but also expanded to the integration of whole process to manage multiple factors that can affect the PPP projects to improve the outputs.

As mentioned above, PPPs are long-term contractual relationships with numerous factors that can affect the projects. Numerous cases have shown that a successful PPP project should

integrate multiple factors deputed in this figure. Problems reported with PPPs include a high costs in tendering, complex negotiations, cost restraints on innovation, and differing or conflicting objectives among the project stakeholders (Akintoye et al., 2003). It is therefore important to explore a series of KPIs. The role of performance objectives in performance management is the baseline for performance measurement that is the process of determining how successful organizations or individuals have been in attaining the objectives. Therefore, the objective of this research is to find the stakeholders' best-value performance indicators by case studies and literature reviews, and establish criteria system to evaluate the process of the PPP projects.

2. LITERATURE REVIEW

2.1 The prior research in PPPs

PPPs are contractual relationships between the public and private sectors in infrastructure development. The Canadian Council for Public Private Partnerships (2004) defines PPP as “a cooperative venture between the public and private sectors, built on the expertise of each partner that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards.” PPPs have been practiced worldwide in both developed and developing countries with multiple objectives including promoting infrastructure development, reducing costs, increasing construction and operation efficiencies, and improving service quality by incorporating the private sectors' knowledge, expertise, and capital.

In this research field, a series of problems have attracted researchers' interests. To date, much of the extant literature has been restricted to examining one of the following four aspects of PPPs:

- Providing an explanation for the rise in their popularity with government and some problem conclusions (Zhang, 2005a; Koppenjan, 2005; Spackman, 2002; Thuen and LÆRUM, 2005; Askar and Gab-Allah, 2002; Badshah, 1998; Mustafa, 1999).
- Discussing the outcomes of PPP projects based on the case studies (Tiong, 1990; Boase, 2000; Abdul-Aziz, 2001; Bloomfield, 2006; Lim, 2007).
- Suggestions on how to make decisions to implement a PPP project mainly including tender selection and future risks analysis (Akintoye, et al., 2003; Alonso-Conde et al., 2006; Kumaraswamy and Morris, 2002; Kumaraswamy and Anvuur, 2008; Lo et al., 1997; Tiong and McCarthy, 1992; Tiong 1994a; Tiong 1994b; Wang, 1999; Zhang et al., 2002; Zhang, 2005b)
- Examining the criteria that make for a successful PPP project (Li et al., 2005b; NAO, 2001; Qiao et al., 2001; Tiong et al., 1992).

Unfortunately, little in these literatures provides insight into the management of this form of inter-organizational relationship, process control. In general, the existing literatures are concerned with examining PPPs at only the broad social or organizational level, thus providing few insights into the ongoing managerial life of a PPP. This deficiency in the literature, then,

represents a significant gap in the current understanding of PPPs. Noble and Jones (2006) concluded that lack of micro-management analysis and lack of stage-specific analysis are two critical problems in the research.

Notwithstanding a few researchers have moved their insights into the process of the PPP projects (Noble and Jones, 2006; Chan et al., 2005; Carllio et al., 2006), the prior research mainly focuses on a single factor of the process, which in the outcomes of their analysis may lead to neglect the influence of other factors. Therefore, it is necessary to establish an integrated system to control and measure the whole process of a PPP project to help PPPs to achieve its intended objectives. In other words, all factors must be considered if they may affect the process, implementation and success of a PPP project.

2.2 Related research in performance management and measurement in construction

Throughout the last several decades, a number of industries, primarily manufacturing, have introduced new methods and techniques to shift traditional paradigms in order to improve their performance. This has led to the creation of new philosophies, e.g. concurrent engineering/construction, lean production/construction, just in time (JIT), total quality management (TQM), etc. The main driver behind those philosophies is the optimization of an organization's performance both internally and externally within its respective marketplace, which has been inevitably introduced to construction industry. Kagioglou et al. (2001) presented a framework which ensured that effective strategies were deployed to form the performance management system that construction organizations can adopt. Bititci et al. (1997) explained the distinction between performance management and measurement. The performance system can be seen as a closed loop control system which deploys policy and strategy, and obtain feedback from various levels in order to manage the performance of the construction projects. Based on the admiring achievement in the field of performance management and measurement in manufacturing industry and primary success in construction industry, performance management and measurement can be viewed as an effective tool to help PPPs, which are long-term with high risk and a series of influence factors. It aims to establish an integrated system to track key indicators during the life-cycle process, measure them to feedback, and continually improving performance.

3. RESEARCH METHODOLOGY

KPIs are compilations of data measures used to assess the performance of a PPP project operation. They are the methods management uses to evaluate the performance of a particular project. These evaluations typically compare the actual and estimated performance in terms of effectiveness, efficiency, and quality in terms of both workmanship and product.

Generalized models exist for implementing and monitoring traditional construction activities, but they fail to identify which indicators will accurately portray the changes in performance. Instead of reporting and disseminating every piece of information gathered on the job, a more simplified

method should be used to gather only that data which directly predicts performance for the task to be measured. Furthermore, a specific model aiming to report and monitor the performance of PPP projects is needed to be established. In order to measure performance or calculate the effects of any given change on the process a PPP project, one must first determine the appropriate KPIs to focus on to measure its impact. Accurate analysis of construction performance can be attained only after the key indicators are determined and monitored.

Using a process viewpoint, this paper extensively investigates the factors that can influence the project performance during the process/lifecycle of the PPP projects. In order to identify these key indicators, there are two main research phases: the establishment of conceptual model of performance indicator system, and the identification of KPIs of PPP projects. Each phase provides progressive focus for the next. First, the establishment of conceptual model phase is carried out to develop an indicator system to measure the PPP projects' performance according to the findings of literature review. The conceptual model is conducted on the basis of stakeholders' requirements by integrating the factors that would influence the performance of the projects aiming to improve the efficiency and effectiveness of PPPs, which provide a narrative of performance management in PPPs. Finally, the KPIs in PPP projects are identified under the guiding of conceptual model as well as comprehensive literature review related to the PPP application.

4. THE METRICS OF SELECTING KPIS IN PPP PROJECTS

During the lifecycle of the PPP projects, the performance of PPP projects will change which can be influenced by several factors. Some of these factors are static which would be traditionally fixed at the beginning of the projects in the given social economic environment for special projects. The studies on PPPs also indicate that these factors would influence the future performance of the projects, e.g. design, construction and operation. The other factors are dynamic during the period of projects, which will be affected by external environment or internal operational factors so that will furthermore influence the performance, e.g. financing ability, public satisfactions and management ability of SPV. On the other hand, PPPs can supply higher level public service than traditional construction activities, which has been proved by some researches and practical cases. PPPs always stress on Value for Money (VfM) and innovation on the basis of concordant partnership. Therefore, the factors can influence the performance of PPP projects would be more complicated than traditional construction activities, which should consider the integration of static and dynamic factors and the benefits of different stakeholders to achieve VfM.

Meanwhile, the performance indicators can be described as a potential effectiveness attribute of a system. It is "how good" a system is, in objectively measurable term. It should satisfy following needs.

- are valued by defined stakeholders;
- are always capable of being specified quantitatively;
- can be complex notion, consisting of many elementary performance attributes.

5. THE VIEW OF KPIS SYSTEM IN PPP PROJECTS

5.1 Establishing the KPIs System in PPPs

As shown in Fig.1, This performance indicator system is divided into three parts. The first is the original characteristics and features of the PPP projects which will affect the performance of the projects at the beginning stage. These indicators will usually not change during the whole life cycle of the PPP projects, but they will strongly influence the concessionaire selection, the agreement between the private and public sectors, risk allocation and to what extent the project will achieve success under the influence of economic, legal, political environment in a particular host country of the projects. The second is composed of financial and marketing indicators, innovation and learning indicators, and stakeholders' indicators. This part reflect special projects characteristic from the perspective of economic, innovation, culture, and the benefit of the stakeholders. The third part indicates the factors may affect the process of construction, operation, maintenance, transfer and post-transfer. In the second and third part, all indicators should be dynamic and measurable to reflect the efficiency, customer satisfaction, business success, product requirement, and future potential of the projects. Any performance change can also be measured by these indicators.

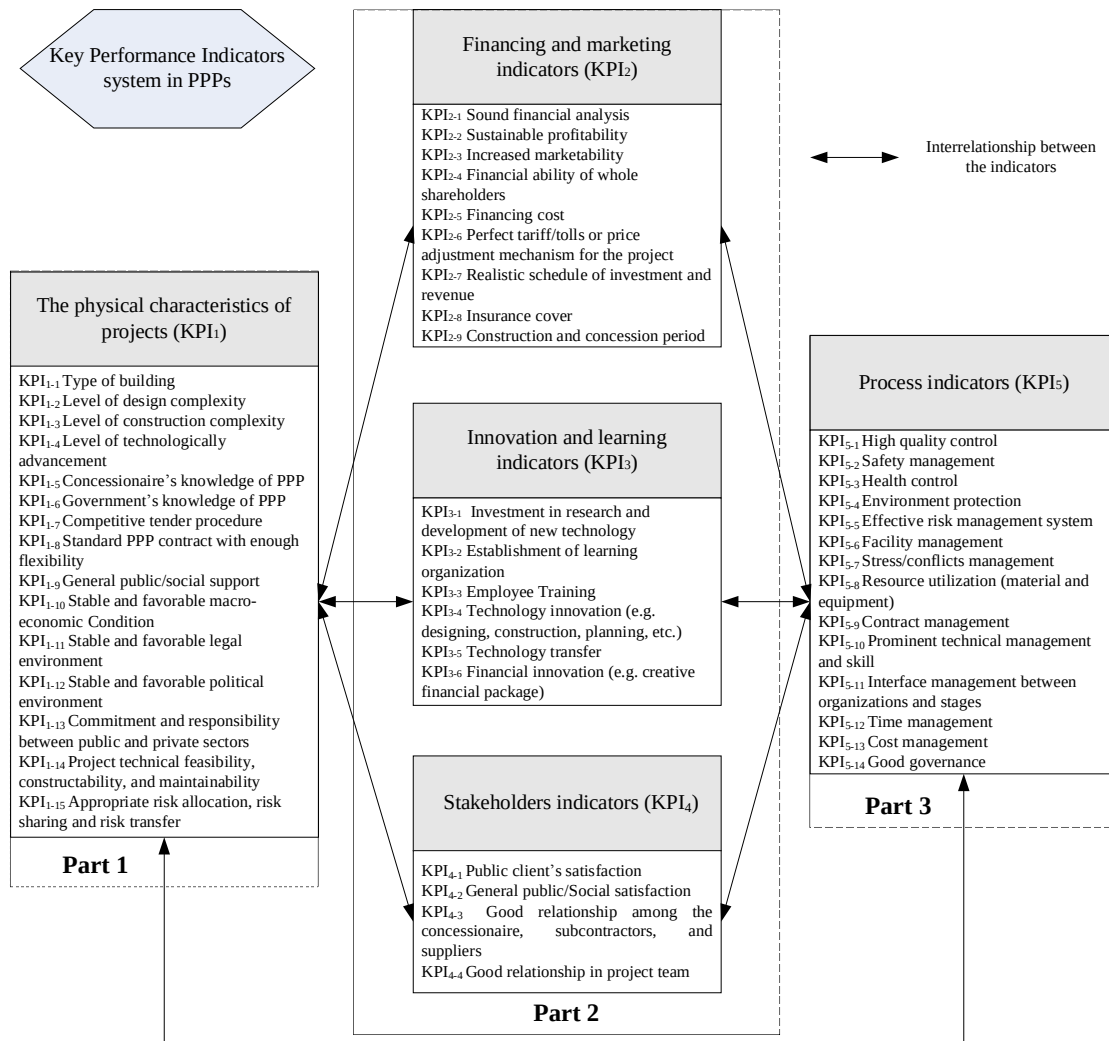


Figure 1. The framework of KPIs in PPPs

5.2 Remarking the KPIs in PPPs

5.2.1 The physical characteristics of projects (KPI₁)

In spite of wide application of PPPs in numerous fields, Bloomfield (2006) points out that local governments embarking on long-term PPP contracts must invest in specialized field with effective contract management and strong governance structures. The type of construction should be considered carefully. Furthermore, design, construction plan, and technical scheme become especially complex since PPPs have been applied to complete large scale and complicated infrastructure projects (Askar and Gab-Allah, 2002). Therefore, the issues related to these factors should be paid attention to.

In some cases, both the public and private sectors may not be ready for the PPP project if it is adopted just because of the urgent need of more infrastructure facilities. For the public sector, it may be an inexperienced body lacking proper understanding of PPPs. Government may

have unreasonable expectations of the private sector. On the other side, the private sector may lack people prepared for working on the PPP projects, understanding among the stakeholders, managerial expertise, experienced project management team, good coordination and team work with concessionaire consortium, the ability to deliver quality service for price offered, and the ability to identify and manage risks (Zhang, 2005a; Li, 2005b;). Compare to traditional construction activities, procurement in PPPs is more complicated. Efficient procurement will select the proper private sector that can undertake the project as the party best able to get contract, which has been viewed as an important factor for a successful PPP project by several researches and some case studies (Wang et al., 2000; Zhang and Kumaraswamy, 2001; Zhang et al., 2002; Li, 2005a; Kumaraswamy and Anvuur, 2008). Then, a long-term contract will be signed between the public and private sectors. Based on some case studies, lack of standardized agreement may result in slower and more expensive procurement process than non-PPP procurement so that overtime and cost overrun of the whole life-cycle will happen (CEPAL, 2005; Akintoye et al., 2003). Therefore, making procurement process more efficient can benefit the performance of the PPP projects greatly.

The promoter of a PPP project should make an adequate and sustained marketing campaign so that the citizens or general public can understand the long-term implications and benefits of the project. This kind of support is very important for procurement process, achieving success and gaining viability in the PPP projects (Salman, 2007). On the other hand, economic, legal and political environment can influence the performance of PPP projects, which have very close relationship with local community of the PPP projects. When success factors, risk factors and viability factors are considered, economic, legal and political factors are also important (Li et al, 2005a; Zhang, 2006a; Salman, 2007). Furthermore, the commitment and responsibility of both the public and private sectors are viewed as a significant successful factor in PPP projects (Li et al, 2005a; Akintoye et al., 2003). All parties should commit their best resources (financial, human, etc.) to the partnership project to achieve value for money and maintain the projects in high performance.

Technical feasibility is the key that can provide an imaginative technical solution for the PPP projects (Zhang, 2006b). Improving constructability of PPP projects is the responsibility of all project stakeholders: public sector, private sector, designers, and subcontractors. On the basis of technical feasibility and constructability, maintainability is a necessary considered factor in the operation stage of PPP projects which can improve internal value of facility and prolong facility's operation period that can provide a good condition for project transfer (Zhang, 2006a).

It is obvious that risk is a crucial issue in the PPP projects, which has been studied broadly and has been proved by lots of cases. How to allocate risks, how to share them and how to transfer them should be considered very seriously. A good risk management mechanism should be established before the implementation of the PPP projects, which could greatly act on the performance (Li et al., 2005b; Alonso-Conde et al., 2007).

5.2.2 Financing and marketing (KPI₂)

There is a wide range of risks and uncertainties related to a PPP project in the long concession period (Askar and Gab-Allah 2002). The occurrence of one or more of these risks can lead to serious financial consequences to the concessionaire, which may result in the failure of the projects. Furthermore, the project company of a PPP project is usually a SPV (distinct legal entity) using no recourse or limited-recourse financing, which requires appropriate financing techniques. Therefore, a strong financial capability is essential to the successful development of a PPP project (Zhang, 2005b). At the same time, improving marketability can greatly help concessionaire to deal with financial issues and obtain more revenue and profit, which can release the pressure of financial risks to make sure that SPV can focus on construction, operation and market development.

Sound financial analysis refers to that important financial aspects should be analyzed adequately, which contains high equity/debt ratio and low tariff/toll or unit price, which means increased capability of concessionaire to overcome financial difficulties and higher commitment to project success (Zhang, 2005b). Based on the survey of Salman et al. (2007) about viability of the BOT projects, "return of investment (ROI)" is the fifth important factor in 21 factors. This is also an attractive factor to encourage the private sector to operate PPP projects more efficient and the public to take full responsibility to supervise the PPP projects because of sharing profits with private sector (Li et al., 2005b). On the basis of profitability, marketability shows concessionaire's ability to possess current market and develop future market (Zhang, 2005b). Financing cost refers to low financial service charge, fixed and low interest rate financing, long-term loan financing and low cost from fluctuations of currency and exchange rate, which would minimize financing and refinancing risks (Zhang, 2005b).

Tariff/tolls or price adjustment mechanism should safeguard consumers' interests without undermining the project viability, while maintaining a certain incentive for the private sector to develop and operate projects efficiently (Ye and Tiong, 2003). Realistic schedule of investment and revenue refers to the schedule of all financial sources (including equity, debt and repayment) and their combination in the development of the project. Revenues distribution can affect the normal operation of the project; contingencies should be made for possible risks in different areas (Zhang, 2005b). One case of Highway project of Nova Scotia, Canada studied by Yeo and Tiong (2000) indicates that the debt repayment schedule structured by proactive management of risk enables project to match the projected revenues and to meet the local government's desired toll levels, which consequently reduce political risk and commercial risk. In order to reduce and transfer various types of risks, insurance coverage should be examined thoroughly. Short concession period means low total costs to the public client and high operation risk to the private. Short construction period and reasonable concession period are critical for the PPP projects' viability (Salman et al., 2007).

5.2.3 Innovation and learning (KPI₃)

Innovation and learning can be considered as important factors to influence the performance of PPP projects. The PPP project is the long-term process with high risks, competition, and uncertainty, which needs both the private and public sectors to learn advanced knowledge,

experience, and all of relative useful information. Enough investment on the research, excellent learning organization and perfect training mechanism can help to continually increase the capacity to improve performance by gaining new knowledge. Innovation on the other hand is the way of applying new knowledge/technique in strategic planning, process design, creative financial package, and resource allocation and management in order to improve performance and sustain competitive advantage. The initiative drive comes from related risks and high requirement from the public sectors force SPV to adopt new technology and management methods and to apply patents in order to reduce cost, shorten time and release risks (Shen et al., 2004). In other words, PPPs present further concepts of BOT and PFI, which needs long-term cooperation between the public and private sectors, steady-going financial support and complicated technology. Considering all of factors above, PPP projects can afford a platform for Technology Transfer. Knowledge or technology transfer could also be an effective mechanism for mitigating risks, a key issue in an increasingly complex PPP environment (Carrillo, 2006).

5.2.4 Stakeholders (KPI₄)

Stakeholder opposition has been reported as the main reason for project failures of PPP projects in several instances. As such, capturing and addressing of stakeholder inputs is crucial to the success of the PPP projects (El-Gohary et al., 2006). Therefore, the 4 indicators in Fig.5 are selected as indicators to present the performance of PPP projects.

The problems of public sector including budget, time and restraint beset many municipal and other public authorities, especially in terms of improving public infrastructure and delivering essential services. Clearly, the attractiveness of PPPs in addressing this problem is fully recognized by stakeholders, which drive the private sector to satisfy public client to improve social welfare (e.g. price, environment, convenience, opportunity for job etc.) to make society happy (Li et al., 2005b). General contractors are continuously involved in a process of transforming inputs (i.e. materials, labor, and capital) into outputs (e.g. constructed facility), during which the private sectors are accompanied by a number of other firms such as subcontractors, material vendors, and equipment dealers. Kale and Arditi (2001) reveal that maintaining a relationship of high quality with subcontractors is positively and strongly associated with the perceived performance. In the PPP context, this relationship is extremely more important than in traditional construction methods (Kumaraswamy and Anvuur, 2008). Therefore, a growing body of research supports the view that contractual parties are more willing to cooperate and to build good relationships on longer-term contracts in PPPs. On the other hand, good relationship in project team (SPV) is mainly used to evaluate team management, interior organization structure, and organizational culture, which is expressed by team value and team attitude (Kumaraswamy and Anvuur, 2008).

5.2.5 Process (KPI₅)

In order to deliver value to stakeholders and the project, SPV must be sure they have right process and capabilities in place. The measurement allows to trace which processes and capabilities must be competitively and distinctive, and which merely need to be improved or

maintained. The process indicators can help track if the process is delivering values they were intended for, which will help the owner to track the capabilities of processes (weakness and strengths) in affording value to stakeholders. Thus the 14 indicators can be considered as process indicators.

In this package some indicators are from traditional performance management in construction. However, their duration period include construction and operation. These indicators include high quality control, safety management, health control, environment protection, resource utilization (material and equipment), contract management, prominent technical management and skill, time management, and cost management. Further explanation in detail of these indicators can be found in the research of Shen et al. (2004), Kagioglou et al (2001), and Zhang (2006b). And other indicators are selected because of their unique characteristic in PPPs including effective risk management system, facility management, stress/conflicts management, interface management between organizations and stages, and good governance.

Risk management involves using skill and experience of various risk management methods. In operational stage of the PPP projects, various facilities management actions should be taken periodically. In the report of CEPAL (2005), facility management is a weakness in the process of the PPP project. It includes the ability to allocate the limited resources for short-term and long-term work programs; the ability to optimize the distribution of the limited periodical budgets in the facility; the ability to predict the level of performance of the facility (Zhang, 2006c). PPPs reverse the over fragmentation of functions in a traditional design-bid-build (DBB) contract that often leads to divergent if not confrontational agendas of the multiple participants, providing a great potential of reduced dispute and claims. Hence effective stress/conflict management can supply a good work environment to improve outcome of performance. Interface management (IM) is the management of communication, coordination, and responsibility across a common boundary between two organizations, phases, or physical entities which are interdependent. Organizational interfaces, lifecycle interfaces, and physical interfaces are believed are important to BOT project management by Chan et al. (2005). Badshah (1998) emphasizes that good governance is essential to attract private sector participation in public services delivery. In UK PFI projects, most authorities and contractors consider that governance arrangements are working well to delivery high quality (NAO, 2001). Therefore, Li et al. (2005b) concludes that good governance is a significant success factor in the PPP projects, which can affect the performance of the PPP projects.

6. Conclusions

In response to urgent need and modern development, some attempt has been made by both of the public and private to promote PPPs from the traditional concept of construction. Many researches have put insights into this field from four directions. First, it is provided an explanation for the rise in their popularity with government and some problem conclusions. Second, the outcomes of PPP projects based on the case studies are discussed. Third, the suggestions on how to make a decision to implement a PPP project are given. The last, the

criteria that make for a successful PPP project are examined.

There may be disappointment in some quarters that the researches on PPPs have not gone all the way to provide the appropriate and perfect method to manage the performance of PPP projects to achieve VfM. Performance management has been introduced into construction industry for many years, which has been proved a effective method to improve the outcomes of the projects. In this paper, a KPIs system is selected based on the characteristic of PPPs and the concept of VfM in order to establish a base for further research on the performance management on PPPs.

On the other hand, the KPIs of PPPs can be used as the criterion for performance evaluation. Thus the indicators are very important for ensuring both of public and private sectors to make appropriate decisions during the lifecycle of the PPP projects in order to promote the value of PPPs. This study has found that a sophisticated set of indicators that can be applied in the system of performance management. This sophistication is suggested due to the implementation of complicated macro and micro conditions during the lifecycle of projects. Proper understanding of these performance indicators has the same significance to both public and private sectors as a long-term partnership should be established. The KPIs used in performance management are identified from five attributes: the original characteristics of projects, financing and marketing, innovation and learning, stakeholders and process.

Although the KPIs are selected in this paper, it is only a step towards an understanding of the performance management in PPP projects. However, there are extensive works should be accomplished. The next step after selecting the KPIs is that they will be included in a questionnaire survey instrument that also addressed wider issues involved in the PPP projects. The foundations layed out in this paper are the base for future research in this regard.

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Height and construction costs of residential buildings in Hong Kong and Shanghai

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ABSTRACT

A widely recognised theme of construction economics suggests that the cost of construction per square metre increases as building height rises. However, after many years, research conducted regarding the height and cost issue have established a classic relationship between those two, well known as a U-shaped curve. This paper describes the study of height-cost relationship of high-rise residential buildings in Shanghai and Hong Kong. Initial findings indicated that the curved relationships of height-cost of residential buildings in Shanghai and Hong Kong exhibit different profiles. The differences suggest that, Hong Kong contractors have more expertise in multi-storey and high-rise construction than contractors in Shanghai. The dissimilarities also imply that different sets of criteria should be applied in the judgement of height affects cost in different locations. Many factors could be contributors, such as the history and experience in constructing residential high-rise buildings, location, linkage and relationships to the neighbourhood provinces, design and construction regulations, and government policy on residential construction.

Keywords: high-rise, residential building, height-cost, economics.

1. INTRODUCTION

The study described in this paper focused on the height and cost relationship of high-rise residential buildings in the Asia Pacific region. Two cities were chosen—Shanghai and Hong Kong.

In the 19th century, after defeat in the First Opium War, Shanghai was opened as one of the treaty ports for international trade. The Chinese government was forced to accept Hong Kong as a Crown Colony of Great Britain on a 99-year lease. Shanghai and Hong Kong are frequently described as places where East meets West. Western culture is deeply ingrained in both cities and coexists with the traditional philosophies and practices of the Chinese.

After the Chinese Civil War and Chinese Revolution in 1949, with a large amount of migrants moving into Hong Kong from fear of persecution by the Communist Party, many corporations in Shanghai and Guangzhou also moved to Hong Kong including many architecture and construction companies. The colony became the sole place of contact between mainland China and the Western world. After the transfer of sovereignty in 1997, Hong Kong is still governed as a special administrative region. The autonomous status enables Hong Kong to serve as an exchange bridge for investments and resources flowing into and out of the mainland.

Shanghai started its economic reforms in 1991. Today, Shanghai and Hong Kong bridge trade and investment flows to different regions in China and the Asia Pacific. As Shanghai's largest foreign investor, Hong Kong has brought not only capital to the city, but also the management expertise and business experience of its companies, as well as other foreign partners via their investment and co-operation with local firms. Shanghai is increasingly seen as Hong Kong's competitor. This competitive environment creates more opportunities with rising transactions between the two cities (HKTDC, 2008).

Hong Kong and Shanghai are both high-density cities, sharing a similar cultural heritage and both are regarded as the fastest growing cities in the world. In Emporis Corporation (2008) a ranking of cities is presented in terms of “most compelling skyline”. Essentially, it identifies those cities with a significant number of tall buildings and the visual impact that this presents.

Hong Kong, famous for its dynamic building developments, is reorganised as having the most compelling skyline in the world. Shanghai, currently experiencing a major high-rise building boom, is ranked at 7th. These observations led to the selection of Shanghai as the city for comparison in this study.

Today, the world's tallest building proposals are of concrete construction and of residential or mixed-use functions (Oldfield, 2007). High-rise residential building developments have become the main focus of high-rise construction, due to the constraints of high-density, shortage of land, and lack of space in Hong Kong and Shanghai. The overall magnitude of high-rise residential projects is reaching levels seldom seen before. Today, projects in Shanghai and Hong Kong very often include a series of 10, 20, 30 or more similar buildings, and comprise several thousand dwellings. Residential buildings will commonly reach heights of 60 or 70, even 80 storeys (Binder 2002). Binder (2002) also suggests that a "hierarchy of spaces, elegant proportions, and quality detail" is commonplace and will continuously stand as the gold standard for high-rise luxury, residential living in Hong Kong and Shanghai.

Over the years, various studies have been conducted to examine the height-cost relationship, mainly sourcing data in western countries. However, having examined the wider research carried out in other aspects of high-rise buildings (for example, the technologies involved), there appears to be a dearth of investigations looking at the relationship between height and cost in high rise buildings. In particular, Hong Kong and Shanghai with their heavy concentration of tall buildings have had limited attention.

In this study, a comparative study was carried out, based on a sample of 35 Hong Kong buildings and 36 Shanghai buildings. The 35 Hong Kong buildings also included the 24 buildings which were examined in a previous study by Picken and Ilozor (2003). The comparison was conducted to analyse the differences and similarities of height-cost relationship in Hong Kong and Shanghai. The aim was to examine the theory put forward by Picken and Ilozor that different sets of criteria should be applied in the judgement of the height affects on cost depending on location, function and commonality of the tall buildings under considerations. This comparison also suggests that there are many other factors which need to be considered in addition to location, function and commonalities, such as the history and experience gained in the construction of residential high-rise buildings, and design and construction regulations, and government development policies.

2. CONSTRUCTION HEIGHT AND COST

Building economics and cost planning professionals are aware of the traditional theories related to the influence of building height on the cost. The belief that the construction cost of high-rise buildings is greater than that of low-rise buildings offering a similar amount of accommodation has become a rule of thumb. A typical perspective would be that a tall structure should only be considered when the land price is expensive. A selection of theories from building economics literature demonstrates the traditional view of height and cost:

The two-storey building performs as cheapest. (Nisbet, 1961) (This statement included in an early study of height and cost, and only referred to buildings in the low-rise range.)

Prices per square foot tended to rise as the number of storeys increased in Britain. Housing in tall multi-storey blocks is around 50 percent more expensive than those in two-storey dwellings. (Stone, 1967)

The cost of a building per square metre of floor area increases with a rise in the number of storeys. (Bathurst and Butler, 1973)

Multi-storey buildings/high-rise buildings would be a design choice only if they could make saving from the tremendous land cost by building upwards. (Cartlidge, 1973)

It is more expensive to build high-rise buildings than low-rise buildings, which offer the same accommodation. (Ferry, Ferry and Brandon, 1999)

Ashworth (2004) concluded some reasons for the assertion of these authors. This contributes to these above viewpoints regarding the height-cost relationship of buildings, with respect to matters such as the higher vertical transportation cost; the delay in site set up; and the increased amounts payable to operatives working at height and the related safety requirements.

In examining the high-rise building literature, many research studies taking a design perspective can be identified, and are focused on construction techniques, energy issues, and the logistics aspects, for example, 'Overview of sustainable design factors in high-rise buildings' by Ali and Armstrong (2008) in proceedings of the Council on Tall Buildings and Urban Habitat international 8th congress, Dubai. Compared to the literature published on these areas, studies on the relationship between height and cost in high-rise buildings appear to be limited. Nevertheless, some research has been accomplished.

Tregenza (1972) carried out a height and cost analysis based on 10 different office buildings, from one to eighteen storeys high. The research found that tall building costs were greater than a low compact building having the same internal floor area. He suggested that the low compact building would give better value for money than a tall building unless the land cost is high. A linear regression line was implied.

Around the same time, Steyert (1972) made a similar study in the USA. He applied a dynamic model instead of a statistical model to analyse the relationship. He concluded that different elements of a building would have different responses to the cost, when the height changed. He also suggested that the cost of some element might decrease with height. Steyert summarized two reasons for cost reduction. Firstly, there would be a learning curve effect. Secondly, the total cost of some items would increase less than proportionately with gross

floor area, such as the roof and foundations.

The contrary discoveries between the UK and USA research raised attention from other scholars in the same field. Flanagan and Norman (1978) took the topic further. They used 15 office buildings more than two storeys height, which were built between 1964 to 1975. They included the 10 buildings used by Tregenza (1972). Their conclusions were that the cost per square metre decreased initially as the number of storeys increased, but eventually it would rise. The U-Shaped curve became well-known as a classic curve in the building economics field to describe the height-cost relationship. Flanagan and Norman firmly suggested that the study above was only a basic theoretical structure, and the precise nature of the impact of height on construction cost needed further investigation. Figure 1 below shows the conclusion of their study.

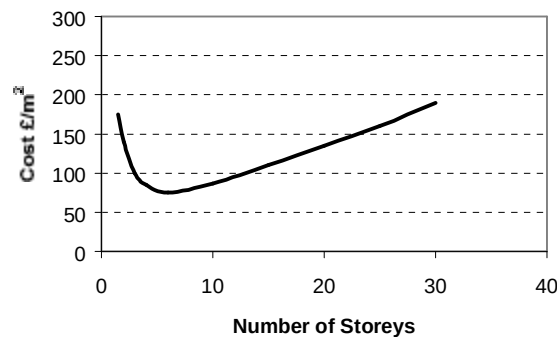


*Figure 1. Cost £/m² of gross floor area versus number of storeys.
(Source: Flanagan and Norman, 1978)*

Newton (1982) carried Flanagan and Norman's study a step further. Although he agreed with their hypothesis, he argued that the relationship varies depending on whether it was the plan area (building footprint) or the gross floor area under consideration. Newton's curves indicate that for constant footprint areas, the increase of height would not cause costs to increase so quickly as for the gross floor areas. Figure 2 below shows the results of his study.

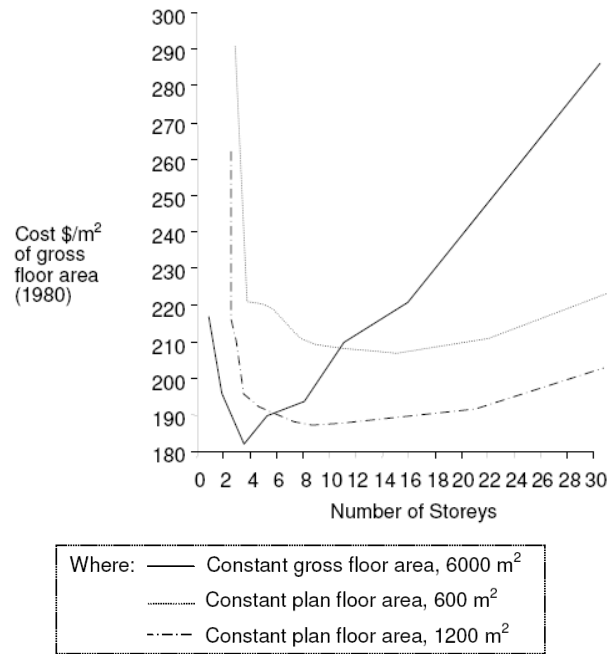


*Figure 2. Selected relationships between cost \$/m² of gross floor area and height.
(Source: Newton, 1982)*

The work of Tan (1999) showed how a simple analytical model could be used to determine construction cost variation with floor level. He described how cost variation with a rise in building height is not only affected by technology, and building design, but is also influenced by demand and institutional factors. Furthermore, Tan strongly recommended that finding the causes of the variation of construction cost and building height is useful for controlling costs or improving the productivity of high-rise construction. His paper contains essential mathematical method analysis. However, his work is theoretical and he does not apply his method to any data relating to actual buildings.

In recent years, research on the height and cost issue was reported by Picken and Ilozor (2003). Instead of commercial buildings, their work used cost figures from 24 residential buildings in Hong Kong completed in the early 1990s, ranging from 3 to 39 storeys. An apparently contradictory result was discovered that increasing height did not appear to cause the expected level of cost increase, showing that, based on the study's Hong Kong data, the total building cost declined until the height reaching 100m based on the study's Hong Kong data.

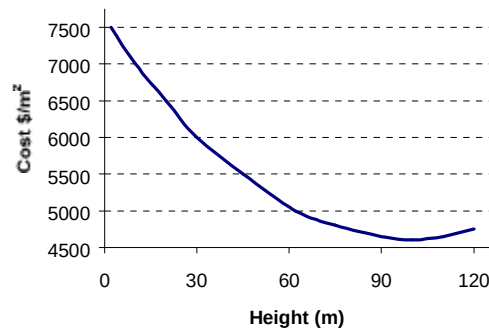


*Figure 3. Cost \$/m² of gross floor area versus height (Hong Kong data).
(Source: Picken and Ilozor, 2003)*

Although Picken and Ilozor still regarded the theory of Flanagan and Norman (1978) as the guideline of studying the relationship between height-cost of high-rise building, they indicated, ‘a different set of criteria should be applied in the judgment of how height affects cost depending on the context and commonality of buildings in the location under consideration.’ (Picken and Ilozor, 2003)

Almost at the same time, Warszawski (2003) analyzed the height and cost relationship of tall buildings from two different viewpoints—those of the developer and of the dweller. 10 to 40 storey high buildings and 5 to 7 storey high buildings were used to make the comparison. The parameters were from much broader perspectives, which included the land and financing cost, risk, costs during use, and even connecting with the intangible impacts of tall buildings on scenery, open spaces, safety, and accessibility.

Lee (2005) briefly analysed the relationship of height and cost based on the Chinese situation. In China, residential buildings are separated into 3 categories based on the difference in the number of storeys—4 to 6 storeys multi-storey building, 7-9 storeys middle-rise building, and over 10 storeys high-rise building. He concluded that the impact of height on cost of building depended on all sorts of different aspects, such as building type, shape, and structure. In principle, if adding one storey does not cause a change of building shape and structural requirements, the unit rate might reduce. However, when the height reaches a critical point, for example, when the existing structure could not uphold the whole building due to the change of height, the structural requirements would change accordingly, and would cause the unit rate to increase.

When carrying out the study described in this paper, the most recent research identified were published in 2007 by Jong, Oss and Wamelink (2007) and by Chau, Wong, Yau and Yeung (2007).

Jong *et al* (2007) studied the economic context of high-rise office buildings in the Netherlands by interviewing experts working on high-rise projects and cost modelling techniques. They analysed seven elemental costs and total construction cost against increases in height.

Structure, installations (building services), and elevator costs were the main factors contributing to the total cost increase with an average of 16%, 25% and 3% respectively. Site costs were also heavily influenced by height. The research discovered that eight storeys is the height of the lowest cost per square metre of the façade structure of the category ‘high-rise’ building in the Netherlands, in effect, the lowest point of their u-curve. They noted that 8 storeys is regarded as the starting point for the experts studying such buildings. Jong *et al.* introduced the term “high-rise-ability” and suggested that building cost is one of the important factors influencing this. They expressed the view that a good understanding of these issues is important in seeking cost reductions during the design process.

Chau *et al* (2007) examined the determination of the building height without the restrictions from the regulation in Hong Kong. Cost data for 54 residential buildings were chosen to test their module $C = C(H, FP, Q_B; \beta)$, where C is the real total construction cost of a project, H is building height, FP is footprint area, Q_B is building quality and β is a vector of unknown parameters. Their study showed that the estimating of the total construction cost is depended not only on the volume of the building (i.e. total floor area), but also on the building shape (i.e. vertical and horizontal dimensions). Additionally, they indicated that market forces can also set a limit on how height the building should be built based on the analysis of the rate of change of the marginal construction cost comparing to the marginal revenue from property sales. However, the 54 buildings were sampled from the public sector and the private sector in Hong Kong. This could cause disparities in cost. Chan and Kumaraswamy (1995) suggested that in Hong Kong, the financing of government projects experiences more rigorous control than private projects. The design deviations, and construction time variations can be effectively minimized by extending standardization and using large prefabricated assemblies for public housing estates. Therefore, the results were not as reliable as expected.

3. METHODOLOGY

This research was developed as an extension of the previous study by Picken and Ilozor (2003). Therefore, the perspective taken in this paper is the relationship between height and total construction cost. Since the previous studies were undertaken in the UK and Hong Kong, it was believed as described above, that the investigation of a third city would be valuable. Picken and Ilozor (2003) suggested that there is a need to enlarge and extend the study in order to explore the height-cost relationship further. They also advised that a larger data sample is needed together with more data on higher buildings. Therefore, their buildings from Hong Kong were included in this study. And were supplemented by a further eleven buildings. The comparison between Hong Kong and Shanghai were set out in Section 1 and identified the basis for selecting Shanghai as a city for comparison.

It is important to note that the area of this research is multi-storey to high-rise buildings. Low-rise buildings are not the main concern. However, the so-called classic U-shape curve by Flanagan and Norman (1978) suggested that the cost per m^2 falls initially with height changes from single storey to five or six storeys. Therefore, it is not necessary to define multi-storey,

merely to indicate that the Hong Kong and Shanghai study described in this paper was not concerned with those height-cost phenomena associated with low-rise buildings. An example of such would be the substructure. The same substructure can be applied to a single storey building or a 2-storey building of the same plan (footprint) area. There is a point where this fall in cost would reach the lowest, when the cost per m² of substructure starts to reflect the need for stronger and more complex structure in higher buildings. It is this latter behaviour that was the form of the study described in this paper.

Compared to other industries, the construction and building industry is unique. No two outputs are exactly the same. Residential buildings have similar functions and structures, which reduce the variations between data. The data studied in this study were categorised as ordinary quality residential buildings. This nomenclature is taken from the Approximate Order of Construction Costs in Hong Kong of Quarterly Hong Kong Construction Cost Report September 2007 published by Rider Levett Bucknall (RLB, 2007).

The study was concerned with the analysis of the relationship between two variables—height and cost. Therefore, regression analysis was employed. Traditionally, the previous studies have hypothesised the presence of a nonlinear relationship with quadratic curved estimation, such as Picken and Ilozor (2003) and Flanagan and Norman (1978). This research also employed the specified relationship—polynomial regression (RICE, 2008). The statistical test used in this study is the Pearson product moment correlation coefficient, since the relationship between two interval level variables were examined (Corty, 2007). Two variables are considered. The independent variable X is height in metres. The dependent variable Y is construction cost (cost/m² = total construction cost divided by gross floor area (GFA)). The hypothesis is nondirectional, so a two tailed test is applied.

4. THE HONG KONG PERSPECTIVE

35 residential buildings were gathered and used in the analysis, ranging from 3 to 73 storeys, including number of storeys, gross floor area (m²), height (m), and cost per square metre (HK\$/m²). They included the 24 residential buildings investigated by Picken and Ilozor (2003). The data for the other 11 buildings were identified in Binder (2002). The buildings were completed between 1990 and 2004, and the data were taken from bills of quantities. Cost figures were adjusted to March 2007 using the Building Works Tender Price Index published by the Hong Kong Government's Architectural Service Department (HKASD, 2007). Table 1 below sets out the data that were collected for the Hong Kong study.

Table 1. Construction cost and height data for Hong Kong buildings.

Project	No. of Storeys	GFA (m ²)	Height (m)	HK\$/m ²
1	3	355	9.45	5766
2	3	753	10.72	5324
3	4	3593	10.64	5624

4	4	3590	13.85	6347
5	4	1160	15.70	8808
6	6	1880	18.28	8163
7	7	4180	27.40	5155
8	7	2047	30.00	6108
9	16	6841	43.00	4042
10	16	10330	47.30	5478
11	19	7470	53.80	6741
12	24	28130	72.96	2806
13	28	100228	94.85	10454
14	30	11329	90.00	5630
15	30	94500	101.00	7466
16	31	16265	84.45	2677
17	34	15314	98.00	6616
18	35	21121	94.10	3842
19	35	39845	167.00	13603
20	36	35288	98.50	3474
21	36	19560	107.80	5135
22	36	21831	108.50	6661
23	37	42745	111.55	3795
24	37	43258	111.55	4281
25	37	42849	112.00	3655
26	39	44678	107.35	3789
27	39	42302	108.20	3758
28	39	169950	120.00	18017
29	39	67738	135.00	8971
30	40	40780	128.00	11189
31	45	65099	178.00	17451
32	47	13277	165.00	21081
33	47	60000	183.00	11415
34	50	68948	139.00	16048
35	73	128845	251.00	19416

Figure 4 shows the graph plotted from the Hong Kong data. This is a diagrammatic representation of a quadratic regression line resulting from our preliminary studies (where $y = 0.404x^2 - 29.620x + 5944.749$ with an $R^2 = 0.510$). It can be observed that the curve is beginning to flatten as it approaches 36 metres, using a differential coefficient to calculate the bottom of the U-shaped curve.

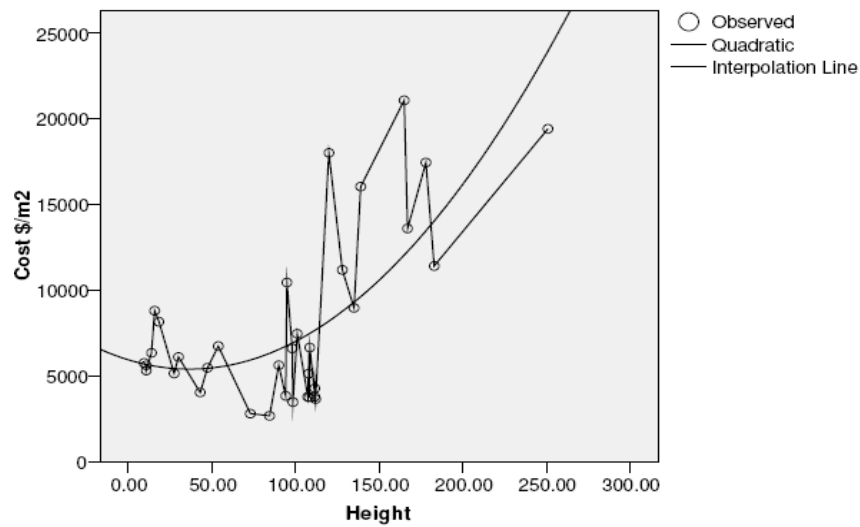


Figure 4. Cost \$/m² of gross floor area versus height (Hong Kong data).

5. THE SHANGHAI PERSPECTIVE

36 residential buildings, ranging from 2 to 37 storeys, were analysed. They were completed between 2000 and 2007. The data included number of storeys, gross floor area (m²), height (m), and cost in per square metre (¥/m²). Height and cost information is based on bills of quantities data. All the cost figures were adjusted to March 2007 values using the cost index published on SHCECI (Shanghai Construction Engineer Cost Information, 2007). Table 2 below sets out the data that were collected for the Shanghai study.

Figure 5 shows the graph plotted from the Shanghai data. This is a diagrammatic representation of a quadratic regression line resulting from our preliminary studies (where $y = 0.110x^2 - 5.334x + 1375.471$ with an $R^2 = 0.369$). It can be observed that the curve is beginning to flatten as it approaches 24 m.

Table 2. Construction cost and height data for Shanghai buildings.

Project	No. of Storeys	GFA (m ²)	Height (m)	¥/m ²
1	2	257	6.0	1558.39
2	2	283	6.6	1712.19
3	2	300	6.6	1834.56
4	2	682	6.7	1725.89
5	3	764	8.7	1897.11
6	5	3467	15.2	1090.21
7	5	2689	15.6	1141.96
8	6	2344	16.8	842.74
9	6	3329	16.8	963.98
10	6	2443	16.8	1020.35
11	6	2663	16.8	1026.26
12	6	2898	16.8	1131.00
13	6	2575	18.0	862.60
14	7	1824	21.0	1147.15
15	7	6570	24.3	865.05
16	7	4947	25.4	1719.62
17	10	3503	28.0	1288.35
18	11	7664	30.8	1167.90
19	11	7052	33.8	1151.35
20	13	9480	36.4	1248.80
21	14	7882	39.2	1479.97
22	15	8757	41.6	1820.79
23	18	12392	51.8	1611.48
24	18	6481	52.7	1149.72
25	18	9434	53.2	1443.54
26	18	19848	54.0	1622.74
27	23	18240	66.7	1318.46
28	25	17250	75.0	1641.37
29	25	105390	75.0	1764.81
30	27	12492	75.6	2206.84
31	28	54088	84.9	1630.37
32	28	29093	87.0	1744.89
33	29	32530	91.3	1859.69
34	34	35000	95.7	1785.33
35	30	74989	105.0	1808.50
36	37	131349	115.3	2134.85

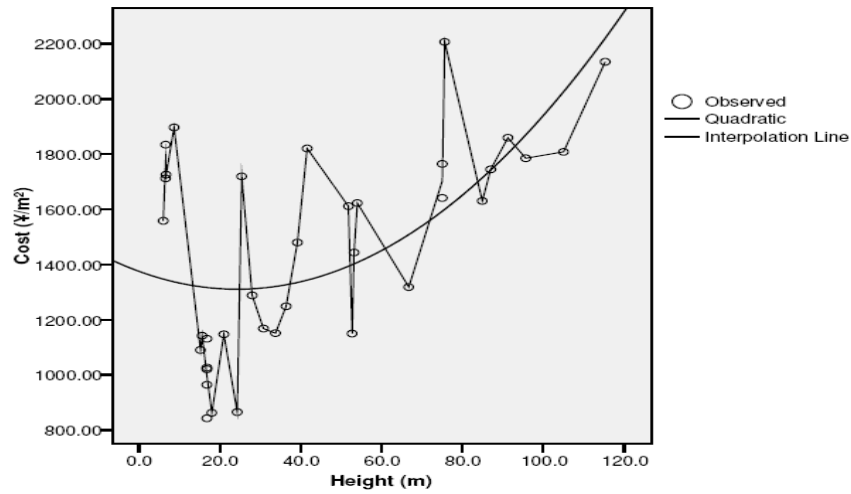


Figure 5. Cost ¥/m² of gross floor area versus height (Shanghai data).

6. DISCUSSION

Figure 4 and 5 show that both plotted graphs from the Hong Kong and Shanghai data follow a similar trendline. The cost per square metre initially decreases with an increase in height, eventually, the cost/m² starts to increase after the height reaches a certain point. In other words, every curve has a ‘bottom-out’ point. This result supports the conclusion from the previous research by Flanagan and Norman (1978) and Picken and Ilozor (2003). It also matches the basic building structural concept, that changes in the height of a building within a certain range do not require the alteration of specifications regarding numerous building elements.

Differential analysis shows that $\frac{dy}{dx}$ in Shanghai is 0.220, and $\frac{dy}{dx}$ in Hong Kong is 0.808.

This supports the conclusion that the trendline of the Hong Kong data appears rather dramatic in its increase once it passes the ‘bottom-out’ point. However, based on the observation of both curves, this transition for Shanghai is much more gentle.

If we use ‘3 metres’ as the average storey height of the residential building in Shanghai and Hong Kong (Davison, Gibb, Austin, Goodier and Warner, 2006), the lowest cost per square metre in Shanghai is around 8 storeys, however, the lowest cost per square metre (that is the bottom of the U-curve) in Hong Kong is around 12 storeys.

There are several interesting factors shown in these plots and calculations. Firstly, the different positions of the ‘bottom-out’ point generated from the analyses according to the locations, such as Shanghai 24 metres, Hong Kong 36 metres, and UK 5 to 6 storeys. These differences among cities supported the theory of Picken and Ilozor (2003) that a different set of criteria should be applied in the judgement of how height affects cost depending on the context and commonality of tall buildings in the location under consideration. Secondly, the scatter plot points of the Shanghai data alternate either side of the trendline. On the contrary,

in Hong Kong, the scatter points are separated into two sections. One section is that buildings from 3 to 31 storeys gather at the downside of the plot. Another section is that buildings over 31 storeys assemble at the upside of the plot.

6.1 Comparison of Hong Kong and Shanghai Analysis

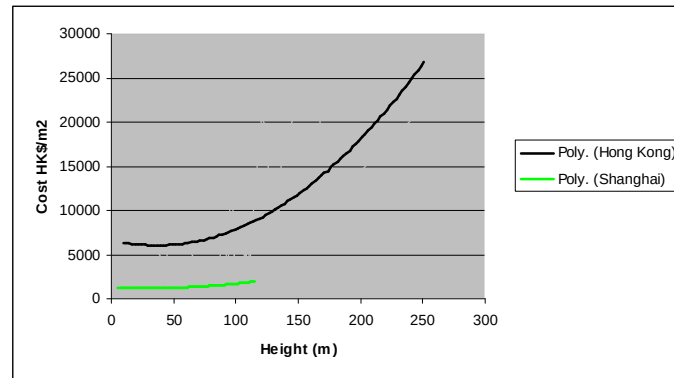


Figure 6. Cost HK\$/m² of gross floor area versus height (Hong Kong and Shanghai data).

Figure 6 combines the cost data from Hong Kong and Shanghai together. The cost of Shanghai buildings ¥/m² was converted into HK\$/m² using the exchange rate published by the Bank of China on 19th May 2008 (Bank of China, 2008).

The work of Picken and Ilozor (2003) identified what appeared to be some unusual relationships between height and cost. The rationale behind this research was to take their work and extend the sample with a view to reviewing their findings in the light of a larger sample. The next step was to consider the matter of another, separate urban centre which had a similar high-rise built environment and to make an examination comparing the two locations.

The possible reasons for differences between Hong Kong and Shanghai are suggested below:

- The Chinese Code for Design of Civil Buildings (2005) divides residential buildings into low-rise (1 to 3 storeys), multi-storey (4 to 6 storeys), middle-rise (7 to 9 storeys), and high-rise (over 10 storeys). Additionally, buildings under 24 metres are included in the single or multi-storey range. This leads to the appearance of the ‘bottom-out’ point being close to 24 metres in Shanghai. Nevertheless, no such a general rule could be found in Hong Kong.
- In Shanghai, any building over 100 metres is referred to as a super-high tower, which requires a different set of fire prevention measures for design including a refuge storey for fire escape purposes. These limitations could be the reasons why Shanghai does not have as many buildings over 100 metres as Hong Kong, especially in the residential high-rise category. Based on the ‘Code of Practice for the Provision of Means of Access for Firefighting and Rescue Purposes 2004’

by the Hong Kong Building Authority (2004), 30 metres is the boundary above which special fire restriction measures are required. This is closest to the 'x' value of the 'bottom-out' point from Hong Kong data analysis. There are no special regulations set up for buildings over 100 metres in Hong Kong.

- The number of 6 storey buildings in the whole Shanghai sample is relatively large. It is because 6 storey buildings are widely built in Shanghai. Lee (2005) reported that there is no regulation requiring the installation of lifts in residential buildings up to and including 6 storeys. Once a high-rise residential building is over 11 storeys, a minimum of 2 lifts should be installed (Code for Design of Civil Buildings, 2005). In Hong Kong, a more mathematical approach is applied for the calculation of the lift installations required by the Hong Kong Building Authority.
- The incidence of high-rise residential building developments is different between Shanghai and Hong Kong. Furthermore, as noted above Hong Kong is already recognized as one of the cities having so called the most compelling skyline in the world, along with Chicago and New York. However, Shanghai is only known as a city currently experiencing a major building boom involving skyscrapers. High-rise residential building has already become common in Hong Kong. Most of the public sector housing is high-rise due to the need for extremely high densities. In contrast, high-rise living is still a relatively new and, to an extent, fashionable concept in Shanghai.
- The intensity of using smaller plots and building higher is greater in Hong Kong than Shanghai, due to the various densities of these two cities. High-rise residential buildings, typically constructed in compact groups in Shanghai usually contain 10, 20, 30 or more similar buildings with a height, of less than 100 metres. Residential buildings in Hong Kong are commonly reaching heights of 60 or 70, even 80 storeys (Binder, 2002).
- Shanghai has strong support from neighbourhood provinces, such as Jiang Su and Zhe Jian. It is easy to commute between the major cities of those provinces and Shanghai. More and more people from Shanghai are moving to the major cities in the nearby provinces, and this will ease the high-density pressure. This has slowed the speed of building high-rise residential buildings in Shanghai. A similar thing has happened in Hong Kong. Due to the high cost of living, many people have moved from Hong Kong to Shenzhen. However, Hong Kong people wishing to travel to any part of mainland China (in this case a move to Shenzhen), must obtain a special pass similar to a passport, and this increases the inconvenience. Therefore, most of Hong Kong people enter into China for travelling and business, instead of living.

The differing history and current extent of property development, considered with the

conflicting results found in the studies comparing Shanghai and Hong Kong also suggest that Hong Kong has a higher expertise in the multi-storey and high-rise building construction than Shanghai, which supports the theory of Picken and Ilozor (2003). The amount of expertise in multi-storey building work could generate significantly different results when comparing various locations.

7. SUMMARY AND CONCLUSION

As mentioned before, this paper is an extension of the study by Picken and Ilozor (2003). If the curves shown in Figure 5 and Figure 6 are truly representative of height-cost relationships in Hong Kong and Shanghai, some of the questions asked by Picken and Ilozor (2003) could be answered:

- Shanghai and Hong Kong exhibit similar distinct height-cost relationships. However, the profiles of the curves are different. This shows that different sets of criteria should be applied in the judgement of height affects on cost in different locations depending on the context and commonality of tall buildings.
- Hong Kong contractors have more expertise in multi-storey and high-rise construction than contractors in Shanghai.

The dissimilarities from the comparison investigated above could be contributed to by many factors, such as the history and experience in constructing residential high-rise buildings location, linkage and relationships to the neighbourhood provinces, design and construction regulations, and government policy on residential construction.

In general, as with all the other statistical studies, the collection of a larger size sample is necessary for replicating an earlier investigation. On the one hand more cases should be collected which focus on buildings higher than 100 metres in Shanghai. On the other hand, in Hong Kong, data from several sources should be assembled, and this was not available in this research.

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Managing Risks Inherent in Key Managers’ Cross-Cultural Competencies vis-à-vis International Growth Projects of Contractors and Suppliers

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ABSTRACT

In the literature, competent risk identification is a mandatory starting point for risk management. In the project-specific contexts of the construction industry, statistical history-based methods are not feasible for managing risks and in particular identifying risks although an assessment of alternative risk consequences or a comparison of alternative response measures may be performed by statistical means. Instead, managerial expertise is recognized as the most important prerequisite for success in overseas construction because of “many inherent problems and peculiarities”. The objective of this paper is to justify the importance of key managers’ cross-cultural competencies vis-à-vis managing the international growth projects of construction contractors or those of building product suppliers. A lack of cross-cultural competence(s) at the managerial level may jeopardize the attainment of a business growth goal. It is herein posited that this lack is a causal, root cause for a consecutive risk of managing international growth unsuccessfully. Most problems and features inherent in overseas construction are cross-cultural by nature. The importance of cross-cultural issues and managers’ competencies to deal with them is initially verified with the explorative case of managing the delivery of a large, complex

plant for supplying pre-cast concrete products in St. Petersburg during the years 1990-1996. The contract sum was USD 200 million, financed by the German Government. Besides the focal Finnish plant contractor, the project stakeholders involved the Russian owner (the Ministry of Defense), the German general contractor, and the Finnish construction contractor. It is proposed that practicing managers should acquire and nurture their cross-cultural competencies as part of their total expertise.

Keywords: Case research, construction, cross-cultural management, international business, risk management

1. INTRODUCTION

This paper is **a part of the on-going doctoral study** on managing risks in the international growth businesses of Finnish construction contractors and building product suppliers. The industry has forecasted that the combined volume of the export and the other foreign operations will exceed the domestic business volume in Finland by the year 2013 while in 1970 they were practically on scratch (RT, 2007). Thus, the study as a whole seeks to find better methods to manage risks within the evolving context of international entries, start-up projects, mergers, acquisitions, post-merger, etc.

The literature on uncertainty and risk implies that **risk identification is a profound base for any proactive actions of risk management** (e.g. Flanagan and Norman 1993 and Artto et al. 2000). In international construction, many conditions of the local environment differ from the domestic market of the focal actor. A new source of “cross-cultural” risk may emerge: Are the key managers’ competencies to manage emerging cross-cultural issues adequate? In this paper, cross-cultural risk is addressed in particular in terms of finding and executing effective responses to **many problems and peculiarities** in international construction (aligning with Ofori 2003).

The main objective is to justify the pivotal role of key managers’ competencies when a construction contractor or a building product supplier is managing cross-cultural risks inherent in its international growth projects. In the case of project-specific contexts, statistical methods are not feasible for risk identification or analysis. The literature emphasizes that competent managers rely on the knowledge of human experts for risk identification, analysis and response. This paper is structured as follows. The key findings from within the relevant literature on cross-cultural risk are reviewed in section 2. The proposed insights on managers’ competence to manage cross-cultural issues are introduced in section 3. The initial verification is reported upon in section 4. Finally, the findings are discussed in section 5.

2. RELEVANT FINDINGS IN THE RISK MANAGEMENT LITERATURE

2.1 Risk Management in International Construction

Uncertainty prevails when a decision-maker has no historic data (e.g. “a group of instances”) relating to a situation for an event, conditions, etc. to occur (Knight 1921, Smith 2003). **Risk**

is a possibility that expectations are not met (Lifson and Scheifer 1982). **Risk is defined to arise from uncertainty** by assessing, either rationally or intuitively, a probability and an impact of an uncertain event (Flanagan and Norman 1993). For the construction industry, **risk management process** has been defined to include risk identification, risk classification and analysis as well as risk response (e.g. Palojärvi 1986, Flanagan and Norman 1993). As to **risk management strategies**, **pro-activeness** is emphasized, i.e. a profound importance of risk identification and response measures, rather than a detailed mathematical analysis of a probability and consequence distributions for assessing consequences. Thus, companies should direct their efforts toward **effective responses**, calling for key managers' sound competencies and a reliance on expert knowledge, especially when time is a scarce factor.

2.2 Key Managers' Cross-Cultural Competencies in International Construction

Sanchez and Heene (1996) define that an organizational competence is an ability to sustain the coordinated deployment of assets in a way that helps a firm achieve its goals. Further, the competence is leveraged e.g. by producing and marketing current products. The existing managerial competence is necessary, but an increase of production by developing and producing new kinds of products...would require competence-building first. Other generic definitions with traceable managerial components have been proposed by e.g. van den Bosch and van Wijk (2001), Langford and Male (2001), Robinson et al. (2002), and Huovinen (2003). Aligning with Jubb and Robotham (1997), one can state that it is a myth that competence has a precise and widely-accepted definition. Huovinen (2003) has defined that "a competence consists of all the technology, embedded knowledge (which can be defined as "managerial competence), capabilities, and resources ...needed for the attainment of the business goals." Aligning with Huovinen (2003) and Sanchez (2001), we herein specify that **a managerial competence** is a pivotal component of a firm's competence that helps the firm attain its goals.

Aligning with Sanchez and Heene (1996), **a manager's cross-cultural competence** is herein defined as an ability to achieve a firm's goals by managing cross-cultural issues well. Cross-cultural implies that at least two different human patterns of activity are present and active at a focal event, e.g. in international business growth situations. During various cross-cultural events – presentations, negotiations, social gatherings, writing and reading documents, etc. - national, ethnic, religious and moral values and other cross-cultural factors typically clash against each other. Similarly, differences in strong industrial cultures or technology patterns - which themselves may simultaneously reflect a cultural background – often diverge as well. In turn, **a multi-cultural issue** is herein seen more complex than an issue along only one cross-cultural dimension.

Firstly, Sanchez and Heene (1996) refer to **decision makers as managers** and a need to build new competences in dynamic, uncertain competitive environments (managerial cognition). In turn, Kiiras and Huovinen (2005) apply Sanchez's (2001) definition and specify that a firm's management-driven business competences are embedded in management teams, individual managers as well as management systems and processes.

Secondly, the recent generic references **on international business failures or successes** put forward two main themes, **expatriate failure** and **inability by headquarters managers to**

appreciate the cultural challenges of doing business overseas (Johnson et al. 2006). Olson and Olson (2000) state that cultural differences form the single biggest factor affecting global projects. Mäkilouko (2003) concentrates on multicultural project leadership, i.e. relationship oriented project leaders (rather than the task oriented ones) may have a higher potential for leadership success since they tend to be able to maintain project team cohesion. An organization design can potentially be used to mitigate multicultural problems. According to Fisher and Ranasinghe (2000), people do not have competences independent of context. Similarly, state Jubb and Robertham (1997) have stated that certain competences could be regarded as being situation specific.

Thirdly, what issues are considered decisive for success in international construction?

Construction Industry Institute (1993) has stressed future needs and pointed out to leadership, efficient resource allocation, innovation and organizational effectiveness. Flanagan (1994) did brought up speed in innovation and delivery, flexibility in a delivery mix, environmental consciousness, HRD and deployment; automation and information, joint ventures, alliances and partnering as well as financial engineering. More recently, Langford (2000) has stressed cultures' importance on international construction projects. Fisher and Ranasinghe (2000) studied the JVs as a cultural factor playing a role in uncertainty avoidance. In turn, success and failure factors have been investigated. E.g. Han et al. (2007) and Kim et al. (2008) emphasize a contractor's own ability, i.e. management of various functions, as crucial. In particular, Ofori (2003) posits that an internationalizing contractor must possess certain prerequisites and that **managerial expertise is considered the most important factor** (for competitiveness) because of the peculiarities and problems of overseas projects. However, he also notes that there is no suitable framework for analyzing success in international construction.

3. INSIGHTS ON THE ROLE OF NECESSARY COMPETENCIES FOR MANAGING RISKS AND CROSS-CULTURAL ISSUES

There is **a risk that a key manager's competency to manage cross-cultural issues**, "peculiarities and problems", in international construction projects **is not sufficient** and its consequence can be disastrous. Thus, **a set of insights** on necessary cross-cultural competencies are synthesized based both on the prior findings from within the literature and the primary author's direct (admittedly subjective) experiences in various international business environments. The latter are herein reported upon as the results of the long-term action research study that the primary author has been conducting since the mid-1980s (Palojärvi 1986).

Each construction project is one of its kind. No prior history exists and future events are uncertain. This **uncertainty** is amplified when a project type or a business environment, or both, is new to a focal actor, resulting in a high degree of complexity. In order to move from uncertainty to competent risk management, one has **to identify risks** as well as to assess a probability and an impact of such an uncertain event. Risk identification is built on the predefined expectations. If expectations (e.g. objectives) are ill-defined, or entirely missing, it will not be possible to define whether they will be met or not, and the respective risk cannot

be identified or responded to. **The core project-specific objectives** are set in terms of cost (and/or profit), time and quality (comprising of scope and standard). Other objectives may be expressed in a form of influencing on a corporate image, disturbing competitors, etc. For the sake of order, identified risks must be classified (e.g. Palojärvi 1986, Flanagan and Norman 1993). Extensive risk lists have been produced for many kinds of projects and environments. Causative events to immediate risks and their respective consequences need to be identified as far as appropriate, thus allowing for **proactive risk management approach**.

The non-construction related literature on international business stresses the importance of culture issues at all levels of managing. Unfortunately, **the business-level competencies** of managers have not been studied much in international construction related contexts. Many authors present their lists of various success factors, e.g. a contractor's own ability or a structure of the team itself, without clarifying how to connect those success or failure factors with the issues of management or managers' competences. **The project –level competencies** of managers and staff in international construction is more covered in this contextual literature. Thus, **Ofori's rare view** (2003) on the availability of necessary managerial expertise in managing overseas projects' cross-cultural problems and peculiarities is herein acknowledged. Based on the numerous past cases, the primary author has compiled **an exemplary list of problematic cross-cultural factors** that illustrates upon what kind of issues practicing managers must deal with, besides the standard issues of general or project management. This list is as follows: (i) local indigenous culture, (ii) visible local signature projects, (iii) local corruption, (iv) local national frictions, (v) the choices of local partners, (vi) the local positions of expatriates, (viii) local currencies and (viii) local geology, climate and other natural conditions.

4 EXPLORATIVE CASE PROJECT – PARTEK CONCRETE ENGINEERING (PCE) SERTOLOVO PROJECT BETWEEN 1990-1996

4.1 PCE Sertolovo Project Brief

An explorative multi-cultural and complex case project of a leading European (Finnish-owned) precast concrete technology supplier is briefly introduced, followed by a review of the relevant risk management actions in order to verify initially the proposed insights on managing risks and cross-cultural issues. The risk management of this real-life case is documented well (e.g. in the authentic memos and the minutes of the decision making meetings) because the primary author could assume a role of an action researcher through all the stages of the project development and delivery during the years 1990-1995. Case project was **tendered and executed under the most uncertain, multi-cultural conditions** of the host country Russia in serious turmoil after the collapse of Soviet Union. Germany undertook financing and overall project supervision." Soviet-aware" Finland played key roles in the plant technology supply and the construction works (Table 1 and Figure 2).

Table 1. Brief of PCE Sertolovo project (during the tender stage in the years 1992-1994).

Client	Two competing clients: (1) Wayss & Freytag (Germany) and (2) GWU Consortium of the German SME contractors led by Suba GmbH
Key co-suppliers	Haka Oy (Finland) for the builder's works (after the bankruptcy, YIT) and

	Hebel (Germany) for the gas concrete plant
Ultimate owner	Russian Army/Ministry of Defence
German financier	Kreditanstalt fuer Wiederaufbau (KfW), Germany
Project location	Sertolovo, located app. 12 km from St. Petersburg, Russia
Strategic background	For newly (in June 1992) established PCE, this was by far the fastest way to increase the business volume to an acceptable and profitable level.
PCE's scope and means to campaign	To deliver a fully working, big plant to produce pre-cast concrete products as a turn key project. Only the builder's works were excluded.
Tender object as a whole (from Client's view)	To design, manufacture, purchase, erect, and commission a "combine" of the precast concrete and dry mix concrete plants including the necessary reinforcement steel and insulation sheet factories. PCE worked in close co-operation with the builder, the other main direct contract party with Client. The process contract price was app. DEM 75 million. The builder's contract price was app. DEM 100 million. The contract period was 22 months
Milestones of PCE's participation	PCE started to monitor a possible project in 1990, when Germany and Russia agreed upon the implementation of the Military Village Program during 1991-1994, with the German funding of DEM 8 billion. PCE submitted the tender in May 1993 and signed the contract in April 1994. The plant was commissioned for the use in the turn of 1996/1997.

In tender stage, the identified main risks were considered to be related to the (i) losing of the tender competition primarily due to the wrong German partner, (ii) winning of the tender and the consequent abortion of the project, (iii) PCE's own performance due to the exceptional scope and size of the project, (iv) scope of the project due to the turn key contract form and (v) currency depreciation where the ailing Finnish Mark, strong German Mark, and highly unstable Russian Rouble were involved.

I phase: Monitoring

Monitoring started 1990
Project assessed realistic ---1991
German partners were contacted --1991
Pre-agreement made with W&F 12/91

II phase: Tendering

1st tender was prepared with W&F 1992-----5/1993
Engineering units of Partek & Lohja merged 6/1992
2nd tender was prepared with GWU Consortium 12/1992----5/1993
Two tenders were submitted ---5/1993
Negotiations and contract with GWU Consortium 5--12/1993
Main contract between Owner and GWU 12/1993
Final agreement was signed between GWU and PCE -----4/1994

III phase: Contract implementation

Haka went bankrupt	3/1994
Suba appointed YIT for the builder's works	6/1994
PCE conducted "business as usual"	-----
Plant was commissioned for the use	1996/1997

Figure 2. Milestones of PCE Sertolovo Project in St Petersburg, Russia, during 1990-1997.

In the **implementation phase**, the identified main risks were considered to be related to the (i) project abortion due to a political turmoil or a dispute of contract parties, (ii) builders' performance due to the last-minute change of the building subcontractor and (iii) scope of the project due to a lack of modern precast concrete knowledge in Russia.

4.2 Perceived High Uncertainty during the Monitoring Phase

In the year 1990, the management of Partek perceived **high uncertainty**, i.e. 'what on earth **will happen in the post-Soviet Russia**'? However, the fast progress of the Military Village Program assured Partek's management in the early 1991 that the program will be implemented. This was so because of the high political pressure to have the Russian troops out of ex-DDR. By December 1991, many Finnish contractors, e.g. Haka Oy, Puolimatka Oy and Teräsbetoni Oy won their first contracts, alongside with e.g. the Turkish and Austrian contractors. The political pressure in Germany forced the remaining projects to be awarded to the German firms.

4.3 Risk Management during the Tendering Phase

The identified risks in the tender phase are compiled in Table 2. Partek concluded that the order for Sertolovo plant must be won in a consortium, led by a German firm. **(1) The selection of the right German firm involved a major risk!** Partek contacted both Philipp Holzmann and Hochtief as the most potential clients. In Autumn 1991, they enquired whether Partek could "agree" with the competitor, Lohja (LPE) upon this "business" and Partek's management replied "yes, we think so". However, the Russian Owner indicated that the total Sertolovo contract will be awarded to the third German contractor, Wayss & Freytag (W&F). This resulted in a pre-agreement between Partek and W&F.

Due to the continuing deep recession in Finland, a merger of the engineering units of Partek and Lohja into Partek Concrete Engineering (PCE) was confirmed in June 1992. Thus, PCE had suddenly **two pre-agreements** for Sertolovo, i.e. the pre-agreement with W&F and the competing pre-agreement between LPE and GWU Consortium (including Haka as the strong Russian expert and the building partner). How could PCE serve the both customers? **A new uncertainty concerning the viability** was emerging, i.e. to break an agreement with any of the two German contractors would not be left without the severe consequences. PCE committed to submit **two technologically different and commercially neutral tenders**, one

for each potential client. Besides, PCE decided to stay contractually out of the builders' works. A half of PCE's internal design capacity of 80 experts was assigned to perform this single huge tendering task. The two tenders were submitted in May 1993.

(2) In the early 1992, both uncertainty and complexity of the project were increasing to a maximum: The Soviet Union had collapsed and the concept of the "CIS countries" was introduced as a temporary action by Russia. Germany put the entire project financing on hold. At Partek, the basic belief was that the German-Russian agreement to remove the Russian troops will be honoured by the future Russian regimes. **A managerial imperative was to get reliable information on future political changes in Russia** as much as possible. PCE ensured the continuity of the relevant information flows by remaining absolutely "apolitical". Otherwise, any change of the politics in Russia could have turned PCE unpopular, like it happened to e. g. Haka Oy. In the case of **(2a) a serious turmoil**, the on-going project will have to be aborted or at least shelved. In turn, **(2b) a moderate turmoil** would delay the project performance. In the both cases, **a claim fight with any German contractor as a client was to be expected.**

(3) A likely loss of a total tender due to a weak sub-tender for the building works was identified. **(4) The existing competencies of Elematic Engineering's (later merged to PCE) management** versus the tendering of the huge Sertolovo project forced Partek's management to replace Elematic's management and to assign the new, more competent management to PCE. **(5) The level and standard of the Soviet pre-cast technology** was well-known to PCE. Consequently, it was expected that the Soviet culture to buy the "best available" technique for a new plant was prevailing. The solution to manage this risk inherent in the right process scope involved the early provision of the extremely detailed plant design.

Table 2. Major risk breakdown structure in the tendering phase of PCE Sertolovo Project.

Level 1	Levels 2-3	Level 4	Level 5
Causative events	Source => Identified risks	Business objectives and/or consequences	Management of identified risks
Lack of know- ledge on Russian/ German politics	Wrong partner => (1) To lose the tender	PCE's profit does not improve. This implies layoffs.	1 To find a potential German partner 2 To eliminate the competitor 3 To serve two or more competing German clients in a neutral way
Ignorance on Russian politics	Serious political turmoil => (2a) Project is aborted	Fighting over claims	1 Claims management 2 Big advance payment 3 No involvement in politics
	Moderate political turmoil => (2b) Project is	Overheads increase	1 Claims management 2 Big advance payment

	delayed		
Consortium structure	Weak building partner => Internal disputes => (3) Project is delayed or even aborted	Overheads increase Fighting over claims	1 Claims management 2 Big advance payment 3 Personnel monitoring
Elematic Engineering's (merged with LPE to PCE) managers' experience on large projects	Managers' competencies => (4) Own performance does not comply with German/Russian requirements	Huge losses	1 To reinforce management 2 To combine own and LPE's resources 3 To stick to technology through a direct contract with Client
Client's knowledge	Tender => (5) Process scope is ill-defined, a plant will not function	Non-performance of the plant and design delays	1 To prepare the detailed tender 2 To pre-visit Client and Owner
Recession in Finland	Finnish economy's continuing recession => (6) Currency, FIM is depreciated	PCE's lower profit	1 To terminate the contract currency, i.e. to fix the DEM/FIM rate

(6) The Finnish economy as well as the Russian politics and economy had been in the turmoil since the year 1990. PCE decided to trust on DEM and terminate the payments to be received in DEM against FIM for that part of the contract sum which was not used for the procurements in DEM.

The low bidder was GWU with Haka and PCE with a tender price of DEM 252 million, followed by Philipp Holzmann (with Puolimatka and **without a technology partner**) with a price of DEM 254 million and W&F with PCE with a price of DEM 262 million. In December 2003, GWU was confirmed to be the winner.

4.4 Risk Management during the Implementation Stage

The identified risks in the implementation phase are compiled in Table 3. **(1a) The ignorance of the Russian politics** was still identified as the source of the main risk. In the worst case scenario, the abortion of the Sertolovo project was possible but not very probable. In addition, **(1b) many limited delays were considered probable**. A claim fight was foreseeable. The intelligence on the future politics in Russia was maintained. **(2) GWU had the ailing Haka as the builder since GWU had itself no prior experience in Russia or the Soviet Union. PCE's management identified this set-up as the major performance risk**. Therefore, PCE's management aimed at securing PCE's position and to receive a "Letter of Intent" from GWU by December 1993 (the contract was signed in April 1994). In March 1994, Haka went formally bankrupt. **The entire project was in crisis** until the moment when PCE's management suggested diplomatically two other Finnish options. Soon GWU assigned YIT

for the building works and the site works could be started in June 1994. Having received the Letter of Intent, PCE Sertolovo Project was organized (Figure 4). The extra key persons with the expertise on the claiming, the legal issues (a corporate lawyer), and the Russian affairs (a top corporate expert) were assigned, too. **(3) The construction works** were a bit delayed due to the conflicts between GWU and the builder over the respective design and the scope of the works. The powerful subcontractors of Haka caused the other problem by demanding their share of the project from YIT. **(4) The final scope of PCE's tender** was accurately specified. Many quality deviations occurred, mostly by the requests of the Russian Army. GWU paid for them. **(5) The termination of the currency risk** resulted in the extra profit because DEM in fact gained against FIM during the project.

In the year 1997, the end result of PCE Sertolovo Project **was good** after all the payments were settled and received. This allowed **PCE to continue as No.1 concrete technology supplier in Europe** with the seasoned staff for the future development of the industry.

4.5 Screening of the Key Managers' Combined Competencies in PCE Sertolovo Project

The underlying risk of having inadequate managerial competencies was managed proactively (i) by designing the viable, interrelated structures for PCE's management organisation with necessary external specialists as additional support, and consequently (ii) by assigning the seemingly competent key managers to the respective tasks ahead. The availability of the key managers' combined competencies has been screened through **the following eight managerial competency areas**: general business management, novelties and specialties, products (plants) and their assembly, international (incl. cross-cultural) issues/general business, project management, knowledge on other trades (e.g. construction), plant design management and international (incl. cross-cultural) issues/local business.

Table 3. Major risk breakdown structure during the implementation of PCE Sertolovo Project.

Level 1	Levels 2-3	Level 4	Level 5
Causative events	Source => Identified risks	Business objectives and/or consequences	Management of identified risks
Ignorance on Russian politics	Serious turmoil => (1a) Project is aborted	Fighting over claims	1 To manage claims well 2 Big advance payment 3 No stakes in politics
	Moderate turmoil => (1b) Project is delayed	Overheads increase	1 To manage claims well 2 Big advance payment
Non-fit consortium structure (PCE + Haka/YIT)	Disputes and crisis => (2a) Project is aborted => (2b) Project is delayed	PCE's profit drops. This implies layoffs. Overheads increase	The previous actions plus: 3 To monitor and interfere by PCE's managers 4 To make a contingency plan for building works
Local Russian builders	YIT's local subcontractors	Project is delayed.	1 To make a direct contract with Client

	=> (3) Performance is poor and delayed		2 To manage claims well 3 To intermediate between GWU and YIT
Client's knowledge	Inadequate tender scope => (4) Process scope is not fit for the specified performance	Non-performance of the plant and design delays	1 To prepare the detailed tender 2 To pre-visit Client and Owner 3 To make a direct contract with Client
Recession in Finland	Continuing recession in Finland's economy => (5) DEM is depreciated against FIM	PCE's lower profit	1 To terminate the part of the contract sum, which is not used in DEM

Identified and realized risk on the consortium's structure, not taken by PCE:

Haka's owner ruined Haka's liquidity	Haka went bankrupt => (6) GWU had no contingency plan [=> PCE only gave its helpful advice to GWU]	Project delay/abortion and a huge loss in the building works, if no competent builder is available for GWU	1 To make two separate contracts for the process and the building works 2 To monitor Haka's status 3 To contact other Finnish contractors for a rescue plan

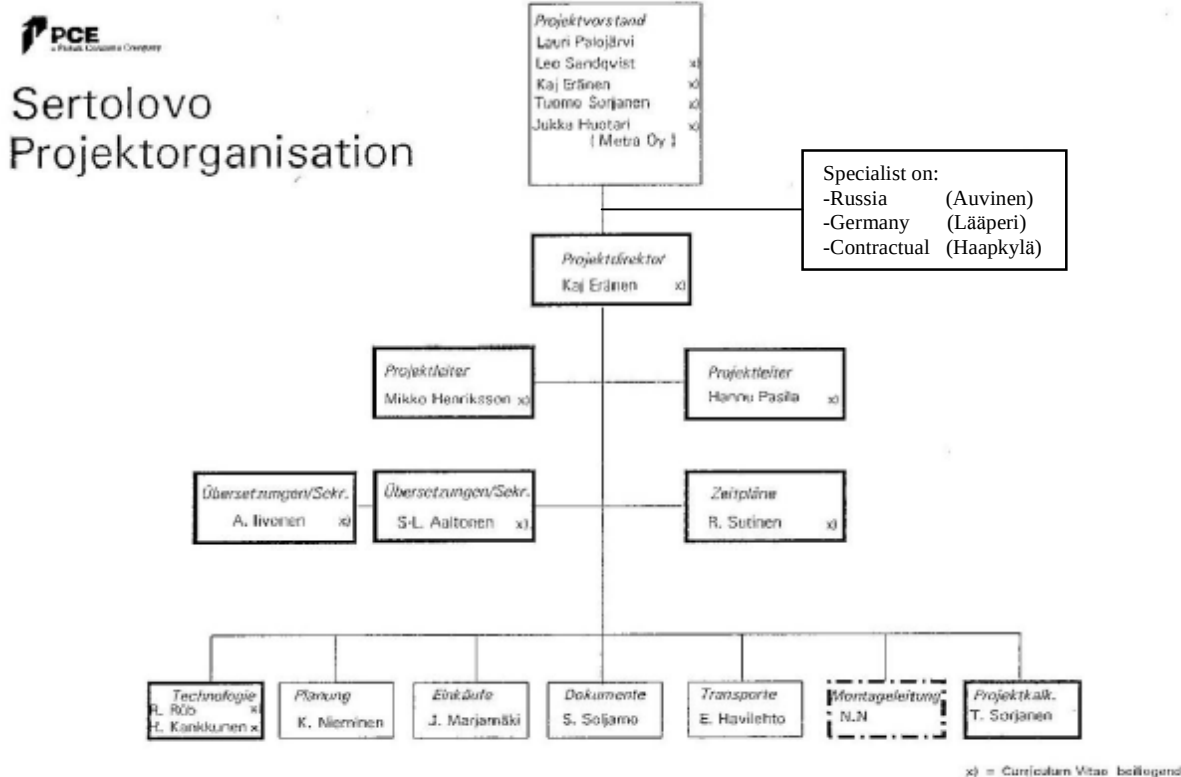


Figure 4. Organisation of PCE Sertolovo Project as of January 1994 (supported by the experts on claims, contract law, German business culture, and Russian business culture).

In 1992, PCE's management perceived that PCE Sertolovo Project was **the only way to attain the core objective** of increasing PCE's profit quickly and substantially. If this growth objective was not met, this had caused a layoff of at least a half of PCE's 600 employees. This also explains the keen involvement of PCE's entire management team in the project. In the tendering stage, the six identified major risks had their roots in the crossing of the Russian, German and Finnish business and/or general cultures entirely (Nos. 1, 2, 3 and 6 in Table 2) or partly (Nos. 4 and 5). In the implementation stage, the two new major, cross-cultural risks were identified (Nos. 3 and 6 in Table 3). The early identification of these risks and their sound management was enabled by the culture-related expertise of the key managers as follows. PCE's management decided to acquire and to assign the key managers with the cross-cultural expertise. The experts on the Russian and German cultures were assigned as the extra support to the management team.

Herein, the results of the screening of the actual levels of the key managers' combined competencies are presented in **a competence diamond** (Figure 5). The action researcher has carried out the screening. Ex post, it can be stated that the levels of the combined competencies

of PCE's key business, functional and project managers were **high enough**, in reality, to handle the risky tasks ahead including the cross-cultural issues.

PCE Sertolovo - Competence Diamond

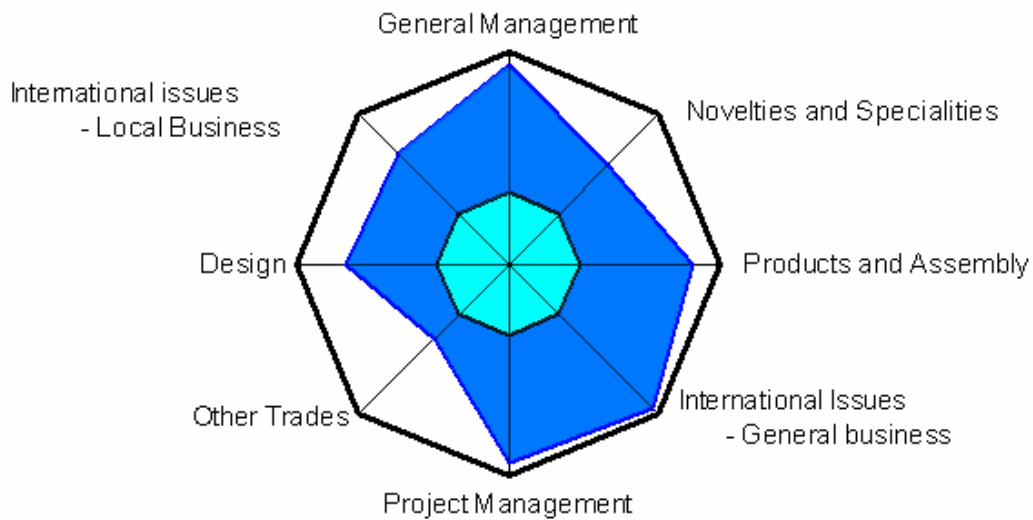


Figure 5. Screening of the levels of the combined competencies of PCE's key managers during the Sertolovo project. (Key: A total diamond (area) refers to the high, required levels perceived by the action researcher. A middle diamond refers to the levels of the available competencies. A small diamond refers to the perceived, lowest acceptable levels.)

Thus, Partek's management succeeded in hand-picking and assigning the key managers to PCE's permanent team. In turn, PCE's management team established the competent project organization for the Sertolovo project. In this short paper, only the management of the uncertainty and the risk inherent in the key competencies in international issues, including the cross-cultural ones, can be reported upon as follows.

The uncertainty concerning the realization of the Sertolovo project **was reduced** after it was unfolded that the Germans want the Russian troops out of ex-DDR and that the CIS arrangement does not bring a chaos inside Russia. Partek's management could reach this conclusion based on the information on the political situations within and the crossing cultures of the two countries. **During the monitoring stage**, the intimate knowledge on the German politics and the partner candidates was necessary to avoid a risk of selecting the wrong partner too early. This risk was managed by analyzing the potential German bidders, by teaming up early with the most potential one, and by eliminating the Finnish competitor (LPE). The success was in part based on the key managers' knowledge on the three national cultures.

During the tendering stage, the currency depreciation was identified as one of the major

risks. It was impossible to predict the economical developments in Russia and Finland, both influenced by two the national general and business cultures, in any reliable way. Thus, PCE management decided to terminate the Finnish Mark in relation to the German Mark.

During the implementation stage, PCE's management chose the role of the plant contractor to be subcontracted for the plant delivery. As predicted, the builder Haka went bankrupt and caused the crisis because GWU had no contingency plan. This came not as a surprise to PCE's management due to its intimate knowledge on the leading Finnish contractors (all of them were Partek corporation's key clients). Briefly, YIT took eagerly Haka's share and the crisis was over. The second major implementation risk, the scope of the turnkey project, was managed with PCE's own, very detailed tender specifications, the ample negotiation period even at the highest level and the own process design resources.

4. DISCUSSION

The main objective was to justify the significance of risks inherent in the key managers' competencies in managing cross-cultural issues in the focal context. Theoretically, we rely on the generic and contextual literature. **In the generic references**, typically headquarters managers are being accused of being incompetent or too carefree to comprehend the cultural challenges embedded in doing business overseas. At minimum, globally or internationally operating companies must rely on competent local managers. **The scarce contextual literature** points out to the importance of understanding and proactively managing two or more crossing cultures in international construction. Herein, our focus is on the individual and combined managerial competencies, in particular their cross-cultural components. It is proposed that **the effective management of cross-cultural issues** is critical for succeeding in international construction business, which is to a large extent local by nature. In turn, continuing globalization will bring together more cultures of more networking suppliers which will add on a need **to manage multicultural complexity**.

Empirically, we report on the findings of **the explorative case project, PCE Sertolovo Project**. These findings clearly support a significant role that **cross-cultural managerial competencies** play as part of managing risks, projects and businesses in international contexts. In PCE Sertolovo Project, most of the identified main risks were causally related to cross-cultural issues and professionally managed by the key managers and experts. In part, this successful management was based on the grasping of the confidential information on the multicultural, political, economical and ethnic scenes as well as the tacit knowledge on the cultures of the key actors and their middlemen.

Overall, **cross-cultural management** deserves to be advanced in the future through collaborative research initiatives across various (multi)national construction (and other project-based) contexts. Readily, it is herein stipulated that (i) future success in international construction is causally significantly dependent on the levels of the individual and combined cross-cultural competencies of the involved managers, (ii) the availability of such high enough competencies must be ensured within companies' organisations and in particular (iii) risks related to managing these cross-cultural competency issues must be pro-actively

managed, too.

In addition, it is herein posited that **contractual relationship management** will surface as the second critical area in managing international construction businesses and projects successfully in the future. Indeed, it is foreseen that **managing contractual and cross-cultural relationships between focal stakeholders** involves the early identification of and the proactive response to risks (and their sources) embedded in these two, most likely interconnected areas. Namely, mutually agreeable contracts in business and project-specific settings directly reflect the cultural backgrounds of the stakeholders in their respective environments.

In turn, the primary author has readily included a more focused analysis on the significance of the contractual arrangement in PCE Sertolovo Project (i.e. PCE's management decided to assume a role of a plant contractor and to exclude a builder's works). He will also continue with the planning of a more rigorous way of measuring the managerial competencies and in particular their cross-cultural and contractual components in the contexts of managing international construction businesses and projects.

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EFFECTS OF CULTURAL DIFFERENCES IN CONSTRUCTION PROJECTS: AN INVESTIGATION AMONG UK CONSTRUCTION PROFESSIONALS

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ABSTRACT

Managing cultural diversity in construction is crucial for the success especially in international projects. Understanding and successfully managing cultural differences can provide several advantages for project as well as company success. On the other hand, problems arising from cultural differences can cause waste of resources and delay of construction. The specific objectives of this study are to find out the opinions of managers about the possible effects of cultural diversity on some management practices in construction business; the relationship between the management of cultural diversity and success; and the possible advantages and problems of working with different cultures in the construction industry. Within this context, semi-structured interviews are carried out among eleven senior managers who have some years' of experience in international projects and are involved in UK construction business. The interviews took place over a 3-month period between November 2007 and January 2008, and each lasted approximately 1 hour. Analysis of the qualitative data has been carried out using the NVivo 2.0 software program. Based on the results; one of the main advantages of working with different cultures was found as knowledge sharing, and managing cultural differences successfully were seen as one of the key elements in project success. The analysis of the interviews showed that cultural differences have an impact on management practices in construction but in different ways and levels. The highlighted practices that can be significantly influenced by cultural differences were human resources management, knowledge management, communication management, safety management, time management, and negotiation.

Keywords: culture, construction, diversity, management, UK.

INTRODUCTION

In today's constantly changing global business environment, cultural issues and understanding cultures have become essential and a prerequisite for business success (Walker et al. 2003). The importance of culture and cultural differences has become more critical especially for companies operating in international markets or having employees from

different cultures. Since culture has the potential to impact on business activities, companies have to consider the cultural concepts in their daily businesses to operate successfully in the global marketplace.

Culture and cultural differences are important issues for every organization in every industry. As Ankrah and Proverbs (2004) stated, these concepts become more critical in construction due to the nature of contracting, internationalisation of procurement, joint venturing, and partnering in this industry. Like in other industries, the increase in strategic alliances in construction also increases the significance of cultural differences due to the interaction of people from different cultures (Shore and Cross 2005). The advantages of managing cultural differences successfully have been addressed by many researchers (Fatehi 1996). It can enhance organizational effectiveness and give an organization a strong competitive advantage. On the other hand, failure to manage cultural differences can cause serious problems such as delay of construction and decrease in productivity. Therefore, understanding and managing cultural differences in this industry is becoming an increasingly important topic especially in international construction projects which involve participants from different cultural backgrounds.

CULTURE AND CONSTRUCTION

There are many different definitions of culture. The definitions differ greatly according to the research fields. Hofstede's (1984) definition in terms of organizations is "the collective programming of the mind which distinguishes one group from another". Barthorpe et al. (2000) presented an overview of the literature published on the subject of culture and defined it simply as "what we are and what we do as a society". A research carried out by Abeysekera (2002) showed that culture in the construction industry is considered to be about the "characteristics of the industry, approaches to construction, competence of craftsmen and people who work in the industry, and the goals, values and strategies of the organisations they work in". Culture has several properties which have also been widely accepted (Barthorpe et al. 2000, Loosemore 1999). It is shared, learned, symbolic, tradition, shapes behaviour and can change over time.

In researching national cultures, Hofstede (1984) identified four dimensions of culture. These extensively used and well known dimensions are; power distance, uncertainty avoidance, individualism/collectivism and masculinity/femininity. The four dimensions provide a framework for considering the effects of cultural differences on management and organization. Another study of how cultures differ has been developed by Trompenaars (1993) who identified seven dimensions of culture which are universalism-particularism, collectivism-individualism, neutral-emotional, diffuse-specific, achievement-aspiration, attitudes to time, and attitudes to the environment.

There is a growing interest in the studies on the culture of the construction industry, projects, and the effects of culture and cultural differences on construction. Hall (1999) investigated the links between cultural diversity and international construction activity from a British perspective. He found that British construction companies adopted an ethnocentric response to the cultural differences that they encountered when working overseas. Mahalingam et al. (2005) investigated which institutional or cultural differences had the most significant impacts on global projects. Liu and Fellows (1999) investigated the impact of culture on construction project goals. Several researchers conducted studies on the impact of cultural differences on management practices in construction such as quality management (Pheng and Alfelor 2000), dispute resolution (Chan and Suen 2005), and communication (Loosemore and Al Muslmani 1999).

Previous studies and experiences in the construction industry showed that cultural differences have an impact on daily businesses, either negative or positive, of construction enterprises working nationally or internationally. Cultural differences are therefore an issue which cannot be ignored in this industry and special attention should be given to the management of cultural differences. Cultural diversity management is defined as an organizational reaction to

the need for competitiveness and to the increasing variety of the workforce (Fleury 1999). According to Adler (1991), companies could adopt three approaches when working in a culturally diverse environment. These are:

- The parochial approach (members of the company believe that “our way is the only way”). In this approach, cultural diversity is ignored.
- The ethnocentric approach (“our way is the best way”). In ethnocentric approach, the members of the organisation recognise the diversity of their environment, but only as a source of problems.
- The synergistic approach (“our way and their way differ, but neither is inherently superior to the other”). In this approach, which is the least used, organizations recognise cultural differences to create competitive advantages for their organisation (Hall and Jaggar 1997).

RESEARCH METHODOLOGY

The specific objectives of this study are to find out the opinions of managers about the possible effects of cultural diversity on some management practices in construction business; the relationship between the management of cultural diversity and success; and the possible advantages and problems of working with different cultures in the construction industry. Within this context, semi-structured interviews are carried out among 11 senior managers, including directors, project managers, group managers, HR managers and construction managers, who have some years' of experience in international construction projects and are involved in UK construction business. In order to provide enhanced understanding and generate rich descriptions of the concept of cultural diversity in construction, a qualitative methodology has been utilized. The majority of the participants have more than 20 years of experience in the construction industry. It is assumed that these participants have enough knowledge about the organizational structure, culture and strategies. Similarly, the companies they work for have more than 20 years of experience in international construction projects. The interviews took place over a 3-month period between November 2007 and January 2008, and each lasted approximately 1 hour. In interviews, the participants were asked a number of open-ended questions and they were strongly shaped by the probing questions to seek further details.

The interviews with these participants were audio-recorded and transcribed. The data collected were coded and analyzed using the qualitative analysis methods proposed by Strauss and Corbin (1998), including coding of individual interview data and coding of the overall data set. Then, the NVivo 2.0 software program was used in the analysis of the qualitative data. Finally, emerged themes from the data were identified which will be discussed in the following section. Table 1 illustrates a summary of the NVivo analysis results including the number of interviewees who mentioned each issue.

STUDY FINDINGS

During the interviews, the participants were asked to indicate the relationship between cultural differences and success; the effects of cultural differences on management practices; and the possible advantages/disadvantages of cultural differences in construction business. All interviewees acknowledged the importance of cultural issues in performing business activities in the construction business environment.

CULTURAL DIFFERENCES AND SUCCESS

Cultural differences can have major impacts on the outcomes and success of construction projects. However, there are also studies that showed no impact on projects even if the differences existed (Nummelin 2005). In this study, a direct relationship between project success and cultural differences were pointed out by all of the participants. Managing cultural

Table 1. Summary of NVivo analysis

Theme		Number of interviewees who mentioned the issue
Project success	<i>Cultural awareness</i>	
	Understanding cultures	11
	Religion	5
	Ethnicity	2
	Cultural identity	3
	Values	5
	<i>Experience in international projects</i>	
	Local offices	4
	Culture of partners	4
	Experience in similar projects	5
	Teamwork	6
	<i>Benchmarking and learning</i>	
	Best practices	4
	Efficiency	3
	<i>Project location</i>	
	Regional cultural differences	4
	Natural events	3
	<i>Company strategy</i>	
	Equal opportunities policy	6
	Staff development strategy	1
	Training programmes	3
	Employee selection	2
	Diversification	1
	Effective management system	1
Effects of cultural differences	<i>Human resources management</i>	
	Requirements of staff	8
	Understanding the culture of staff	7
	Adaptation to culture	6
	Flexibility	6
	Trust	2
	Capabilities of staff	4
	Efficiency	4
	<i>Knowledge management</i>	
	Knowledge transfer	6
	Knowledge sharing	9
	Knowledge capture	5
	Learning	8
	Knowledge loss	2
	New business methods	3
	Knowledge management team	1
	Experienced staff	3
	Training	2
	Project databank	2
	<i>Communication management</i>	
	Language	11
	Personal relationships	3
	Regional differences	4
	<i>Safety management</i>	
	Safety standards	6
	Safety practices	4
	Communication	5
	<i>Time management</i>	

Effects of cultural differences	Working hours	6
	Requirements	4
	Personal characteristics	3
	<i>Negotiation</i>	
	First contact	6
	Language	7
	Communication	7
	Learning the culture	4
	Future projects	3
	Delay	2
	Profit	1
	Risk management	1
	Quality Management	1
	IT management	1
Advantages of cultural differences	Knowledge sharing	9
	Innovation	7
	Problem-solving	6
	Learning	7
	Different business methods	3
	Marketing	1
Disadvantages of cultural differences	<i>Miscommunication</i>	
	Language differences	8
	Decrease in productivity	4
	Prejudices	4
	<i>Culture shock</i>	
	Lack of experience	6
	Cultural training programmes	6
	Different living conditions	3
	Informal briefings	5
	Teamwork	4
	Adaptation to culture	6
	Requirements of people	4
	Different working styles	2

differences successfully were seen by the respondents as one of the key elements in project success. Understanding, respecting and accepting different cultures are considered as highly important issues for performing construction projects successfully. One interviewee illustrated this by saying: *“You have to appreciate who you working with, to make any project a success. Someone has got different values different sort of drivers. So, that is the important thing to make sure that you as a team, you understand what the differences are and appreciate them”* (Interviewee E). On the other hand, the majority of the managers also considered ignoring and mismanaging cultural differences as one of the important causes for project failure. One manager noted the importance of understanding the business methods in different countries to prevent failure: *“We had some offices in France and it did not work. One of the reasons was because there was not enough understanding about how French do business compared with the British do business. You think that within European Union it would be the same. It’s absolutely not”* (Interviewee G).

Besides cultural factors, some other issues affecting project success were also noted by the participants during the interviews. These factors include having experience in international projects, benchmarking and learning, project location, company strategy, and having an effective management system. One manager reported the significance of having local offices and employing local people in these offices while doing business internationally. Employing local people were considered as important for establishing good relationships with governmental bodies and local people: *“We have always had the greatest success where we had local offices. For example Malaysia, Indonesia or Dubai. The greatest success comes from the fact that we have an office there with locals employed in the office”* (Interviewee A).

EFFECTS OF CULTURAL DIFFERENCES ON MANAGEMENT PRACTICES

Previous studies related to the impacts of cultural differences on management practices in construction showed that the differences have an impact on those practices, either negative or positive. However, exactly how culture affects management is still a difficult question to answer (Shore and Cross 2005). According to the participants cultural differences can have an effect on all management practices, but in different ways and levels. However, some management practices were more highlighted in the interviews. These are human resources management, knowledge management, communication management, safety management, time management, and negotiation that will be discussed in the following sections. According to the participants, cultural differences can have more effects on these management practices than other practices such as IT management.

HUMAN RESOURCES MANAGEMENT

As might be expected, one of the main issues pointed out by the interviewees was managing the culturally diverse human resources. The importance of cultural awareness was highlighted by most of the managers. Understanding and accepting cultures and the requirements of people, including religious requirements, from different cultural backgrounds seemed to be the key points in overcoming the possible problems related with cultural differences. Flexibility in managing culturally diverse people and adaptability to the cultures were also highlighted many times during the interviews. As one manager stated: *"I think one of the main important issues with regard to management of any company is its staff. Managing the staff here is just as important as managing the staff in Dubai or Malaysia or Indonesia. You still have to manage the staff. So it's adapting to the culture of the staff. There is always the religious aspect and that is quite involved and very important locally. And depends on which country you are in. It's understanding and adapting to that. So I think as a manager, the important thing is managing the staff rather managing the project because you have to manage the staff first in order to manage the project. Manage them within their requirements locally. That's quite important"* (Interviewee A). According to the comments of the participants it seemed that the companies adopted a polycentric approach, in which cultural diversity is accepted, when working in culturally diverse environments. However, this might be interpreted with caution since further detailed analysis is required whether the firms adopted this approach or not.

KNOWLEDGE MANAGEMENT

There has been limited research on the impact of culture on knowledge management (Ang and Massingham 2007). While several researches showed no evidence that cultural differences have an impact on knowledge management practices (Jensen and Szulanski 2004), some of the researches showed an impact on practices such as knowledge sharing (Voel and Han 2005). The interviewees gave also different comments about this subject. Some managers saw no direct connection with cultural differences and an impact on knowledge management or had no specific idea about this issue. On the other hand, the highlighted point was the direct relationship between knowledge sharing and culture and was noted by the majority of the interviewees. Here, knowledge sharing and consequently learning was also seen as one the most important advantages working with different cultures. As one manager commented: *"The knowledge, the culture, goes back to my original point about learning. More cultures you come across, I think the more acceptable we become. In other words, more adaptable and more broader you become as a person. From my experience, the knowledge management, knowledge sharing and knowledge capture are best placed being in that persons culture, team that he is faced with. And you can respect that, capture that. We are going to employ a knowledge manager. One of her areas would be to look at the cultural ways of working in our offices. See what advantages they bring. We recognize that the knowledge capture, knowledge management is now a major issue. So if you are working with different cultures, we need to respect, then there would be very good practices"* (Interviewee J).

COMMUNICATION MANAGEMENT

Since language is the most important medium of communication and is often used to distinguish one culture from another (Walker et al. 2003), differences in language can be a major source of communication problems (Loosemore and Al Muslmani 1999). A common theme that emerged from analysis of the interviews was the problems of communication with people from different cultural backgrounds. Language differences were noted as the biggest problem in effective communication. It was stated that these problems can seriously effect business processes and thus decrease productivity. As one manager reported: *"Communication management between each participant of the project. The communication is the base. I think it is the most affected management practice by cross cultural diversity"* (Interviewee B). Another manager commented: *"Language is a clear cultural difference, however patience can be most important in this regard and making an effort to communicate on both sides is necessary for success. The influence often depends on the personal beliefs of those involved as to whether it is positive or negative"* (Interviewee K).

SAFETY MANAGEMENT

Safety management was also reported as one of the main practices that can be influenced by cultural differences. One manager indicated the connection between communication problems and safety applications when working with people from different cultures and saw safety as the most influenced practice. Another manager pointed out the different standards and practices in safety applications in different countries and noted the problems related with these applications when working in culturally diverse environments: *"In my experience this is the most obvious indicator of cultural differences, safety practices in eastern Europe (for example) appear to be far less than in the UK and this can lead to issues on site"* (Interviewee K). Similar comments were given by another manager: *"I think that each nationality has the different safety construct in their mind. Just like an American. They pay attention to everything. But some people from other nationalities, they do not concern much in safety"* (Interviewee B).

TIME MANAGEMENT

Hall (1998) defined two basic time systems; monochronic and polychronic time. Monochronic time means paying attention to and doing only one thing at a time. Generally, British, Americans and Germans are considered to be monochronic. In monochronic cultures time is seen as a resource and an opportunity cost that equates to money. Polychronic time means being involved with many things at once. Generally, Asians, Latin Americans and Arabs are considered to be polychronic. In polychronic cultures people may not be interested in time schedules and do not see time as a resource. It is obvious that if those two cultures work together in projects, problems could arise (Abeysekera 2003). During the interviews some managers commented about this subject: *"I manage my time and I expect each member of staff to manage their time and prioritize. There is no difference whether you are in the UK office or in the Dubai office. I still have to manage my time. I would suggest that I do more than one thing in one time, all of the time. My whole day I do several things happening. And I never get the opportunity to start one thing and complete and go to the next. That does not happened in my life at all"* (Interviewee A). Another manager pointed out the problems due to working days of different cultures: *"Each nationality has their own holiday. Our company and the joint venture had to set up a joint venture holiday! So they put this into our schedule. And we used this as our standard working days in our schedule"* (Interviewee B).

NEGOTIATION

Negotiation is one of the most difficult and important tasks that international managers face in their businesses (Fatehi 1996). Due to cultural differences, negotiations can become a difficult activity since many of the rules used in one country may not apply elsewhere (Gulbro and Herbig 1999). In this study, negotiation was also considered as a practice that can be highly

affected by cultural differences, either negative or positive. On the negative side, language and thus communication problems were noted as the biggest barriers for negotiating successfully. On the positive side, negotiation was seen as an opportunity to learn the client's or other contractor's culture. It is stated that, when performing successfully, it can give advantages to win and carry out future projects. One of the managers illustrated this by saying: *"I think in the beginning of the projects if you negotiating with the client or with the contractor or with the consultants, negotiating is a good sign. It's the sign you might be pretty close to win the project which is positive and that's a good opportunity to understand the culture. So you are learning a lot of the culture of that country and you are trying to adapt almost all the way through negotiating. On the positive side, it's an opportunity to learn the culture of the client. Once you negotiated successfully, you carried out the project successfully within that culture, it's every chance you will win another project then"* (Interviewee A).

ADVANTAGES OF CULTURAL DIFFERENCES IN CONSTRUCTION PROJECTS

As mentioned previously, cultural differences can provide several advantages for organizations. It can enhance organizational effectiveness and give an organization a strong competitive advantage. Cox and Blake (1991) highlighted six areas where the management of cultural diversity can create a competitive advantage. These areas are: cost, resource acquisition, marketing, creativity, problem solving, and organizational flexibility. One common theme that emerged from analysis of the interviews related to the advantages of cultural differences was knowledge sharing. Knowledge sharing is an important knowledge management practice for organizations to learn and develop (Dulaimi 2006). According to the managers, it is one of the main advantages working with different cultures: *"They bring something different to share knowledge and experience, and they bring the best skills together. But the difference is the culture. So you have to understand and respect. The advantages could be the disadvantages and likewise. You got to understand whom you working with"* (Interviewee E).

Innovation and problem solving were the other highlighted advantages. The possibility of more innovation in culturally diverse teams was a common idea by all of the managers. Similarly, coming up with alternative solutions to problems was pointed out as a vital benefit: *"I think they can open your mind and you can come out with different things. It gives value for the project and more flexibility, and this is a continuous thing. Things like the integration of language line"* (Interviewee H). On the other hand, one manager also noted the enjoyable part of working with different cultures: *"I find working with people of different cultures a very interesting and very enjoyable environment to work it. The conversation and discussions are more diverse and for the time being at least I always know what the weather is like in Latvia!"* (Interviewee K).

DISADVANTAGES OF CULTURAL DIFFERENCES IN CONSTRUCTION PROJECTS

There can be serious problems in projects when working with different cultures. If mismanaged, it can cause decrease in productivity and failure of projects. Dealing with coordination and control issues, maintaining communication richness, and developing and maintaining team cohesiveness are also some other major challenges (Marquardt and Horvath 2001). Among the several problems reported from the managers, communication was considered to be the most important one. Language differences and miscommunication due to different meanings were noted as serious causes for possible conflicts. One manager explained this by saying: *"We are working in different areas with different cultures. We are going into areas where people that first language is not necessarily English. I have been in a situation recently and we had to go through the language line. You know we had to talk and the first time I did not really exactly understand what they wanted to. I said yes yes! It can be very difficult"* (Interviewee H).

Prejudices are remarked also as a serious problem in organizations. If people have some prejudices about others having different cultural backgrounds, this can also lead to serious conflicts: *“Whether people like it or not, people from all cultural backgrounds have usually some prejudices or they do not necessarily express them. But they exist. It is hard to deal with because if you have got a whole group of people who are misbehaving, treating somebody unfairly for reasons of prejudice, changing that mindset and making it acceptable for the person who is the victim can be very hard to do. It can be huge difficult to shift their opinions”* (Interviewee G).

Another emerged theme was culture shock. When entering a new culture, professionals, managers or engineers can experience a cultural shock. One of the main reasons for that is the inability to deal with cross-cultural adaptation. It can significantly affect the performance of the managers and thus result in serious problems in the projects. During the interviews, the main reported factor for getting a culture shock was lack of experience. It was pointed out that those managers that do not have adequate experience in international projects and working with different cultures, and not worked in another country before, are more likely to be shocked: *“I think it is experience that softens that shock. Some people would be shocked because they never left the UK. They will be shocked and there are many reasons for that. I think as engineers, professionals generally culture shock is a bit less. I do not think this is big at professional level. Probably more at labouring level”* (Interviewee J). Another manager considered the different living conditions in different areas, even in the same country, as one of the main reasons for getting a culture shock: *“I think we all get some kind of culture shock. You can have a culture shock if you are going to Romania for a while and it does not matter how much money you got. You can get culture shock when you move from London to Scotland. It’s not just the food, its pace of life. It’s tradition”* (Interviewee C).

Pre-departure preparations and cultural training may reduce the cultural shock that people experience when entering a new culture (Fatehi 1996). According to the given information, there is lack of cultural training programmes in the majority of the companies. Instead of formal training practices, informal briefings are seemed to be the most common used method when companies send people abroad. One manager illustrated this by saying: *“We do when we send people abroad. There is a cultural training. We tell them about the customs and practices. We are trying to educate. They must be prepared a little bit”* (Interviewee C).

CONCLUSION

Culture has the potential to impact on business activities. Therefore, companies have to consider the cultural issues in their daily businesses to operate successfully in the global marketplace. This study is based on interviews with managers from the UK construction industry. The analysis of the interviews showed that cultural differences have an impact on management practices in construction but in different levels. The results of the study could be summarized as follows:

- There is a direct relationship between project success and cultural differences. Understanding, respecting and accepting different cultures are key issues for managing projects successfully when doing business with people from different cultural backgrounds.
- Ignoring and mismanaging cultural differences can lead to project failures.
- Cultural differences can have an effect on all management practices.
- Human resources management, knowledge management, communication management, safety management, time management, and negotiation are the practices that can be significantly influenced by cultural differences.
- The main advantages of working with different cultures are knowledge sharing, innovation and problem-solving.
- Language differences and miscommunication were considered as important problems when working with people from different cultures.
- There is lack of cultural training programmes in the majority of the companies. Informal briefings are the most common used method.

It seems to be that the construction industry should pay more attention to the management of cultural differences and professional training programmes related with culture. As one manager noted: *"I think the construction industry has a very long way to go and you know we could do a bit more. We will do more in internal training. We could do more to understand that not everybody is the same"* (Interviewee G).

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VALUES AND VALUE ON CONSTRUCTION PROJECTS: ISSUES OF COMPATIBILITY AND OUTCOMES

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ABSTRACT

Realisation and use of construction projects are multi participant activities. As such, a great diversity of specialists are involved whose objectives and interests vary. For projects to be effective and efficient, as processes and as products a high level of coordination is essential. Such coordination requires recognition of the range of values held by the participants, sensitivity to the interests of others and hence, appropriate determination of the values to be employed for deciding criteria and targets for performance. That takes place within various dynamic socio-political-economic environments in which the temporary multi organisations (TMOs) assembled to realise the projects through design and construction activities are embedded. Through a review of theory and literature coupled with case studies of construction projects, this paper analyses the realisation of those projects as evolving realisations of the values of major participants via organisational structures and episodic power plays of the TMOs. It is concluded that power distribution is a primary determinant of the realised project from the perspective of the hierarchy of values which are embodied in the completed building.

Keywords: alliances, cultural distance, power distribution, value, values

INTRODUCTION

Almost invariably, the goal expressed by participants on construction projects is to satisfy the client. That overt expression raises four fundamental questions – (1) who is the client, (2) what are the criteria for satisfaction, (3) what are the relative importances of those criteria, and (4) what about the interests of the other project participants? Further, it is common in marketing and, especially, when issues of quality are addressed for the goal to be raised to delighting the customer. Given that it is appropriate to consider the client as the customer for a construction project, the satisfaction may be viewed as a rather minimal level of achievement in that it is meeting targets of performance rather than the notion of delight which implies exceeding performance targets by a significant margin.

Today, the criteria for performance evaluations are extending for both organisations and for projects. The single criterion of financial metrics relating to the business unit is extending to

embrace the stakeholder perspective and so, includes environmental metrics, and corporate social responsibility (CSR). Adoption of the stakeholder perspective, in whole or in part, extends the consideration of who is affected by a project, as in the applications of cost-benefit analysis (CBA), an approach adopted widely for evaluation of alternative major projects – notably, public funded, infrastructure projects; CBA is enhanced in the planning balance sheet approach.

The realisation and use of a construction project are multi-participant activities – increasingly so as projects extend in complexity, specialist activities are isolated and various guises of internationalisation occur. Whilst the extending incidence and recognition of the need for and advantages of specialisation are amply demonstrated in many areas of activity, it is the commensurate requirements of greater integration of those disparate specialisms which are likely to be problematic (Lawrence and Lorsch, 1967).

Generally, project and organisational performance criteria may be classified as ‘technical’ and ‘relational’ (or personal); the technical criteria comprise technological criteria (structural integrity, and aesthetics) and business criteria (turnover, market share, and profitability), whilst the relational criteria comprise individual and organisational criteria which determine how the participants interact and with what consequences. Clearly, the technological specialisms are complimentary – architecture, interior design, structural engineering, services engineering, cost and contractual management, and construction. Business criteria, however, appear to be common amongst organisations, although the typology between public sector and private sector organisations is distinct in several respects; that remains despite fuzzing of the boundary between those sectors due to privatisation, and partnering approaches.

This paper examines the values of participants and stakeholders on construction projects – using case studies to demonstrate applications in practice – with a view to determining sources and degrees of influence on the initial criteria, the outcomes and the processes of project realisation.

VALUE AND VALUES

Rokeach (1972) defines a value as signifying enduring beliefs in particular ways of behaving or preferences for states in the future. Hence, a value is positive as it indicates worth to the individual(s) and leads to the concept of values constituting desirable attributes. Such conceptualisations underpin the labour theory of value as advanced by David Ricardo and Karl Marx.

Schwartz and Bilsky (1987) advance “...five features that are common to most...definitions of values...(a) concepts or beliefs, (b) about desirable end states or behaviors, (c) that transcend specific situations, (d) guide selection or evaluation of behaviour and events, and (e) are ordered by relative importance.” Thus, values are, often, depicted e.g. (Schein, 2004) as constituting the layer of culture which is intermediate between the fundamental beliefs and the manifestations of behaviour, language, symbols, and heroes. They note a variety of motivational domains of values and so, support the desirability of congruence between people’s values and those expressed for tasks / projects to generate a positive effect on performance. In that context, Schwartz and Bilsky (1987) distinguish between values which relate to terminal situations (outcomes – as in the functioning of a project in use; project performance) and instrumental values (processes – as in project realisations; project management performance).

Investigations of values and their behavioural consequences have led to the development of competing values models for analysis of organisational effectiveness. Quinn and Rohrbaugh (1983) advanced a three dimensional model of competing values: control and flexibility, internal focus and external focus, and ends orientation and means orientation. However, such models are criticised by Buenger, Daft, Conlon and Austin (1996) due to their “...potential negative consequences of overemphasising certain values and excluding others”.

Generally, economics employs two primary concepts of value. Use value is the subjective determination of the usefulness (utility) of a good or service and is contingent upon situations. Exchange value is the market price of an item as expressed in a transaction (normally, in current, local currency). Under the alternative forms of rationality and market mechanisms, use value underpins exchange value and those relationships, as expressed by potential sellers and buyers, determine whether transactions occur and, through bargaining and market operations, at what money amounts any transactions do occur.

If values lead to objectified end states and to behaviour (processes) perceived conducive to their achievement, then, those end states constitute the primary (behavioural) drivers with the processes acting as facilitators / parameters; the parametric components are founded in morals and manifested in ethics and social institutions, as well as law. Many disciplines employ basic assumptions of rationality of human behaviour, whether complete or bounded. Economics is underpinned by the belief that 'rational *homo economicus*' has the objective of utility (satisfaction / profit) maximisation for self (whether individual or collective). That leads, e.g. Williamson (1985), to assert that, usually, people behave opportunistically – self-seeking with guile.

In endeavours to increase utility in supplies, the techniques of value engineering (VE) and value management (VM) have developed. In such techniques, the concept of value tends to relate utility to expenditure, commonly as expressed as value being function for cost ('value for money'). That leads to the categorisation of value as 'essential / primary', 'secondary / supplementary', and 'unnecessary', with each function being described by one verb and one noun only – to ensure precision. Costs are measured against each value item as the monetary expenditure for its provision. Thus, the concern of any VE / VM exercise is to maximise the surplus of functionally-based values over costs, which may involve hugely important equity and monetary valuation issues for major projects.

A common, but, often, unrecognised practice of VE / VM in construction is cost planning by consultant quantity surveyors during the design of projects. Although in many such cases the focus may be on minimisation of the initial capital cost for the commissioning client (and / or ensuring the cost will not exceed some pre-determined budget amount – of particular import on public sector projects), value considerations and full project life evaluations are attempted increasingly. Here, as in many other cases, it is important to be aware that it is a forecasting exercise and so, subject to the errors, risks and uncertainties, and potential biases inherent in forecasting. Further, it is stochastic processes which are being forecast, such that the deterministic approaches which are adopted most usually are likely to yield over-simplistic results and decisions by deluded, to the extent of being disenfranchised participants (Reugg and Marshall, 1990).

In any decision chain, early decisions have greatest effect with, normally, effects declining geometrically throughout the project realisation stages in the form of initiation, design and construction. Usually, projects are not realised by a team but by a coalition of individuals, and individuals representing organisations, who have diverse interests and objectives and varying types and amounts of power and influence. Hence, the appropriateness of characterising the realisation of a construction project to be via a TMO.

For a project TMO, membership increases incrementally as the realisation progresses (and, changes further, during occupation and use, adaptation etc, and final disposal). Given the functionally diverse specialisations of the progression of members, the values which are brought to bear on the project design and construction are numerous and diverse. Many values will be expressed, but many other will remain implicit – left to be intuited from behaviour of the participants. People are not always aware of their own values until issues which impinge upon them, most obviously as threats to them, arise.

Thus, even if participants' values are determined at the initial stages of a project and an accurate hierarchy is communicated and accepted, that value structure is likely to be 'threatened' through the subsequent phases of realisation of the project as the TMO power structure changes, membership evolves, and participants' appreciation of project

management and project performances develop. The consequence is that the values applicable to determination of desired performance change, so generating differences in the basis for performance evaluations. Further, early value structures may have been fixed by early decisions and project realisation processes such that subsequent amendment may incur huge costs financially and otherwise, irrespective of how desirable those changes may be.

Usually, a trade-off, or zero-sum-game, model of performance is assumed; that dictates that the values which generate the desired performance attributes must follow the trade-off model too. However, a non-zero-sum-game or 'win-win' is also a possible model (Womack, Jones and Roos, 1990), as epitomised in the 'continuous improvement' philosophy. In particular, zero-sum-game models are applied to project management performance.

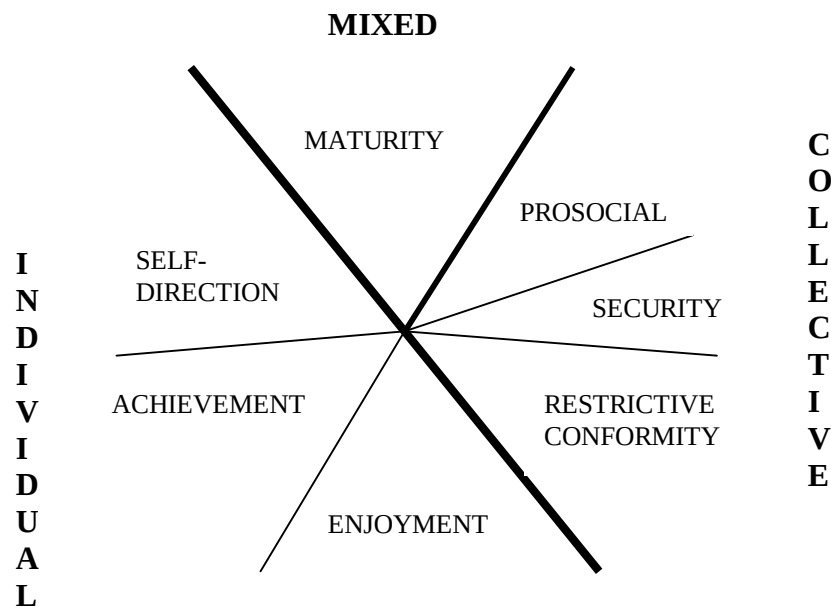


Figure 1: Hypothesised structure of value-based motivational domains (following Schwartz and Bilsky, 1987, 1990).

The domains presented in Figure 1 are defined by (Schwartz and Bilsky, 1990):

Prosocial: active protection or enhancement of the welfare of others;

Security: safety, harmony and stability of society, of groups with whom one identifies, of relationships, and of self;

Restrictive Conformity: restraint of actions and impulses likely to harm others and to violate sanctioned norms;

Enjoyment: pleasure, sensuous, and emotional gratification;

Achievement: personal success through demonstrated competence;

Self-direction: independent thought and action – choosing, creating, exploring, and

Maturity: appreciation, understanding and acceptance of oneself, others and the surrounding world.

Following further research regarding the cross cultural applicability of their model of motivations underpinned by values, Schwartz and Bilsky (1990) note that “The cross cultural evidence clearly supports the universal existence of the seven basic motivational domains tested.” (Figure 1) Their studies indicate that “...the discrimination between values as serving the individual’s own interests or those of the collectivity is universally meaningful.” (Schwartz and Bilsky, 1990)

CULTURE

Various dimensions have been identified for examining national culture and organisational cultures. Measurements on the dimensions form basic indicators of the underpinnings of organisational cultures and climate and so, the context for organisational behaviour. Hofstede (1980) isolates four dimensions of national culture: Power Distance, Individualism / Collectivism, Masculinity / Femininity, Uncertainty Avoidance, and, later, adds Long-Termism / Short-Termism (Hofstede, 1994) following studies in Asia which detected important impacts of 'Confucian Dynamism' (The Chinese Culture Connection, 1987).

Individualism / collectivism is a spectral dimension at one extreme of which an individualist considers his / her personal interests more important than the interests of a group; at the other extreme, a collectivist values membership of a group and looks for the benefits to the group even at the expense of his / her own personal interests (Hofstede, 1980, 1994b). Collectivists are members of very few in-groups and are highly loyal and positively disposed to other members; individualists may have loose membership of many in-groups but are tied much less to each one. Further, individualism – collectivism is examined through vertical (hierarchical; primarily, work situations) and horizontal (egalitarian; primarily, domestic and social situations) components (Triandis and Gelfand, 1998; Chen, Meindl and Hunt, 1997).

Power distance concerns the expectation and tolerance by subordinates of power holding and execution by superiors in societies (measured by Hofstede in work situations). That yields indicators of the degree, strength and rigidity of hierarchies in social institutions – especially, organisations. Positioning on the power distance dimension has important impact on motivation, empowerment and decision making – notably, who makes decisions and how, especially in respect of consultations.

According to Hofstede (2001), organizational culture is the collective programming of the mind that distinguishes the members of one organization from another. Schein (2004) defines organizational culture as a collection of shared basic assumptions that was learned by the organization as it solved problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to problems.

Researchers often use different dimensions to describe organisational culture. For instance, Caldwell, Chatman and O'Reilly (1991) identify seven dimensions to develop their Organizational Culture Profile (OCP), i.e., innovative, stable, respecting people, outcome oriented, detail oriented, team oriented, and aggressive. Some researchers allege that there are principal factors that influence the choice of culture and structure, for instance, Handy (1993) suggests these principal factors to be history, ownership, size, technology, goals, the environment and the people; in Hofstede's (2001) dimensions of national culture, particularly the dimensions of power distance, uncertainty avoidance and individualism – collectivism may influence organisational culture. For organisational cultures, Hofstede (1994) employs the six dimensions of: Process – Results Orientation, Job – Employee Orientation, Professional – Parochial, Open – Closed System, Tight – Loose Control, and Pragmatic – Normative. These dimensions of culture may be viewed as 'competing values dimensions'.

Definitions from most scholars, including Hofstede (2001), Schein (2004), Cameron and Quinn (1999), Beyer and Trice (1993), suggest that organizational culture is a pattern of shared basic assumptions and values within an organization which allow the organization to operate. Values are implicit. In order to identify the individuals' perceptions of their working environment, Quinn (1988) suggests that values, motives, and problem-solving styles could reflect four notions of organizing, which emerge to a close parallel of four information-processing orientations, to form the basis of a competing values framework. The competing values framework is also applied in the study of organisational culture of construction firms in China (Liu, Zhang and Leung 2006).

The competing values framework is used to determine organizational effectiveness. Campbell, Brownas, Peterson and Dunnette (1974) creates a list of indicators for

organizational effectiveness, which Quinn and Rohrbaugh (1983) then analyze to form two major dimensions splitting the indicators into four main clusters. In these two dimensions, one differentiates effective organizing criteria from *flexibility* to *stability* while the other one differentiates from *internal focus and integration* to *external focus and differentiation*. The ends of these x and y axes (figure 2) represent competing values and the four quadrants each represents a distinct organizational culture type, i.e., hierarchy, market, clan and adhocracy.

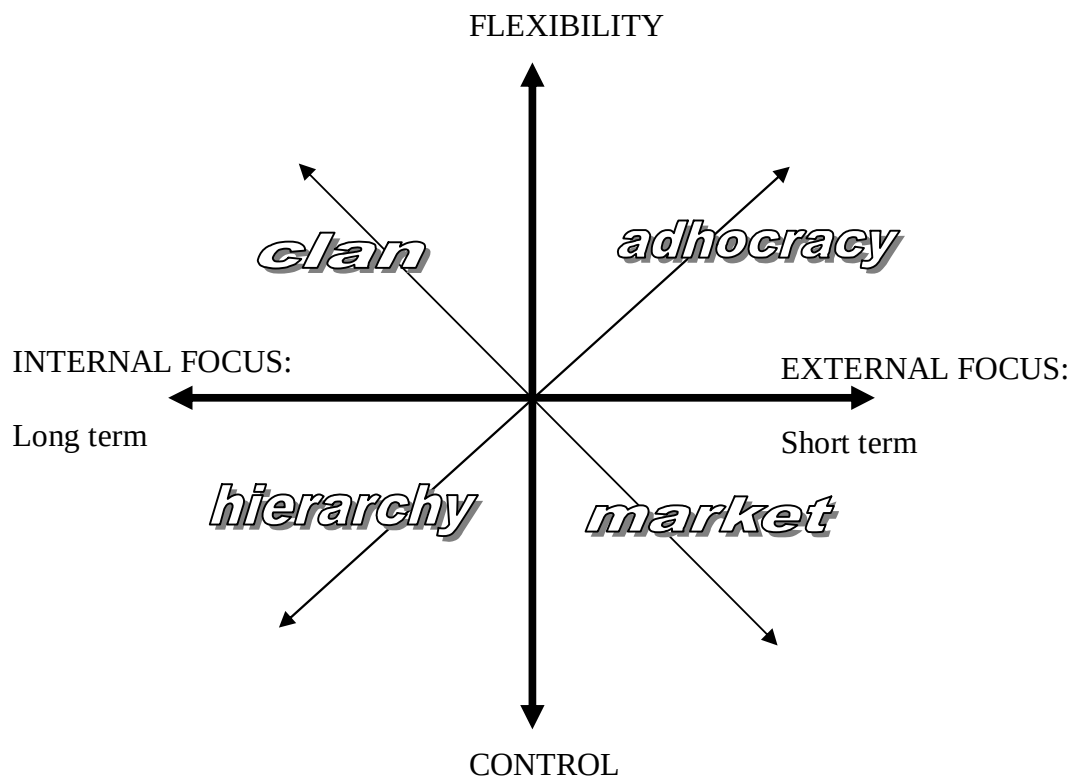


Figure 2: Competing values framework
Source: Cameron and Quinn (1999)

Hierarchy Culture

In the 1950s-60s, organizations set rules and policies for employees to govern their work procedures; leaders would ensure smooth running of the operation. In the long term, the hierarchy culture is to facilitate a stable, predictable and efficient environment for the organisation. The seven characteristics stated by Weber (1974) are rules, specialization, meritocracy, hierarchy, separate ownership, impersonality, and accountability.

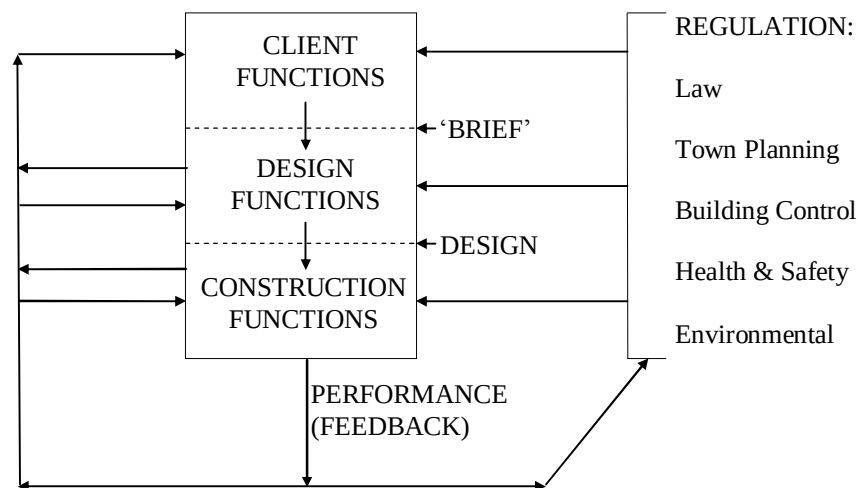
Market Culture

Popular in the late 1960s, due to very hostile and competitive markets, organisations focused on transaction costs aiming to create competitive advantages over their competitors. It is a results-oriented workplace driving towards profitability and productivity using aggressive strategies. In the long term, such a culture focuses on competitive actions and achieving stated goals and targets.

People working in such an organization have shared values and emphasize teamwork. They develop an environment stressing human relationships where managers empower their staff and facilitate them to participate and commit. In the long term, such a culture will lead to an organization focussing on individual development with high cohesion and morale.

These organizations like to be adaptive, flexible and innovative so they can use new resources to gain further profit. However they bear high risks and greater uncertainties. Emphasis is on individuality, risk taking and anticipating the future.

Figure 3 indicates the functional categories of participants on a construction project, together with primary (constraining) regulations and outcome consequences. The model is applicable widely, independent of the procurement approach adopted. The main client functions are commissioner, owner, user, financier; design comprises architecture, structural engineering, environmental engineering, quantity surveying; construction includes management, supplies and sub contracting. Each function may be carried out by a person or organisation, but depending on the size, nature and complexity of the project, functions may be either combined or sub-divided further – as in a consortium of international banks financing the new airport in Hong Kong.



Note:

- (1) Performance leads to (project) goal attainment and, hence, perspectives of project success and satisfaction of participants. The relationship of performance-success-satisfaction is explained by Liu and Walker (1998).
- (2) Performance-Success-Satisfaction also produces feedforward in the ‘cycling’ of project data and information to aid realisations of future projects through participants’ perception-memory-recall filtering (‘experiences’). Performance-Success-Satisfaction also produces feedforward in the ‘cycling’ of project data and information to aid realisations of future projects through participants’ perception-memory-recall filtering (‘experiences’). The participants will be able to bring forward their experiences of past behaviours to enhance their

performances in subsequent projects, thereby securing likely attainment of project goals (success) in future.

Clearly the objectives of the individual functionaries vary, depending, *inter alia*, upon the sectors of society (public – private, ‘professional’ – commercial, etc.) from which they are drawn. Their technological expertise impact on their primary functional objectives e.g., appearance – structural integrity, whilst business imperatives may be common but, through the trade-off nature of their operation, cause conflict between participants e.g., profit-seeking. Given that each project participant has their own hierarchical array of objectives regarding the outcome of the project and / or the realisation process, the issue arises as to what objective will be applied to the project and its realisation i.e. product or project objectives – ends; process or project management objectives – means. The, often expressed, overall objective is ‘to satisfy the client’ which raises issues of client identity, accurate determination of that participant’s objectives – which, notoriously, may change rapidly and extensively – and subjugation of all other objectives to those – involving communication, acceptance, and preferably, commitment.

“...clients...do not always fully understand their demand profile.....construction companies are effectively the ‘integrator’ for a myriad of construction supply chains...[and]...Adversarialism and opportunism are rife at all stages...” (Ireland, 2004).

Even if a value structure for the project is determined accurately for briefing most probably based on the values of the commissioning client, the likelihood of powerful others amending that structure subsequently by imposing their own values during realisation is likely to yield outcomes different from those forecast initially. Thus, in respect of performance outcomes, cognitive dissonance (Festinger, 1957) is likely to occur and impact on the value of the project as perceived by both suppliers and consumers.

Thus, often, performance is reported as falling significantly below expectations. The reasons which are advanced most usually comprise inadequate briefing, poor design, lack of productivity in the construction process, lack of constructability, poor coordination, lack of skill, institutional / regulatory framework, claims (Green and Siminster, 1999; Rooke, Seymour and Fellows, 2003). Application of value management tends to pursue the perspective of the commissioning client and to freeze the value hierarchy determined at the time of executing the study (ideally, as early as possible in the project realisation) for design of the project and of the realisation procedures (Green and Popper, 1990; Kelly, Male and Graham, 2004).

Baiden, Price and Dainty (2006) note the enduring emphasis on perceived technical abilities of organisations when project participants are selected, including business criteria such as financial security, and quality assurance certification. They confirm that the ability of potential participants to work together in cooperative and integrated ways to deliver the project effectively and efficiently remains, almost universally, ignored, despite its acknowledged importance (Tavistock, 1966).

As noted above, given that each project participant has their own hierarchical array of objectives regarding the outcome, the case studies below delineate the realisation of three actual projects - all in a university campus environment - as evolving realisations of the values of major participants via organisational structures and episodic power plays of a set of TMOs.

CASE STUDIES

Professional librarians in universities – ‘academic librarians’ – are one group of non-construction specialist project participants who have very often found themselves in TMOs which steer construction projects to hopefully successful completions. This may seem surprising to non-librarians, but the rapid worldwide growth of universities themselves in the last forty years has necessitated many new library buildings. Moreover, in the last decade, the spectacular increase in the availability and provision of electronic Web-based information with a consequent decline in the use of print – particularly printed journals – has made many university administrators wonder if their libraries really need all that space for book-stacks and,

in turn has forced their librarians into radical rethinks towards zoned and flexible learning spaces in their buildings. Typically then, a senior academic librarian of twenty or thirty years experience will have been involved in at least one new build, and many, many refurbishments in his / her career.

The cases are intended to illuminate the kinds of challenges involved when the professional objectives, interests and values of TMO participants such as architects, builders, academics, academic administrators, and librarians coincide, or sometimes collide. Since the case studies are drafted by an academic librarian, it should be recognised at the outset that a librarian's subjective values are naturally predominant. Yet, there are no good or bad guys in the cases and processes described, merely multiple project participants each with differing viewpoints and priorities.

The three case studies each involve new or refurbished library buildings and space within a publically-funded university organisational structure. All the proposed projects are sited in the Hong Kong Special Administrative Region (HKSAR) of China, and are currently at the design stage. Consultant architects are soon to be hired, or have just been hired. The project participants in the three TMOs are predominantly:

- The 'librarian-client': the end user;
- The internal university commissioning architects;
- The university CEO: the President or Vice-Chancellor;
- The university senior administrators;
- Professors and researchers;
- Students;
- External consultants for the university – usually architects;
- The external consultant architect.

'Shenzhen Project': a new university post-graduate research facility to be built in Shenzhen, China across the border from the HKSAR, with 500m² of library space, to open in 2010.

'Architecture Project': A university to build a new building for the Architecture Department. The existing 560m² Architecture Library is to move into the new building in 2012.

'Main Library Project': this is the largest project, a 6 000 usable m² extension to a main university library building, to open in 2012.

Academic library professionals could immediately and subjectively identify the kinds of stresses and strains which might arise amongst the various project participants for any university library building project. The following questions would be foremost in the minds of the people who would eventually be the end-users of the newly built environments – the librarian-clients:

When will the librarian-client be brought into the process? There is nothing predictable about the timing of this at all. It has certainly been a common experience that, since a librarian is neither an academic nor an architect, senior educational administrators seem to assume that he / she knows little or nothing of the factors involved in any building's commissioning or design stage. In fact, as noted above, senior librarians often have a great deal of experience in these matters. For the Main Library Project, given its very size, the librarian-client was brought in at a very early stage, by being asked to contribute to a written paper on proposed usage for government funding for the project. Usually though, the librarian-client is brought in much later, probably (though not always) when a project management committee is formed of the various university project participants – to be a member of the project's TMO. As far as the Shenzhen and Architecture Projects were concerned, it seems that the librarian-client was the last to be informed that the buildings would be built, perhaps because library space only formed part of each building. For the Shenzhen Project, the librarian-client was not a member of any project management committee. Indeed, a rectangular space on the fourth floor of the

proposed building had simply been identified as 'library'; the implication being, "Well, only when the space is actually built, need the librarian-client be involved".

Often, if the librarian-client is brought in very early, he / she is merely asked, how much space will you need in m²?

Who will design the buildings and do they know what a library should look like? For the Architecture Project, it appeared that external consultant architects would do the design, rather than the academic architects who would inhabit the building. Would the librarian-client be caught in the middle as an external architect argued with internal architectural professors about how the building should look? Librarian-clients with any sense never try and influence the external elevation designs of any building to any extent. However, the interior designs and layouts are a different matter. The design concept in the existing Architecture Department was all open-plan, bare concrete. Would this be replicated in the internal spaces of the new building? Could the librarian-client ever influence such overall aesthetic considerations?

In the Shenzhen Project, the designer is a mainland Chinese architect, based in Shenzhen. Thus, the Project was being managed to some extent remotely across a border. When would the librarian-client meet him / her, since the building was about to be built in an allocated space on the fourth floor, windows facing east - did anyone think about this configuration of light and heat? What did this architect know, or need to know, about libraries?

As noted, the librarian-client was on the Main Library Project university managing committee, along with four architects, a computer professional and four academics. It would involve an HKSAR architect. The original site footprint of the building over an existing car-park had been radically changed from the original idea, because no-one liked the thought of a high, thin, rectangular building once the architects' submissions came in. One 'world-class' architect was wooed to make a further submission, but would not alter the design as originally tendered for anything, so declined to be considered further. Half the building in the Project would now be underground (for the Library), so that a low-rise building would be in evidence above ground. The people around the table tended first to listen to the architects on the judging panel, and then, to be fair, they did take into consideration the strongly held views of the librarian-client.

Everyone in the world thinks they know what a library is and what librarians do, and architects and engineers are no exception. From careful observations in these matters, it is safe to say that architects usually want to make a statement about libraries in terms of form, but are less interested in function. Platitudes abound from potential consultant architects' mouths, for example: "the Library is the heart of any university, so a clear statement is needed to signify the importance of this building!" This 'clear statement' is usually an atrium rising in stately museum fashion through many floors of the library building where valuable potential floor-space is jettisoned for mostly aesthetic reasons. As librarians often say, "Avoid voids!"

In addition, it is quite clear there are 'fashions' in architectural design, so it can be predicted quite accurately what architects are going to propose for internal library design – they are often boringly and predictably similar to one another. From experience, it is best for the librarian-client to take a more proactive view and move towards the architects with a revolutionary internal design for a library. A new concept library could, for example, be open 24/7, with self-check units for issue and return of books etc – thus allowing students to treat an 'open' library as an extension of their workrooms / laboratories - just across the way, or even integrated into their workrooms. Only exceptionally foresighted members of the TMO would ever consider being so radical, unless the librarian-client takes the time to educate them gently but forcefully. The university's students might take to such an idea, but they were usually not invited to the frequent TMO meetings.

How much space will the librarian-client get in the final building? Would the library be allocated all the space it needs in any new buildings? For example, though the Main Library Project was, by its very definition, an 'extension to the main library', would all 6 000m² be

library space? If the space is allocated, would it be a single storey library or multi-storey? The concept and usability can be quite different for each, for example by extra required provision for E&M services, disabled access, toilets and so on. Again, this can be a lottery, depending on the site footprint of the building as a whole. In the Architecture Project, the library was originally 560m² in size, but the site footprint of the new building indicated only 500 m² per floor. In addition, what of space for Library staff and staff offices – would this be dictated, as other things were, by space norms that bore little relation to function?

A sure result is that whatever space is asked for, and however many statistics are produced to back a librarian-client's claim for the right mixture of:

- staff / public space;
- electronic / print provision, and
- furniture / stack space.

Senior university administrators allocate librarians what space they want to give librarians and probably always wanted to allocate to them. This political dimension – in actuality, the very limited amount of power the librarian-client possesses to influence a university's decision – is very real, and needs to be understood by the librarian-client from the outset of any project.

Two lessons learned from experiences in TMOs. For an academic librarian-client, the first common lesson drawn from the experiences in the three cases is the clear mantra:

Power over form over function

Professional architects, while noting the requirements of the end-user (the Library), are always fairly firm on what is really wanted - 'a signature building'! Form over function every time. Yet, in the final analysis, and notwithstanding the external architectural consultants' views, which participant in a Hong Kong university project TMO actually has the final say for everything? Despite the predominant value culture evident in any discussion forum in Chinese society for 'getting to yes', given the dynamic and contradictions inherent in the personal aesthetics and participant values of any design project, it eventually ends up on the desk of the CEO – in a university's case, the Vice-Chancellor or President. So, months of discussions and re-designs can hinge upon the final decision, the power, of the CEO, whose views will, when and where necessary, inevitably take precedence over everyone else's.

The second lesson is:

The devil is in the detail

Despite all the decisions that have been made by multiple project participants in any TMO, particularly major ones concerning the external and internal form of the building structure, eventually, the finished space, with all its flexibility and constraints, will be handed over to the librarian-client to populate and to inhabit. If the librarian-client is to be the 'delighted' client whom construction specialists seem to covet as the optimum result of their labours, the librarian-client will need, from the outset of any project, to concentrate on a clear advocacy of the library's needs when a TMO is discussing the detailed designs of the internal spaces, square metre by square metre. If this lesson is not learned early on and fully appreciated by librarian-clients, and hopefully by all other project participants, the resulting spaces which the librarian-client will live and work in for a long time into the future will be impractical, if not downright unworkable as functioning, state-of-the-art library buildings.

DISCUSSION

In their seminal study of construction project TMOs, Cherns and Bryant (1984) conclude that any project which reaches the construction industry represents a resolution of conflicts over which project, if any, should be adopted and the form of the project and its adoption within the commissioning client organisation. Such a process of conflict resolution is demonstrated in the case studies examined in this paper, which proceed to reflect the fluid, power-based decision making within the project TMO in the early stages of project design.

Especially for wealthier countries, Hofstede (2001) reports a negative correlation (99%) between long term orientation and individualism. That indicates that individualistic societies adopt more short term time horizons and so, decisions are based on evaluation of more immediate outcome effects which impact on the particular decision maker. For professionals, there is more likely to be conflict between serving the interests of the commissioning client, their own interests and the broader interests of society, which as practicing professionals, they are ethically-bound to safeguard (Fellows, Liu and Storey, 2004).

Hong Kong is a highly dynamic, free market society which, throughout its recent history has undergone many major changes. Although, a root of 'traditional Chinese values' remain, they have been subjected to powerful, diverse influences to yield a society which retains significant collectivism whilst becoming more individualistic, with high power distance and so, hierarchical, male dominated, low uncertainty avoidance and longer term oriented, but decreasingly so. In business, the role of intuition, especially amongst successful tycoons is notorious. Changes are rapid and Western style democracy is very limited. Networks of social relationships are very important and involve both 'face' and '*guanxi*'. Thus, individuals and organisations are highly oriented to serving the interests, which may have to be intuited to a significant degree due to the high context nature of communications in the society, and pleasing superiors / clients; associates of superiors or elements of client organisation, which are perceived to have little power tend to be politely ignored.

It is common for organisations to exhibit more than one organisational culture; the larger and the more diverse the organisation, the greater the number and differences those cultures will be. However, organisational cultures are grounded in the societal or national culture, the beliefs and values of which underpin the organisational culture. Thus, whilst there may be significant differences in the values expressed by different parts of an organisation, that may be interpreted as reflecting a different hierarchical ordering of the fundamental beliefs which are likely to be held in common throughout the organisation. Thus, members of specialist functional sections of an organisation are prone to express values, as reflected in project requirements, relating to their specialism, those charged with strategic management of the entire organisation are likely to adopt a more generic, strategic view, thereby generating some apparent conflict and frustration if appropriate rational explanation is not communicated. Such problems are likely to be exacerbated if designers, and others involved in the project realisation appear arrogant by merely pursuing their project preferences over those expressed by client constituents such as librarians.

CONCLUSIONS

Throughout their realisation, and beyond, construction projects, as products and processes, reflect the values and objectives of participants. However, such reflections are determined by the power structuring in the project TMO and mediated by the ways and extent to which such power is exercised, as acceptable within the cultural context; that occurs both within and between the individual organisational participants.

Unless appropriate rationale exists and is communicated to participants who, then are able to accept the decisions, participants who perceive themselves to be intimately affected by the project-related decision, but who perceive that their expressed interests and requirements are being given little attention or, even, ignored become frustrated. Of course, such processes and outcomes are matters of degree and depend upon the underpinning societal culture and manifest behavioural expectations.

Clearly, as change increases in pace and extent and as expertise becomes more diverse resulting in ever more specialisations, which must be integrated for successful realisations of construction projects, the need to communication and coordination to secure coordination and commitment extends geometrically. The potential for participants to feel excluded, ignored and so, devalued is large and should be recognised and avoided by project managers so that the consequent negative effects do not occur.

Thus, project managers must be sensitive to and aware of the interests of all participants, irrespective of their immediate power relating to the project processes in order that important considerations are not overlooked, especially at the specialist, detail level. Such an approach will secure commitment with its positive consequences. Power can be far too dangerous to be the dominant factor but, of course, that is extremely difficult in a free market capitalist and increasingly short term, more individualistic society.

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DEVELOPING A COMPUTER ASSISTED RISK ASSESSMENT SYSTEM FOR INTERNATIONAL CONSTRUCTION PROJECTS: REPORT FROM AN ONGOING STUDY

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ABSTRACT

International construction activities are often exposed to significant political, economic, legal, cultural, and technical risks. This makes efficient and effective risk assessment critical to succeed in international construction projects. The mathematical theory of probability is the most widely used uncertainty reasoning tool, but it is so highly data intensive that its application to international construction projects is difficult. Fuzzy logic is identified as an alternative technique. A conceptual framework for lifecycle and multi-participant risk assessment with integration of fuzzy logic and influence diagram is proposed. A prototype is then developed, followed by a case study to illustrate the applicability of the prototype. The conceptual framework and the tested prototype support the value and potential to develop a complete computer assisted tool which enables different project participants to assess project risks in international context.

Keywords: fuzzy logic; international construction; risk assessment; global project.

INTRODUCTION

The international construction sector is an important part of the global economy. Through international projects, contractors can achieve opportunities for growth that may be unavailable in their domestic market, and capitalize on expertise and experience gained from long involvement in a type of construction or some sophisticated technology (Ashley and Boner 1987). To the contractors' country of origin (home country), the benefits from international construction can be grouped into six categories: 1) expatriation of profits from foreign projects; 2) exports of equipment and materials as a direct result of foreign project work; 3) exports of services (such as insurance, transportation, and financing) as a direct result of foreign project work; 4) repatriation of personal income in the foreign projects; 5) follow-up procurement of home country goods and services resulting from the continued operation and maintenance of foreign projects; and 6) employment of home country nationals both in home and host countries (U.S. Department of Commerce 1984). However, it is not easy to make the best of opportunities in international construction markets. Working in an international setting often requires a much wider view of the project's context than with domestic projects and international projects involve more types of risks than domestic projects (CII 2003; Han and Diekmann 2001; Mawhinney 2001).

The mainstream of construction risk management tends to focus on quantitative risk assessment based on estimating the severity and probability distributions of risk events respectively and then combining the two dimensions so as to develop risk management strategies. However, this approach often requires huge amount of information. Unavoidably, assessment of risk is a highly complex subject amid uncertainty and vagueness. Therefore, fuzzy logic is identified to be an alternative technique to improve construction risk assessment.

Risk assessment and life cycle project considerations are critical in the decision making process for capital investments, yet in the changing industry where 'partnering' is increasingly emphasized, few evaluation tools exist to assist both owners and contractors in joint risk assessment efforts. The lack of continuity of project participants pursuing similar goals to manage risks is very common and risk impact and severity rarely remain constant over the entire project lifecycle, making a continuous monitoring and adjustment a necessary part in risk assessment. Besides, most recent efforts to evaluate risks involved in international construction are fragmented and fail to identify and evaluate the shared and unique risk issues that contractors and owners encounter at various management levels in a holistic manner.

The goal of this study is to develop a risk assessment tool to support risk management through project lifecycle with consideration of major participants by applying innovative theories and techniques.

LITERATURE REVIEW

Risk assessment

The following questions capture the essential elements of traditional risk assessment (Kaplan 1997): 1) what can go wrong? 2) what is the likelihood that it will go wrong? 3) what are the consequences? Selecting an appropriate technique for evaluating the uncertainty associated with a specific project is critical. The mathematical theory of probability has traditionally been the most widely used uncertainty reasoning tool. There are also other uncertainly reasoning tools as compared by Han and Diekmann 2001. Most of them are data intensive, requiring significant amount of data collection and processing (Han and Diekmann 2001). However, in international construction the data required for applying these techniques are judgmentally intensive and scarce, unavailable, or very expensive to collect. Fuzzy logic is therefore identified as a potential technique. However a systematic analysis language is still needed. Therefore, this research makes an attempt to integrate influence diagram and fuzzy logic to develop the risk assessment model.

Fuzzy logic

Fuzzy logic is an artificial intelligence methodology to find definite solutions from vague, ambiguous or imprecise information as inputs. Different from classical logic which requires a clear-cut definition of a system, exact equations, and precise numeric values, Fuzzy logic takes a quite different way of thinking. Fuzzy logic allows modeling complex systems with a high level of abstraction based on our knowledge and experience. Fuzzy Logic allows expressing this knowledge with subjective inaccurate concepts such as very good and a long time which are mapped into exact numeric ranges. The difference between traditional set theory and fuzzy set theory lies in the degree of membership which elements may possess to be assigned to a set. Traditional set theory dictates that an element is either a member of a set or it is not; its membership values are defined as 1 or 0. In fuzzy set theory, this membership value can take any real value from 0 to 1, defining the various degree of membership of a given set. There have been a number of studies to apply fuzzy logic to the construction risk management domain, but none of the approaches is generic and representative enough to be applied generally (Tah and Carr 2000).

Influence diagram

An influence diagram is a simple visual representation method to handle certain decision problems. It provides an intuitive way to map the essential elements, including decisions, uncertainties, objectives, and their interactions. Influence diagrams have three types of nodes: chance nodes, action nodes, and a single value node, which represent random variables, actions, and the value of a utility function respectively. Edges represent dependencies between variables. Chance nodes can be either unobserved (hidden nodes) or observed (evidence nodes). The nodes and their interrelationships jointly yield a cause effect and time-sequence relationships between risks, decisions, and outcomes.

Lifecycle and multi-participant risk assessment

Although certain projects may be divided in more or less number of phases or give these phases different names, construction projects generally consist of three major relatively distinct phases: project planning, construction, and operation. Each phase has a predetermined purpose and an identifiable series of tasks. In many cases major decision points (e.g., go/no-go) are identified at the interfaces between phases where progress and risks are assessed and mitigated. Gibson et al. (2003) recognized that managing risks as a continuum over the project life cycle is advantageous especially in global projects where risks have a greater tendency to vary over the life cycle. In the traditionally adversarial construction context, project participants are usually concerned with only their own risks. The research investigation by Gibson et al. (2003) shows that most contractors and owners give minimal consideration to risks outside their realm of concerns. To validly evaluate risks and therefore allocate risk efficiently among participants needs the removal of significant biased perception of any major participant. The changing construction market which sees an increasing use of cooperative project procurement methods such as partnering make it necessary to take into account the multiple major project participants and their various roles and responsibilities associated with risks.

DEVELOPMENT OF THE SYSTEM

Framework of the system

To support project assessment through project lifecycle with participation of multiple parties, a risk allocation framework is developed as a basis for risk assessment (see Fig. 1):

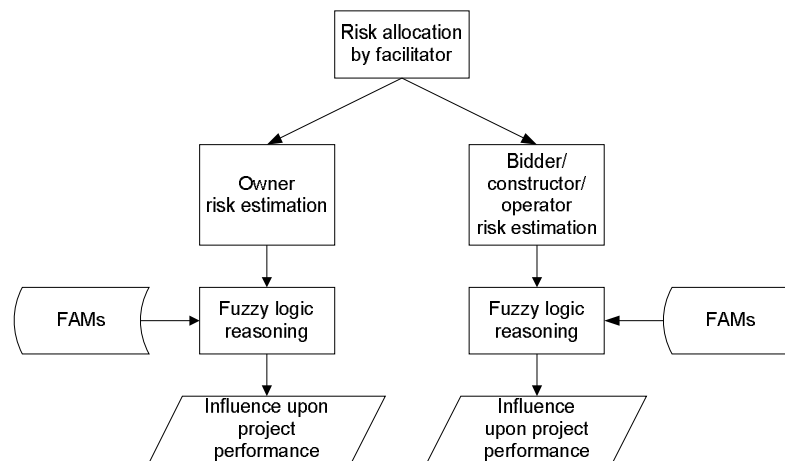


Figure 1. Conceptual framework for risk assessment

In this system,

1. A facilitator is involved to allocate risks between project participants, that is, owner and bidder at project planning stage, owner and constructor at construction stage, and owner and operator at operation stage.

2. Each party then estimates the severity and likelihood of risk factors allocated to him for a specific project;
3. Fuzzy associative memories (FAM) represent relationships and rules governing influenced between risk factors that can be obtained from project and risk management experts;
4. Each party's estimation and FAMs are used as inputs for fuzzy logic reasoning process and influences upon project performance in terms of cost, time, quality, safe, etc. depending on different party and project stage.

This framework may seem too ideal as in reality there is rarely such a facilitator in between major project participants (e.g., clients and contractors), but it has practical implications. The facilitator could be a consultant employed by the owner and contractor to help assess risks in a partnering based project procurement, or it can just be the owner or bidder who would like to undertake risk assessment/allocation issue fairly and objectively by tentatively taking a third party's perspective.

Risk classification & identification

Risk classification is an important step in the risk assessment process, as it attempts to structure the diverse risks that may affect a project. Many approaches have been suggested in the literature for identifying and classifying risks. This research uses the risk hierarchical structure shown in Fig. 2, because it is comprehensive and incorporates various project participants and project stages that are important dimensions to develop the risk assessment system.

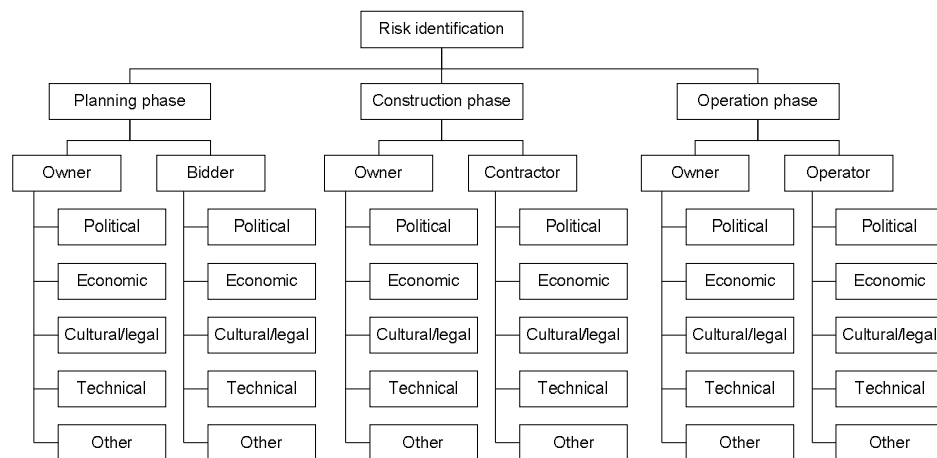


Figure 2. Risk classification (level 1; partial)

Influence diagrams

Influences diagrams are proposed to depict the relationships between risk factors, and influences of risk factors upon project performance (see Figure 3, 4 and 5).

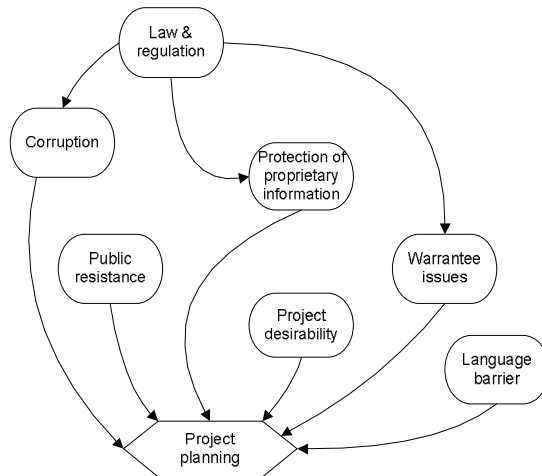


Figure 3. Influence diagram for project planning phase

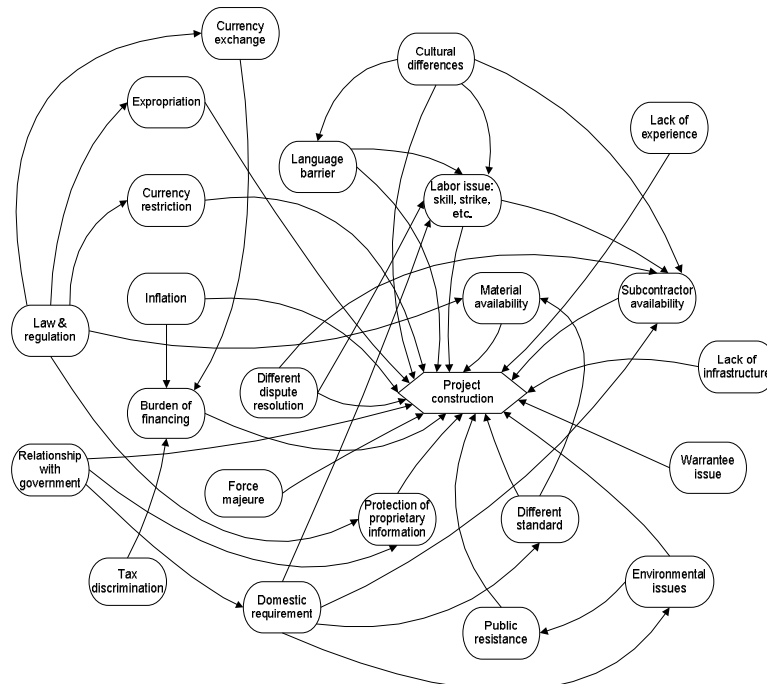


Figure 4. Influence diagram for project construction phase (adapted from Han and Diekmann 2001)

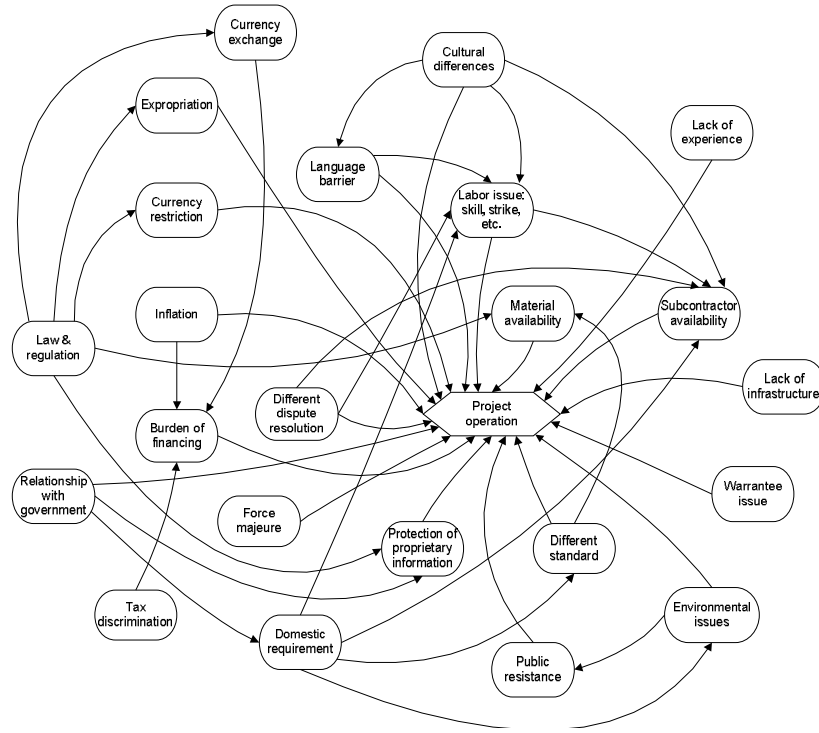


Figure 5. Influence diagram for project operation phase

Most of the risk factors are controllable. That means either risk allocation or risk management efforts and resources can influence the severity or likelihood of these risk factors. However to simplify the diagram, the links between risk factors and management activities are neglected. The influence diagram for planning stage is greatly simplified to use as a basis for prototype development and case study.

Membership functions

For developing a prototype, the membership functions for the linguistic terms set to be used are shown in Fig. 6 and the corresponding fuzzy sets are defined as:

Low = L = {1, 0.67, 0.33, 0, 0, 0, 0, 0, 0, 0, 0}
 Low-to-medium = LM = {0, 0, 0.5, 1, 0.5, 0, 0, 0, 0, 0, 0}
 Medium = M = {0, 0, 0, 0, 0.5, 1, 0.5, 0, 0, 0, 0}
 Medium-to-high = MH = {0, 0, 0, 0, 0, 0.5, 1, 0.5, 0, 0, 0}
 High = H = {0, 0, 0, 0, 0, 0, 0, 0, 0.33, 0.67, 1}

The number and shapes of the membership functions have been set up to test the fuzzy algorithms as described previously. The triangular shape is one which commonly has been used for fuzzy membership functions.

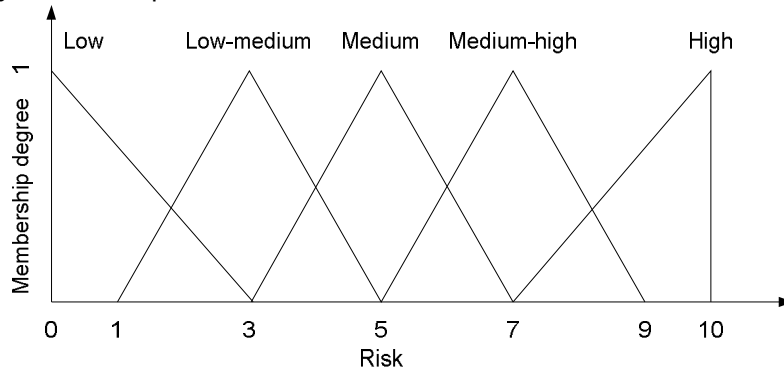


Figure 6. Membership function adopted in this study

A common language for describing risk likelihood and severity is necessary so as to achieve consistent quantification within an organization. Risk severity should be considered in terms that are as close as possible to the corporate objectives at the time of assessment. The severity should be expressed in a uniform set of terms as well.

Project measurement

Project performance measurement is always a challenging issue in project management. Different participant has different preferences and these preferences can vary through project lifecycle. For example, in construction stage, the owner may use time, cost, quality, and safety as measures, while he may use profitability as measurement for operation. In construction stage, there is a possibility that the contractor emphasizes more on safety than the owner. It is therefore necessary to allow for flexibility in defining project performance measures used in this system.

PROTOTYPE

A prototype for this system is developed with MS Excel, just because MS Excel is easy to use and no programming is needed . There are three modules: 'Input', 'FL Reasoning', and 'Output'. Each module is a MS Excel worksheet.

In the 'Input', the facilitator defines the allocation weights for each shared risk between participants involved in a specific project phase. The sum of the weight should be 1 regarding each risk factor. Then each participant defines the criteria for performance for each phase as well as a scale that characterize the degree of performance in terms of each criterion. He then estimates the severity and likelihood of each risk on his side. Each participant can consider transfer part or all of a risk to third parties like insurance company. Fig. 7 shows the part of 'Input' module for planning phase. Facilitator should fill in the blank cells in the columns of 'Risk management-allocation-owner' and 'Risk management-allocation-bidder'. He must ensure that the values of all cells in the columns of 'Risk management-Allocation-Total' are 1.

STAGE I: Project Planning

Owner

Standard terms for severity quantification

Scale	Severity	Cost		Time	
		Lower	Upper	Lower	Upper
5 Very high			100.00%		100.00%
4 High					
3 Medium					
2 Low					
1 Very low		0.00%		0.00%	

Risk assessment input

Code	Risk variables	Risk feature		Risk management				
		Severity	Likelihood	Allocation				
				Owner	Remain	3rd Parties	Total	
1	Laws and regulations						0	0
2	Corruption						0	0
3	Public resistance						0	0
4	Protection of proprietary information						0	0
5	Project desirability						0	0
6	Warranty issues						0	0
7	Language barrier						0	0

Bidder

Standard terms for severity quantification

Scale	Severity	Cost	
		Lower	Upper
5 Very high			
4 High			
3 Medium			
2 Low			
1 Very low			

Risk assessment input

Code	Risk variables	Risk feature		Risk management				
		Severity	Likelihood	Allocation				
				Sponsor	Remain	3rd Parties	Total	
1	Laws and regulations						0	0
2	Corruption						0	0
3	Public resistance						0	0
4	Protection of proprietary information						0	0
5	Project desirability						0	0
6	Warranty issues						0	0
7	Language barrier						0	0

Figure 7. 'Input' module

In the 'FL Reasoning' module, each participant should align a FAM for any influence between two risk factors, or influence of a risk factor upon the project performance. Fig. 8 shows the calculation process for the influence of Risk 1 to Risk 2. The participant should choose a FAM for the influences in terms of severity and likelihood respectively.

Influence		1 From 2 To					
FAM for severity		Influence 2					
Severity	H	M	M	MH	MH	H	
	MH	ML	M	M	MH	MH	
	M	ML	ML	M	M	MH	
	ML	L	ML	ML	M	M	
	L	L	L	ML	ML	M	
Likelihood of influenced risk factor		L	ML	M	MH	H	
		Likelihood					
FAM for likelihood		Influence 2					
Severity		L	ML	M	MH	H	
Severity of influenced risk factor		L	ML	M	MH	H	
Severity	H	0.00	0.00	0.00	0.00	0.00	0.00
	MH	0.00	0.00	0.00	0.00	0.00	0.00
	M	0.00	0.00	0.00	0.00	0.00	0.00
	ML	0.00	0.00	0.00	0.00	0.00	0.00
	L	1.00	1.00	0.00	0.00	0.00	0.00
Likelihood of influenced risk factor		L	ML	M	MH	H	
		Likelihood					
Severity		L	ML	M	MH	H	
Original severity		0.00	0.00	0.00	0.00	0.00	0.00
Last severity		1.00	0.00	0.00	0.00	0.00	0.00
Likelihood		L	ML	M	MH	H	
Likelihood of influenced risk factor		0.00	0.00	0.00	0.00	0.00	0.00
Original likelihood		1.00	0.00	0.00	0.00	0.00	0.00
Last likelihood		1.00	0.00	0.00	0.00	0.00	0.00

Figure 8. 'FL Reasoning' module

In the 'Output' module (Fig. 9), the complete influence of performance is shown in a fuzzy set, a figure, and defuzzification ratio.

RESULT

L	ML	M	MH	H
0.00	0.00	0.00	0.00	0.00

Figure 9. 'Output' module

CASE STUDY

To test the applicability of the prototype, a case study is carried out.

In the 'Input' module, the owner puts down their performance criteria, risk severity and likelihood estimations as shown in Fig. 10.

STAGE I: Project Planning

Owner

Standard terms for severity quantification

Scale	Severity	Cost		Time	
		Lower	Upper	Lower	Upper
5	Very high	20.00%	100.00%	20.00%	100.00%
4	High	12.00%	25.00%	10.00%	25.00%
3	Medium	8.00%	15.00%	5.00%	15.00%
2	Low	1.00%	10.00%	1.00%	10.00%
1	Very low	0.00%	5.00%	0.00%	5.00%

Risk assessment input

Code	Risk variables	Risk feature		Risk management			
		Severity	Likelihood	Allocation			
				Owner	Remain	3rd Parties	Total
1	Laws and regulations	0.6	0.1	0.9	0.9	0	1
2	Corruption	0.46	0.6	0.5	0.5	0	1
3	Public resistance	0.86	0.4	0.9	0.9	0	1
4	Protection of proprietary information	0.26	0.4	0.3	0.3	0	1
5	Project desirability	0.82	0.6	1	1	0	1
6	Warranty issues					0	1
7	Language barrier	0.1	0.8	0.3	0.3	0	1

Figure 10. Case study: 'Input' module

Fig. 11 shows the FAMs that the owner chose for likelihood and severity for one influence relationship.

FAM for severity

Influence i		2				
Severity	H	M	M	MH	MH	H
	MH	ML	M	M	MH	MH
	M	ML	ML	M	M	MH
	ML	L	ML	ML	M	M
	L	L	L	ML	ML	M
Likelihood of influenced risk factor		L	ML	M	MH	H
		Likelihood				

FAM for likelihood

Influence i		2				
Severity		L	ML	M	MH	H
Severity of influenced risk factor		L	ML	M	MH	H

Figure 11. Case study: 'FL Reasoning' module

Then the fuzzy set for criterion 'Cost' is obtained in Fig. 12.

RESULT

L	ML	M	MH	H
0.67	0.63	0.50	0.40	0.00

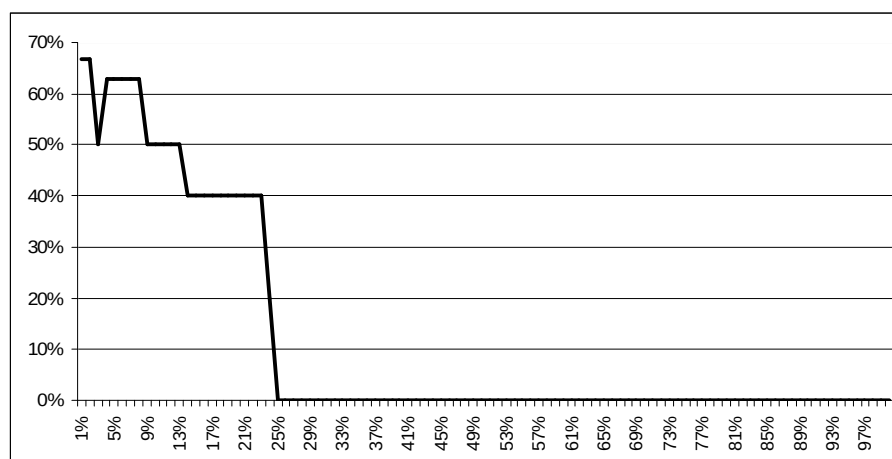


Figure 12. Case study: 'Output' module

The defuzzification ratio is 11.02%. This means that complete influence of risk factors upon the project is 11.02% of project cost.

CONCLUSION AND FUTURE RESEARCH

International construction activities are exposed to numerous political, economic, legal, cultural, and technical risk factors. A computer assisted tool that can support risk assessment through project lifecycle and different viewpoints can be of great value to the industrial practice. Innovative techniques like fuzzy logic and influence diagram make it possible to establish such a valuable tool. This research first develops a conceptual framework for lifecycle and multi-participant risk assessment with integration of fuzzy logic and influence diagram. A prototype is then developed with MS Excel and illustrated with a simple case study. However, in the framework only two participants involved in each phase were considered, and the case study just covered the project planning phase. In addition, how to take the links between project phases into consideration in the framework is an important area for improvement. These problems will be addressed in the next stage of the ongoing study. Involvement of experienced industry practitioners will be sought to improve the reliability of the system and the interface to facilitate easy uses. MS Excel will of course be replaced in formally programming the tool. Comparison with existing risk assessment tools based on probability approaches will be made to validate the alternative approach proposed and the system.

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AN ANALYSIS OF PRIVATE PARTICIPATION IN INFRASTRUCTURE (PPI) PROJECTS IN CHINESE TRANSPORT SECTOR

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ABSTRACT

The past two decades has seen a dynamic transport infrastructure market in China, where foreign developers harvested not just gains but also pains. The characteristics and trends of the market need be identified and the driving and impeding factors behind the ups and downs need be examined to better understand the Chinese transport infrastructure market and identify managerial and policy implications for both PPI project developers, foreign or local, and local decision makers. A database consisting of 206 PPI transport projects with financial closing between 1990 through 2007 are analyzed and the trends of the market for PPI and the location patterns of these projects are identified. The driving and impeding factors for the PPI market are tentatively discussed. The findings can give private sponsors a clear whole picture of the Chinese transport infrastructure market for foreign and private participation and help them to predict the market in the near future, identify niche markets, and optimize their entry decisions regarding the Chinese market

Keywords: Private participation in infrastructure (PPI); China; transport sector; private sector; infrastructure development.

INTRODUCTION

The fast economic growth of China partially attributed from the significant investment in its transport infrastructure systems, and this was confirmed by the empirical study by Zhang (2007). In China, favourable policies were lay down in middle 1980s and middle 1990s to promote the development of transport infrastructure development, and as a result, from 1978 through 2003, the average annual growth rates of railroads, roads, and airports are 1.4%, 2.95%, and 10.85% respectively (Wen and Shen 2008). According to the newly released National Expressway Network Plan by the Ministry of Communications, from 2005 till 2030, China would build 51,000 kilometres of expressway, making a total length of 85,000 kilometres. This means the total investment for the coming five years would be as high as 1 trillion Yuan. However, the government can only provide 40% of the required capital, with the remaining portion to be secured from other sources, including the foreign and local sector (Wang and Lv 2007). The Foreign Investment Industrial Guidance Catalogue (“Catalogue”) was just revised allowing over 51% foreign ownership of port projects and Port Law was enacted on January 1, 2004, providing legal and regulatory support and protection for foreign and local investors to enter the port segment. The revised Catalogue also lists railway construction and operation as an “encouraged” area and there is now no specific portion of

the railway segment which is prohibited from foreign investment (Zhen 2006). Besides, the Medium- and Long-Term Railway Network Plan by the Ministry of Railways has depicted a continuous huge investment program on the railway segment till 2020, and during the Eleven Five Period (2006-2010) alone, 1.25 trillion Yuan is needed while the government can only afford 550 billion (Zhen 2006). The fast growing market and enhanced business and institutional environment provide great chances for foreign local private transport infrastructure investors/developers to enter the Chinese market.

In China, private sector first entered the traditionally government-resigned transport infrastructure sector in late 1980s. The past two decades has seen a dynamic transport infrastructure market, where private developers harvested not just gains but also pains. The characteristics and trends of the market need be identified and the driving and impeding factors behind the ups and downs need be examined for PPI project developers, especially those new entrants, to formulate and/or adjust their entry and business strategies, and for local decision makers to optimize the policy framework to better guide and serve private investors/developers.

RESEARCH GOAL

This data-driven and exploratory study aims to quantitatively identify the characteristics, chronological trends and spatial location patterns of the Chinese transport market for PPI by analysing a PPI project dataset developed by the World Bank Group and tentatively associating them with the dynamics of the economic and institutional environment of China.

PPI TYPOLOGY AND WORLD BANK PPI DATASET

Private Participation in Infrastructure (PPI) has very specific definition that fits into the mission of the World Bank Group. For a project to be counted as a PPI project in the database established and maintained by the Bank, it must possess several necessary elements: 1) it is an infrastructure project; 2) there is private participation in the provision of services or private ownership of the infrastructure assets; 3) the project serve the public (not one or a group of companies); 4) the project has achieved financial closure; 5) the private participation is above a minimum size.

Importantly, regarding the above element 2, projects are considered to have private participation if a private company or investor bears a share of the project's operating risk. That is, a private sponsor is at least partially responsible for operating cost and associated risks. This could be by either having the rights to operate alone or in association with a public entity or owning an equity share in the project.

The Database classifies private infrastructure projects in four categories: 1) Management and lease contracts; 2) Concessions (or management and operation contracts with major private capital commitments); 3) Greenfield projects; and 4) Divestitures with their respective definitions given in Table 1.

Table 1. PPI types (World Bank 2007)

PPI Type	Definition
Management and Lease Contract	A private entity takes over the management of a state-owned enterprise for a fixed period while ownership and investment decisions remain with the state.
Concession	A private entity takes over the management of a state-owned enterprise for a given period during which it also assumes significant investment risk.
Greenfield Project	A private entity or a public-private joint venture builds and operates a new facility for the period specified in the project contract. The facility may return to the public sector at the end of the concession period.
Divestiture	A private entity buys an equity stake in a state-owned enterprise through an asset sale, public offering, or mass privatization program.

A private sponsor is a company controlled and majority owned by private parties. State-owned enterprises or their subsidiaries are considered private investors only in projects located in foreign countries. Partially divested state-owned enterprises or their subsidiaries that remain majority owned by government entities are not considered private sponsors in their own countries.

The World Bank has a research team for the PPI database (World Bank 2007). The database records PPI projects by attributes such as project name, location, financial closing date, status, contract period, PPI type and subtype, sector and sub-sector, sponsor, private ownership, contract award method, bid criteria, investment value, and more. In the database, there are altogether 206 transport projects with financing closure achieved during the period from 1990 through 2007. Table 2 shows a small portion of these projects.

Table 2. PPI transport projects in China (partial)

ID	Year	Project Name	Serving Area	Subsector	Type of PPI
444	1999	Zhapu Port Multi-Purpose Terminal	Zhejiang Province	Seaports	Greenfield pr
446	2003	Shanghai Pudong International Co	Shanghai	Seaports	Greenfield pr
623	1997	Zhejiang Expressway Company Lim	Zhejiang Province	Roads	Divestiture
855	1994	Fuzhou International Airport - Phas	Fujian Province	Airports	Greenfield pr
858	1998	Shenzhen Airport	Guangdong Province	Airports	Divestiture
900	1996	Anhui Expressway Company Limit	Anhui Province	Roads	Divestiture
901	1997	Jiangsu Expressway Company Lim	Jiangsu Province	Roads	Divestiture
949	1996	Guangshen Railway Company Lim	Guangdong Province	Railroads	Divestiture
953	1996	Shanghai Industrial Holdings Limit	Shanghai	Roads	Divestiture
954	1996	Deging Xijiang Bridge	Guangdong Province	Roads	Greenfield pr
955	1993	Wuhan Airport Expressway	Hubei Province	Roads	Greenfield pr
956	1994	Wuhan Bridge Development	Hubei Province	Roads	Concession
957	1992	Shenzhen-Huizhou Expressway (H	Guangdong Province	Roads	Greenfield pr

DATA ANALYSIS

The attributes of the PPI projects are analysed to identify their descriptive characteristics, chronological trends, and geographic location patterns.

Descriptive analysis

In the dataset, 160 out of the 206 projects have their contract terms recorded. It should be noted that divestiture projects do not have a fixed concession term but operate on a continuous basis. The frequency distribution of the contract term is shown in Figure 1, quite different from a normal distribution.

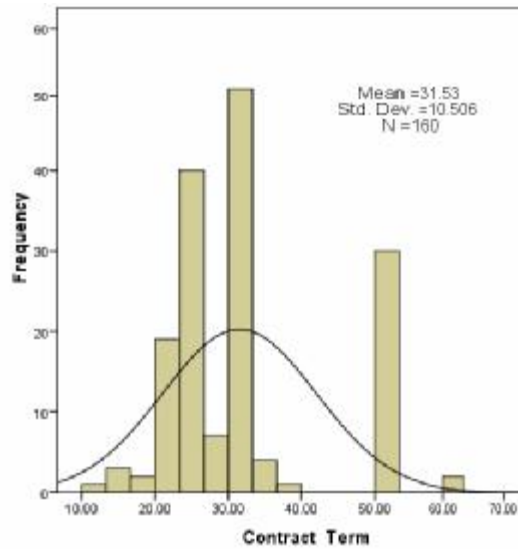


Figure 1. Frequency distribution of contract terms of PPI transport projects

The sample has a mean of 31.53 years, longer than that of transport PPI projects (27.35 years) (Chen 2008). This may be because transport projects have a traffic volume that is usually difficult to predict, therefore need longer contract terms to ensure enough operating income to repay debts and gain profit. The standard deviation is 10.51 years. It is small because most of the projects fall in the range from 20 years to 30 years. There are about 30 projects with a contract term of 50 years. The maximum contract term is 60 years, but such projects are a quite few.

Both total investment value (including both private and government investment incurred in, e.g., joint ventures) and private investment value have a distribution quite skewed to the right as shown in Figure 2. Most projects have a total investment value lower than 125 million US\$. In terms of private investment value, even more projects (in total about 75%) fall in this range from 0 to 125 million US\$. The standard deviations indicate there is a significant variety among the PPI projects in terms of investment size, total or just private.

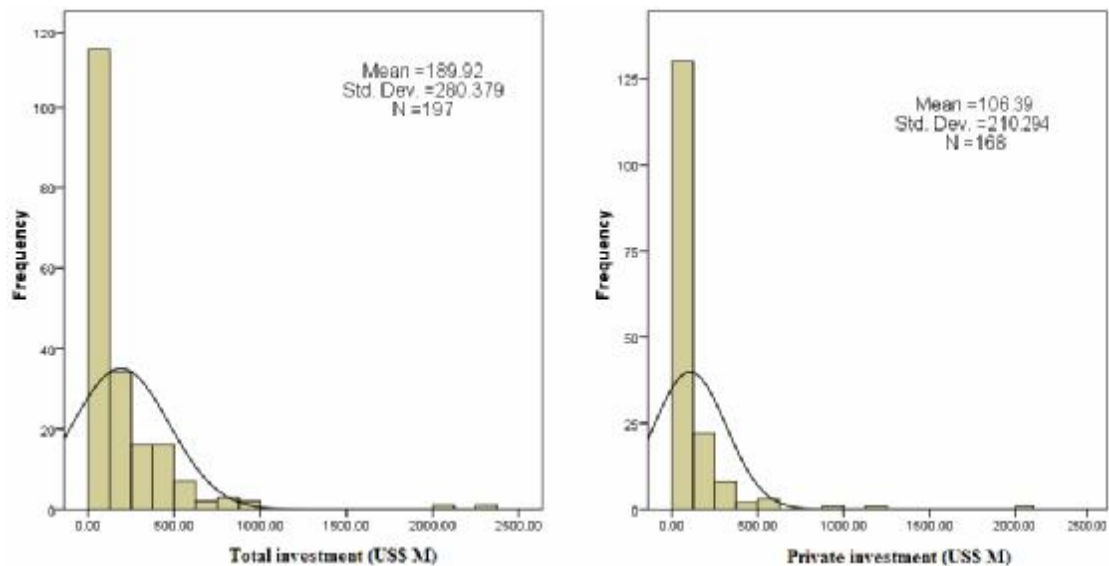


Figure 2. Frequency distribution of total investment value and private investment value

In the dataset, there are much more greenfield projects than other types (see Figure 3). This however does not mean that private developers are more interested in developing new facilities. Chinese governments tend to involve foreign private developers in transport project development via greenfield method to use their technologies and management skills and

meanwhile transfer development risks. With concession and divestiture, these purposes are more difficult to meet.

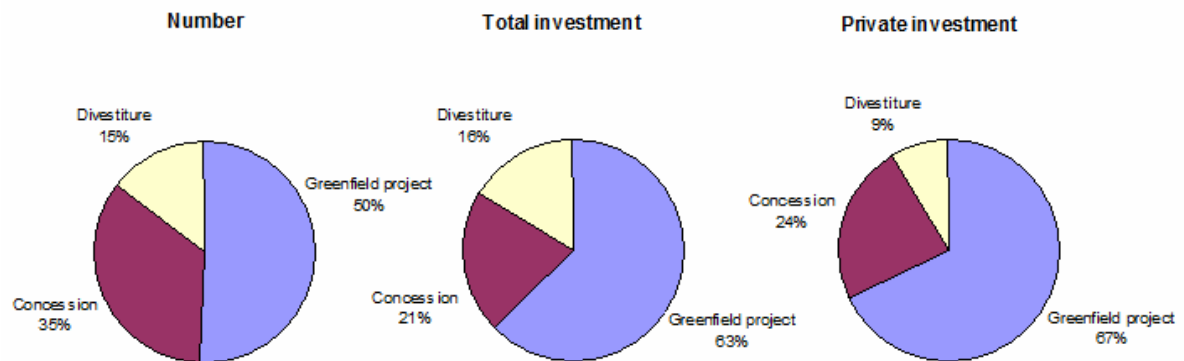


Figure 3. PPI types by number, total investment value, and private investment value respectively

There are much more road projects (including bridges) than those in other segments in terms of number, total investment value and private investment value (see Figure 4). Seaports account for about 25% of the portfolio. Foreign or private investment in railroads is still quite limited, confirming the observation of Yang (2007). However, as mentioned in Introduction, there is in fact no significant policy barriers again private participation. It is a very potential niche market.

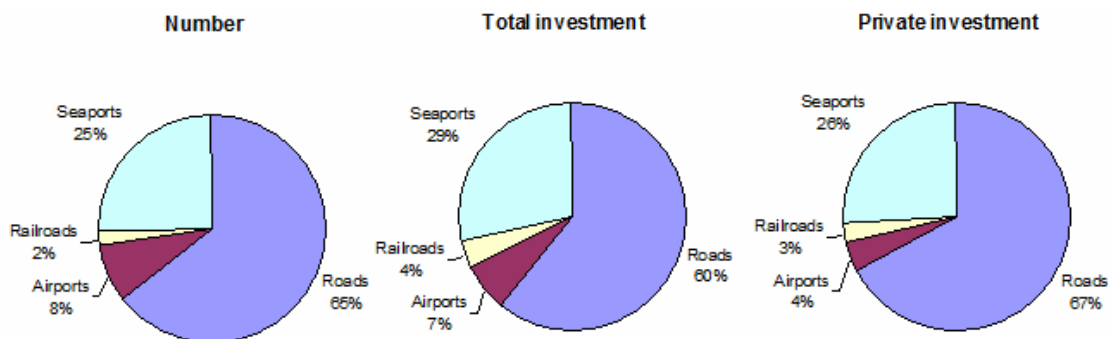


Figure 4. Transport segments by number, total investment value, and private investment value respectively

A review of the sponsors of these transport projects lead to an observation that many of them are based in Hong Kong. The pie charts in Figure 5 indicate that Hong Kong based sponsors were involved in 65% of the PPI transport projects and their investment amount as a whole accounts for 55% of the entire portfolio. The difference between the two percentages of market share of Hong Kong based sponsors (65% versus 55%) shows that compared to sponsors from other places (i.e., foreign and local), Hong Kong sponsors generally invest less in projects.

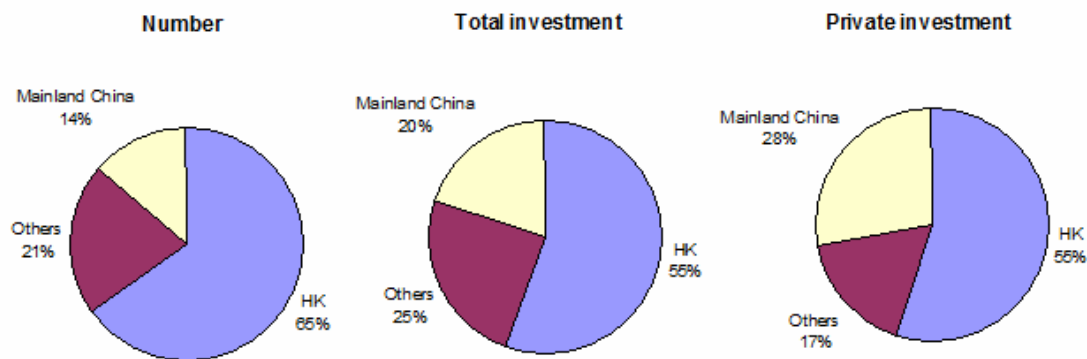


Figure 5. Transport sponsors by number, total investment value, and private investment value respectively

Chronological analysis

As can be seen in Figure 6, the growth of PPI transport project development peaked in 1996 in term of number, total investment value, and private investment value. After 1996, there was a decline trend till around 2000, and then it is followed by another increase trend. Because the World Bank dataset usually has a time lag in including the latest projects, it is difficult to make inferences from the drop in 2006 and 2007. However it is obvious in 2005, the amount of PPI transport projects is more than in 1996 by investment value. The number of PPI transport projects in 2005 is smaller than that of 1996, indicating the relatively bigger project size on average in recent years. The occurrence of the Asian financial crisis in 1997 may well explain the decline trend starting from 1997.

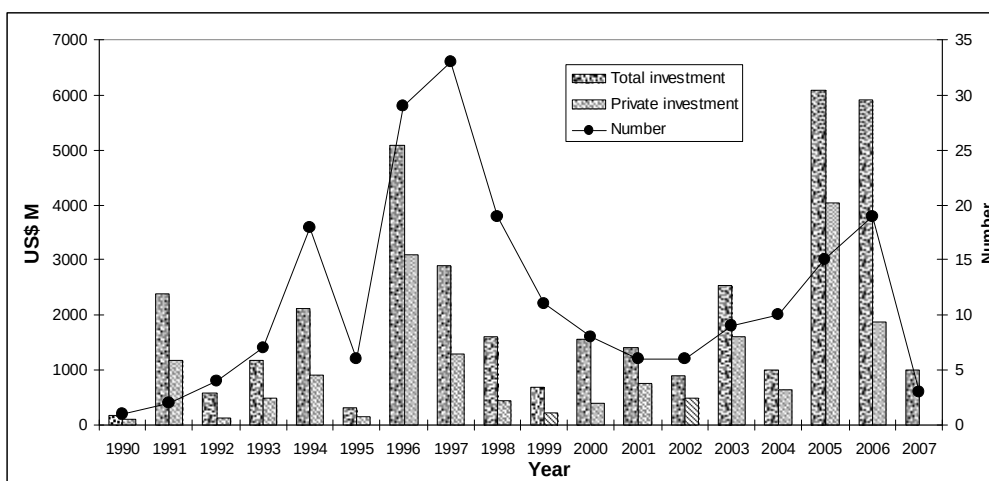


Figure 6. Chronology of PPI projects by number, total investment value and private investment value

The longitudinal trends of different types of PPI transport projects basically resemble that in Figure 7, showing a 'horseshoe' profile. One of the obvious characteristics of the chars in Figure 7 is the rapid grow of greenfield projects in recent years. Although there is a peak of Greenfield PPI transport projects around 1997 in terms of number, by investment value, the peak in recent years has far exceeded that of the first peak, indicating the relatively bigger size of recent projects on average. It is interesting to notice that the application of divestiture has never recovered to the level before the financial crisis. It seems foreign and private investors prefer to participate into the Chinese transport sector on project level rather than investing in transport development companies directly or through stock markets.

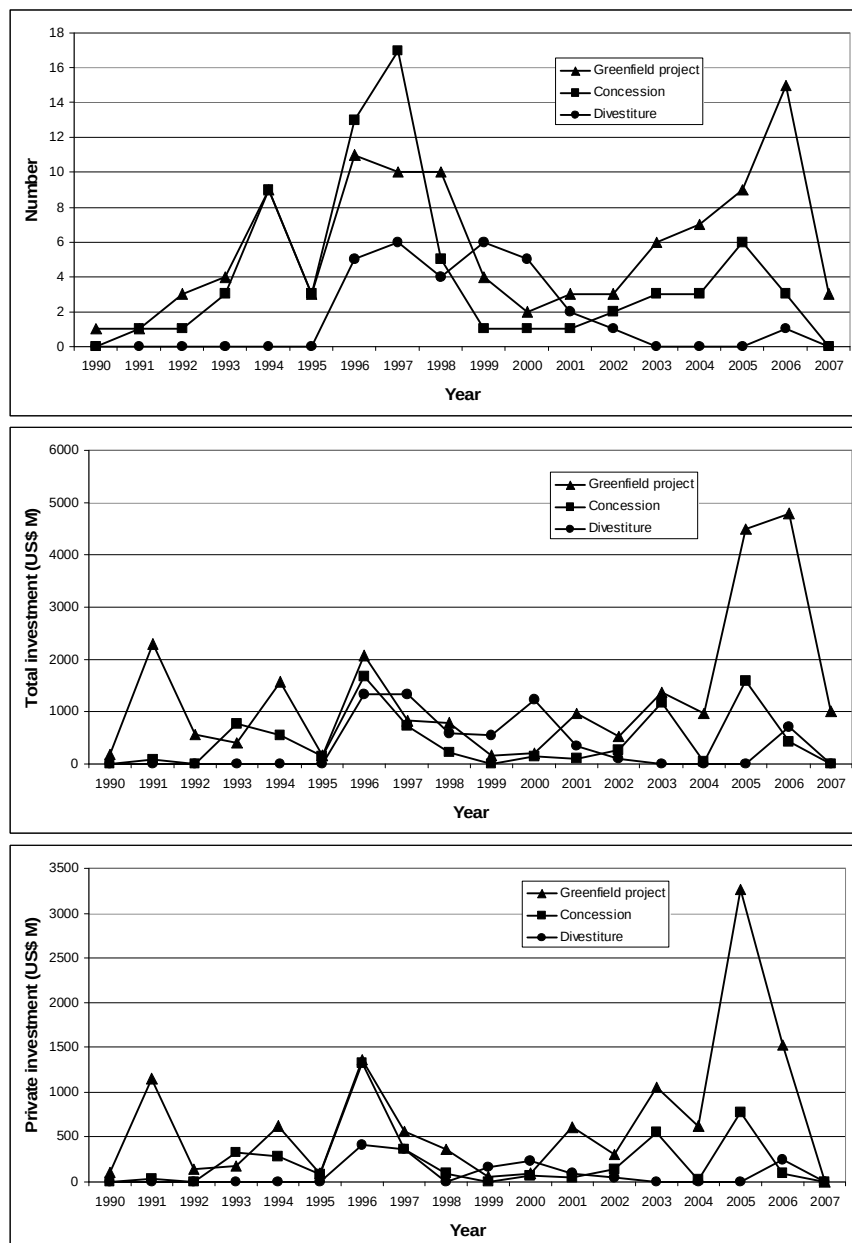


Figure 7. Chronology of different types of PPI projects by number, total investment value and private investment value

Figure 8 shows the trends of different segments of PPI projects. The number of railroads and airports with private participation is rather small, and obviously road projects dominate the portfolio. The chronology of road projects shows a horseshoe shape in terms of investment value, but by number there seems to be only a single peak around 1997. This indicates the average project size of recent road projects is much bigger than those developed around 1997. The continuous increase of seaport projects is well worthy of special attention. Either by number or investment value, Fig. 7 depicts this segment as a fast growing niche market for private participation.

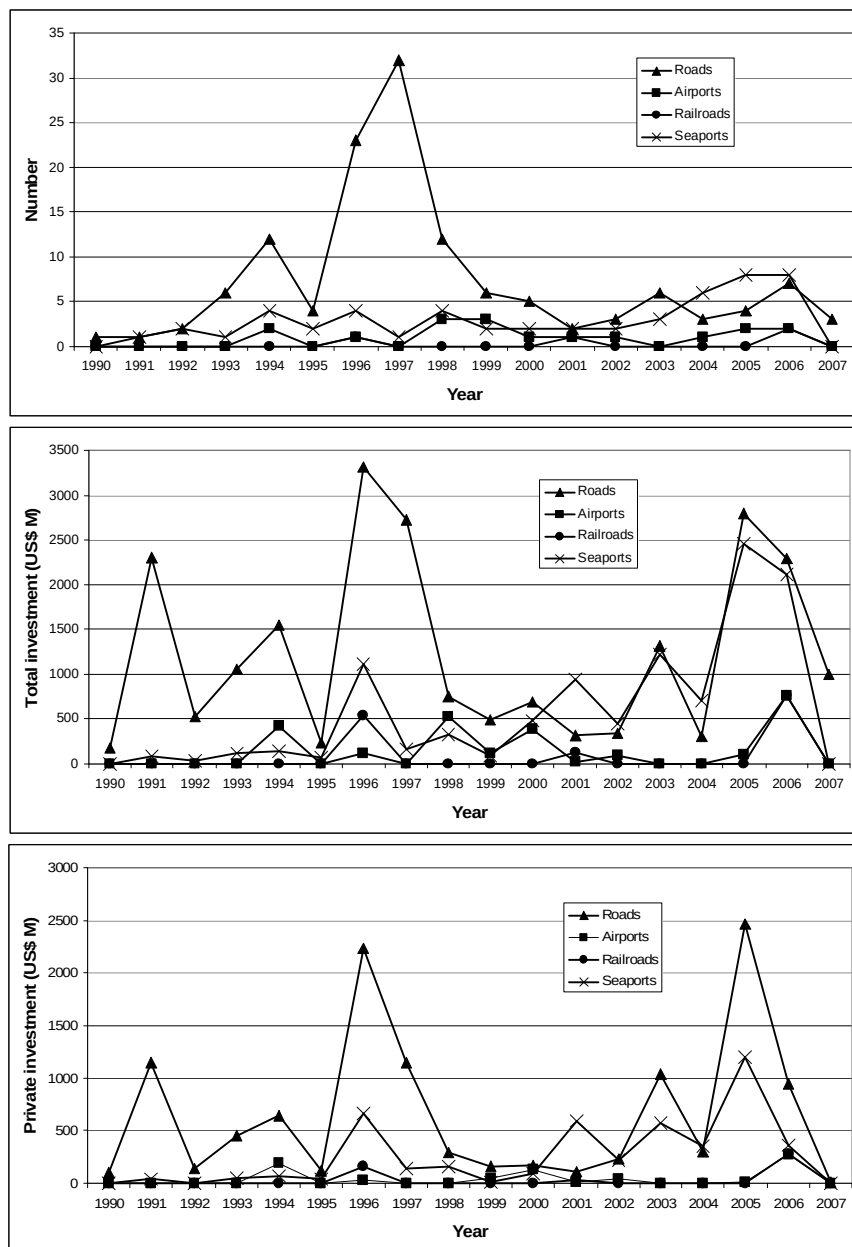


Figure 8. Chronology of different segments of PPI projects by number, total investment value, and private investment value

Hong Kong based sponsors' dominance in the PPI transport portfolio is obvious in Figure 8. The horseshoe type of trend seems to be not that obvious, but the low from 1998 to 2004 is apparent. Although by number, Hong Kong sponsors' commitment is now smaller than before the financial crisis, their investment scale in 2005 is more than in 1996, indicating their recovered interest in the mainland transport market. The emergence of local private investors is quite obvious in Figure 9. Their private investment value exceeded that of Hong Kong sponsors in 2005 and 2006.

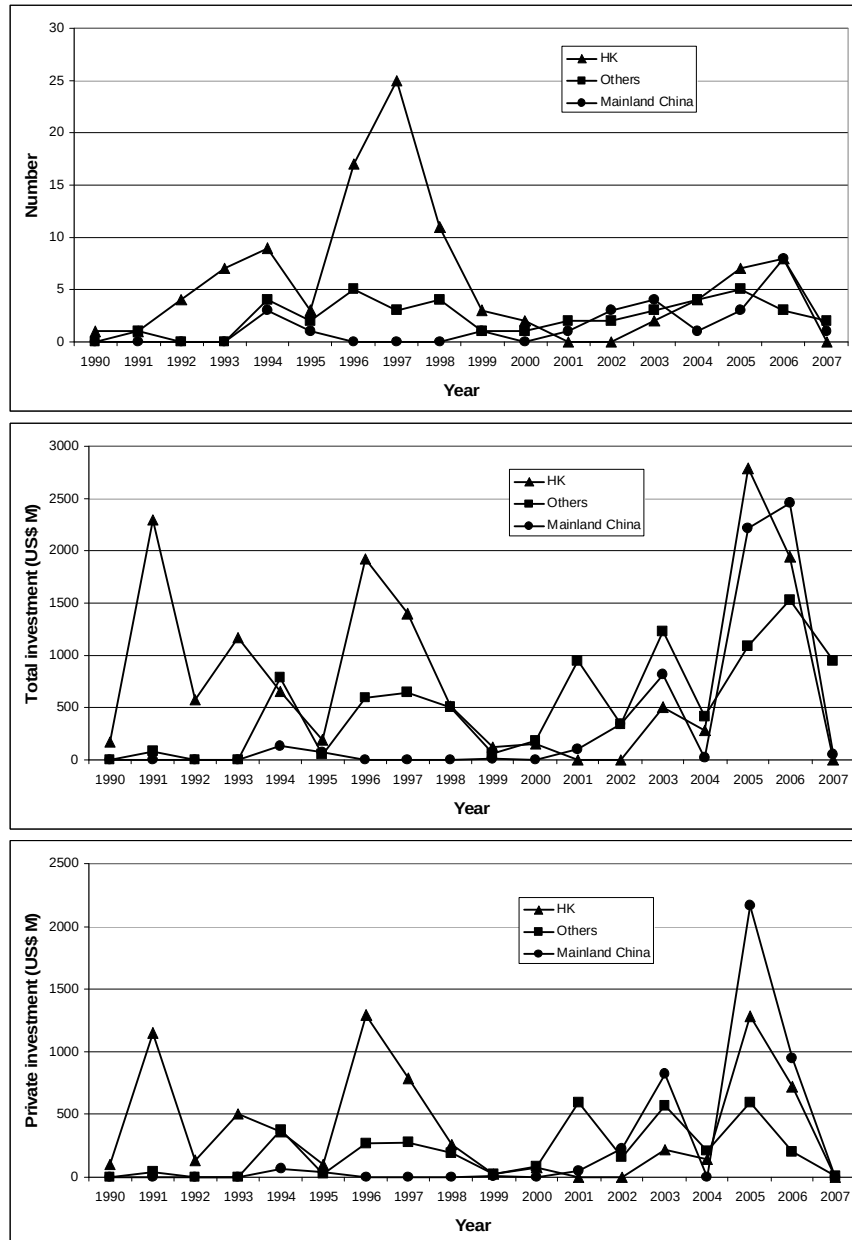


Figure 9. Chronology of PPI projects by origin of sponsors (Hong Kong based sponsors, sponsors from other countries, and local private sponsors) by number, total investment value, and private investment value

Spatial analysis

Provinces and municipalities that have attracted a large number of PPI transport projects include Guangdong, Zhejiang, Shanghai, Beijing, Fujian, Tianjin, and Shandong in terms of investment value. By number, however, Beijing and Tianjian, two municipalities, are not on the list, indicating the relatively large average size of projects there. The spatial distribution is highly unequal as can be seen in Figure 10. Guangdong Province along has attracted so much PPI that the discrepancy between it and the 2nd in the top 7 ranking list, Zhejiang Province, is pretty significant.

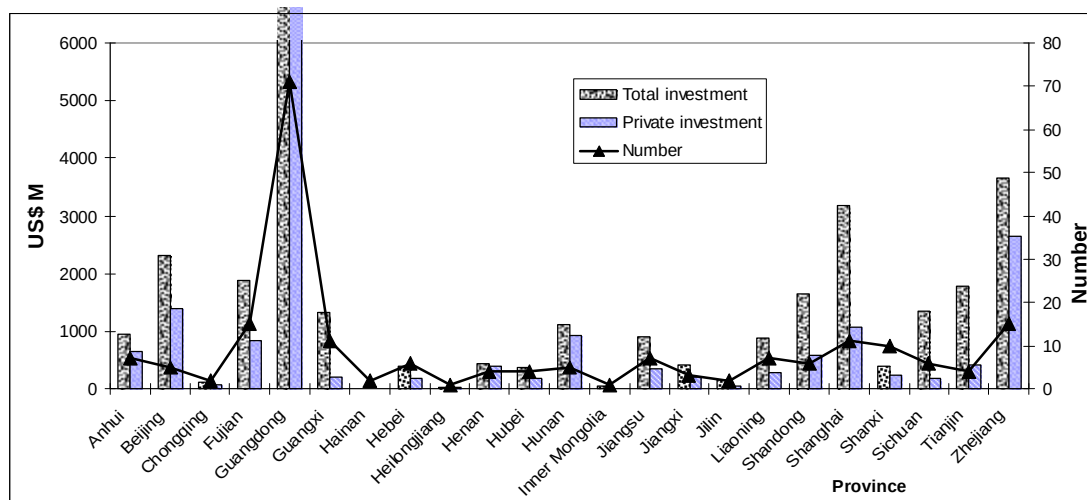


Figure 10. Spatial distribution of PPI transport projects

Above spatial analysis was at the provincial level. China is administratively divided into three regions as shown in Figure 11. The number under the name of each province/municipality is the number of PPI transport projects located there.



Figure 11. Regional division of China (Eastern, Central, and Western Region)

Figure 12 shows that Western and Central regions lag far behind Eastern region in attracting PPI. 72% of total PPI transport projects fall in the Eastern region and either total or private investment value accounts for 82% of the total PPI volume in China.

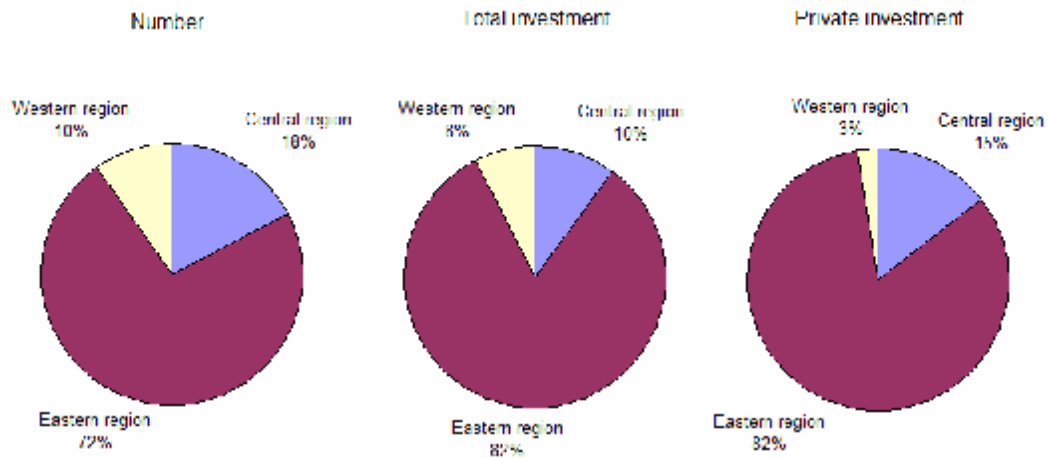


Figure 12. Regional distribution of PPI transport projects by number, total investment value, and private investment value respectively

Both the spatial studies at provincial and regional level indicated the pattern of location that most PPI transport projects tend to be located in more developed places. This confirms the observation of Zhang (2007) that investment in transport infrastructure is highly spatially unequal.

As can be seen in Figure 13, there is a significant inconsistency in the ranking of top 6 provinces/municipalities by number, total investment value, and private investment value, except that Guangdong and Zhejiang always occupy the first two positions. Guangdong is the province that has attracted the largest amount of PPI via either greenfield or concession procurement types, while Shanghai has attracted the largest amount of divestiture projects.

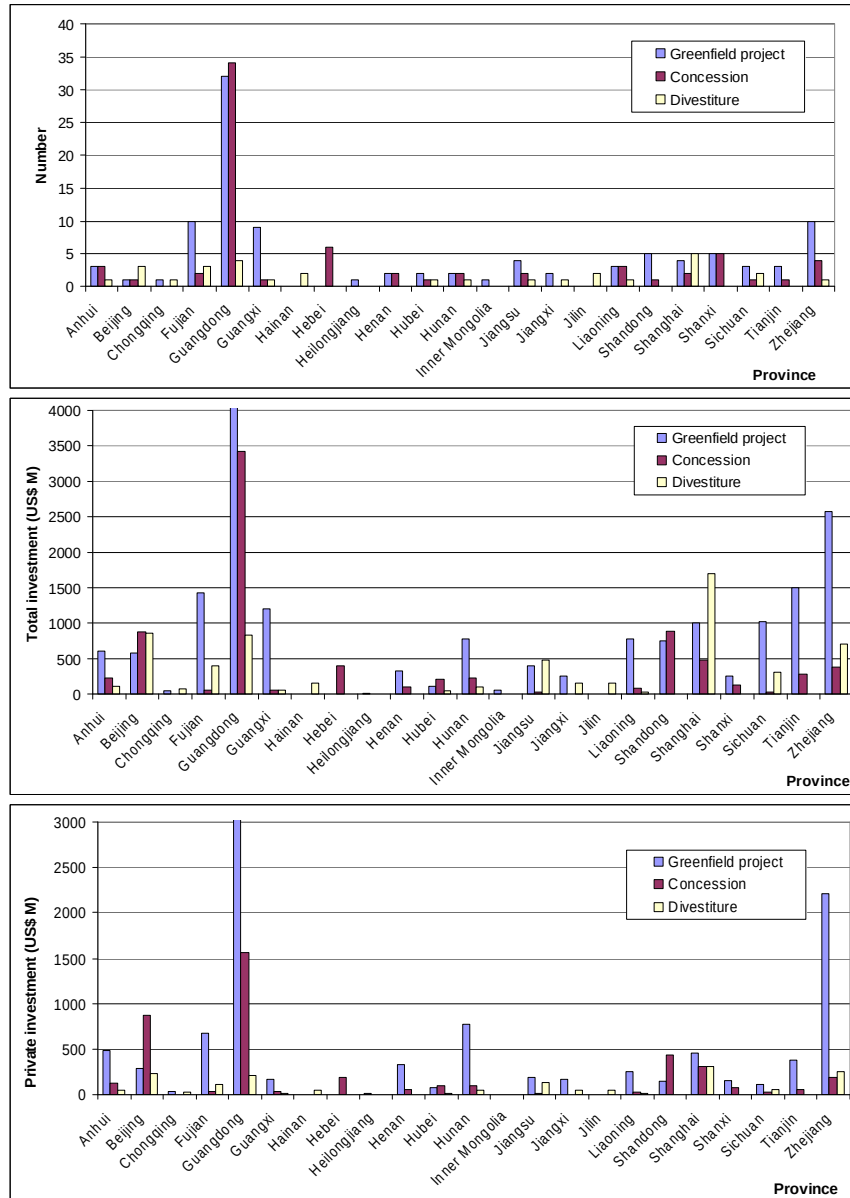


Figure 13. Spatial distribution of different type of PPI projects by number, total investment value, and private investment value

Figure 14 depicts the spatial distribution of different segments of PPI transport projects. Not surprisingly, Guangdong has the largest amount of road and seaport PPI projects, far ahead of other provinces/municipalities. Airport projects with significant private participation are very limited and are located in Beijing, Fujian, and Zhejiang. The top provinces/municipalities in terms of private investment value in road projects include Guangdong, Zhejiang, Beijing, Hunan, Anhui, and Henan.

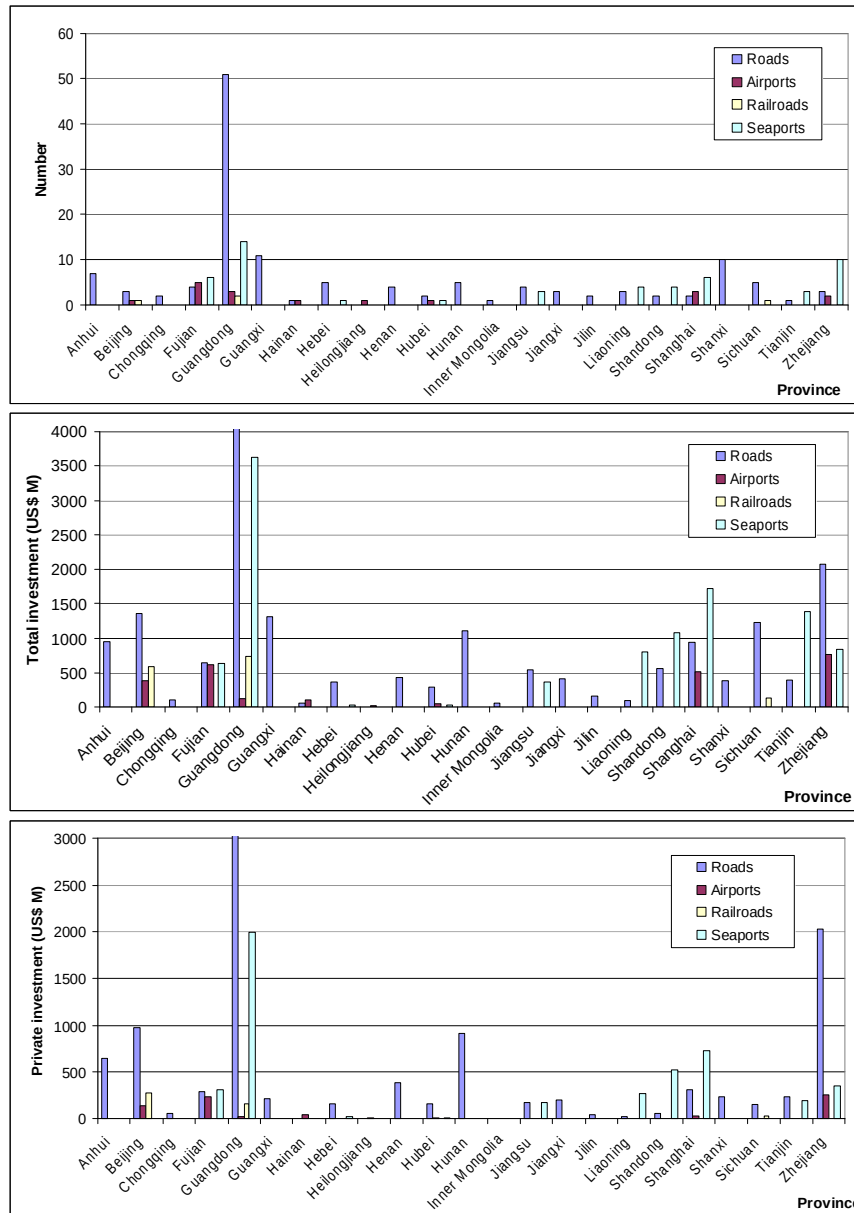


Figure 14. Spatial distribution of different segment of PPI projects by number, total investment value, and private investment value

As can be seen in Figure 15, sponsors from different origin have different spatial preferences. Hong Kong based sponsors prefer Guangdong, Zhejiang, Shanghai, Beijing, and Tianjin, other foreign sponsors favour Shanghai, Fujian, Guangdong, Shandong, Liaoning, and Jiangsu, and local private sponsors enjoy Zhejiang, Hunan, Guangdong, Henan, Fujian, and Jiangsu. Among them, only Guangdong is jointly favoured by different types of sponsors. Because of the geographic and cultural proximity between Hong Kong and Guangdong, it is not surprising to see a large number of PPI projects in Guangdong were developed by sponsors from Hong Kong. It is interesting to notice in Zhejiang province where the private sector is very strong, there are quite a few PPI transport projects developed by local private sponsors.

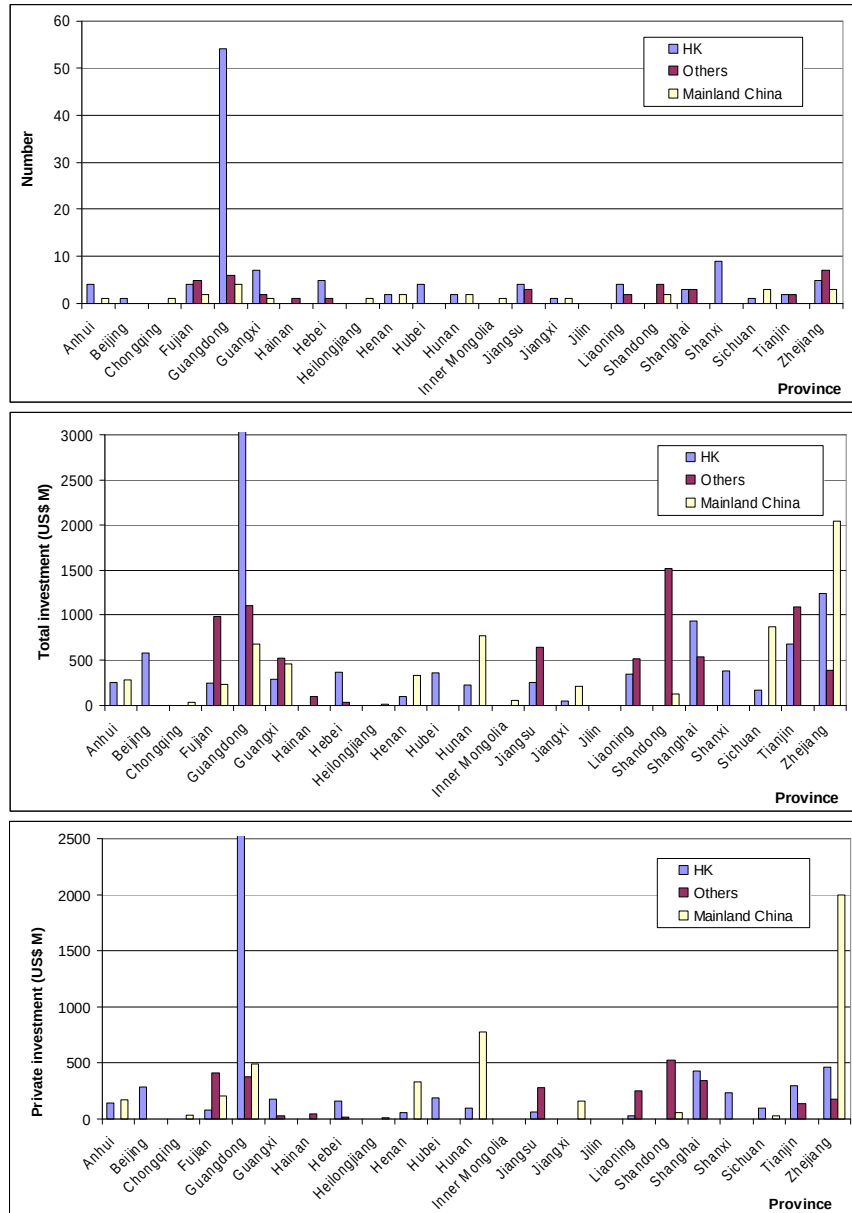


Figure 15. Spatial distribution of PPI projects by different type of developers by number, total investment value, and private investment value

SUMMARY AND CONCLUSION

Based on the dataset of the World Bank, this study identified a set of characteristics, trends and location patterns of PPI transport projects in China. The sample has a mean of 31.53 years. The majority of the projects have a total investment value lower than 125 million US\$. In the dataset, there are much more greenfield projects than other types. There are much more road projects (including bridges) than those in other segments. Seaports account for about 25% of the portfolio. Many of the PPI developers/investors are based in Hong Kong. The longitudinal trends of different types of PPI transport projects show a 'horseshoe' profile. The average project size of recent road projects is much bigger than those developed around 1997. The continuous increase of seaport projects is well worth special attention. The emergence of local private investors is quite obvious. Provinces and municipalities that have attracted a large number of PPI transport projects include Guangdong, Zhejiang, Shanghai, Beijing, Fujian, Tianjin, and Shandong, in terms of investment value. Western and Central

regions lag far behind Eastern region in attracting PPI. 72% of total PPI transport projects fall in the Eastern region and either total or private investment value accounts for 82% of the total PPI volume in China. Because of the geographic and cultural proximity between Hong Kong and Guangdong, a large number of PPI projects in Guangdong were developed by sponsors from Hong Kong. In Zhejiang province where the private sector is very strong, there are quite a few PPI transport projects by local private sponsors.

Managerially speaking, the private and foreign investors and developers should notice the sensitivity of the PPI market of China subject to the impact of capital market. The emergency of local private investors is now a strong force and foreign investors can seek coalition with them. The ongoing implementation of the national strategy of "West Development" and the small amount of PPI projects in Central and Eastern China imply chances to access the less developed areas of the country. The fast growing seaport segment is a niche market that private investors cannot turn their back towards. Railroad segment can be a very potential niche market too. Policy makers in China should acknowledge the importance to promote private and foreign participation to the less developed provinces to make it beneficial to the balanced development of China and as a measure to implement the "West Development" initiative. Hong Kong based sponsors, as an important investment force, should particularly be guided to participate in infrastructure development in other provinces in addition to Guangdong.

As a data driven analysis, this study involves some drawbacks. For example, only variables covered in the dataset were analysed and some explanations for specific characteristics, trends and patterns are tentative and deserve deeper analysis for confirmation. The interaction between private and public transport infrastructure project is well worth exploring.

ACKNOWLEDGEMENT

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The Impact of Chinese Cultural Values on the Performance of Hong Kong Construction Professionals

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ABSTRACT

It is believed that every “Descendant of the Dragon” is affected by Chinese values in the everyday aspects of life and one’s work performance in an organization; this would include construction professionals in Hong Kong (HKC-Ps). This study therefore investigates the impact of Chinese values on the performance of HKC-Ps. Based on a structural equation modeling using Lisrel 8.50, we developed an integrated Chinese Values-Performance model that identified four Chinese values (interpersonal integration, conservative personality, social conventions, and work-related ethos) and three types of performance (task performance, interpersonal performance, and organizational performance). Among these variables, we found that conservative personality and social conventions had no direct impact on the three performance dimensions. Interpersonal integration, however, had a direct and positive impact on the interpersonal performance of HKC-Ps. A work-related ethos also had a positive influence on both the interpersonal and organizational performance of individuals.

Keywords: Chinese values, Construction Professionals, Performance.

INTRODUCTION

Chinese values are the social construct in Chinese society, which has long been shaped by the Chinese tradition of four thousand years of history. These values also continue to shape current Chinese culture. The intimate relationship between culture and values must therefore never be overlooked. While the cultural dimension has been a classic topic in various

research areas (Hofstede, 1991), such as psychology (McCrae et al., 2007), sociology (Zilwa, 2007), gerontology (Chua et al., 2006) and so on, it is the “value” that acts as the crucial variable determining the nature of culture and the various cultural dimensions of humans in every nation (Chiu and Kosinski, 1995). Previous studies have focused on the effects of single values, while neglecting the complex nature of value structures and their impact on various socio-contexts (Homer and Kahle, 1988). The impact of cultural values on various issues appears to have been rarely addressed, and in particular on the self-evaluated performance of construction personnel. It is believed that the impact of Chinese values is so deep that they affect every “Descendant of the Dragon,” including the construction professionals in Hong Kong (HKC-Ps), in terms of lifestyle, work attitude, and more importantly, work performance, which is the greatest concern of various stakeholders. Therefore, this study investigates the impact of Chinese values on the performance of construction professionals in Hong Kong.

1. THE CHINESE VALUE SURVEY

Various values surveys are available, such as the Rokeach Value Survey (RVS), the Singapore Chinese Value Survey (SCVS), and the World Value Survey (WVS) (Hofstede, 2001; Bond and King, 1985; Chang et al., 2003; Inglehart et al., 2004). The RVS and WVS were originally developed for Westerners with a Western cultural background, while the SCVS was developed for Singaporeans. Values can be interpreted in different ways based on different cultures. To avoid any cultural bias, we chose the 40-item scale of the Chinese Values Survey (CVS) developed by the Chinese Culture Connection (1987) for the current study. We categorized the Chinese values of HKC-Ps into four main types based on Chinese characteristics and previous studies of HKC-Ps, namely, *intrapersonal*, *interpersonal*, *work-related*, and *socio-environmental* values.

Intrapersonal values refer to the self-development or accomplishment of individuals in Chinese society. “Better one’s being, one’s family, to enable one to rule a country, eventually contributing to world peace” (pinyin: *xiushen qijia zhiguo pingtianxia*) is one of Confucius’ maxims (Ames and Rosemont, 1999). If one was not able to cultivate their internal self, he /she would fail on other aspects connecting to the outside environment. On the other hand, Chinese people are much concerned with *harmony* and *humbleness*, which are advocated by the three mainstream philosophies of Buddhism, Taoism, and Confucianism (Chen, 2001; Lin, 1948). Because construction projects involve various stakeholders, harmonious and humble **interpersonal** values are generally a prime consideration of HKC-Ps in the management process (Buck, 1972; Defrank and Cooper, 1987; Holt, 1993). Besides, HKC-Ps with concerns on the intra- and inter-personal values would certainly have greater integration to the others in the society with higher interpersonal performance.

Work-related Chinese values originated from the work-related Confucian values of Chinese societies (Siu, 2003) and are mainly based on working hard (i.e., *industry*, as stated in the CVS), endurance (i.e., *persistence*, as stated in the CVS), and harmonious interpersonal relationships with others at work. HKC-Ps with high level of work-related values would devote more effort and time on their tasks. In other words, their task performance could be enhanced. While, on the other hand, as harmonious interpersonal relationships at work are encouraged, the interpersonal performance of HKC-Ps could be also be enhanced. With certain devotion to task and satisfied interpersonal workgroup support in the organization, sense of belongingness of individual HKC-Ps could then be developed.

Lastly, **socio-environmental** values refer to the social conventions and rites of individuals in accordance with their specific role and social status in the Chinese social structure. They are closely related to the concepts of *relations* (pinyin: *guanxi*) and *rituals* (pinyin: *li*) in Confucianism. HKC-Ps emphasize socio-environmental values, placing importance on the hierarchical relationships and rituals between individuals in the organization. As hierarchism would usually discourage the upward communication from the subordinates to the superiors in the organizations, this might have a negative impact on the interpersonal performance of HKC-Ps within an organization.

2. PERFORMANCE OF HKC-Ps

For common labor, job performance refers simply to task aspects such as quality of work or productivity. However, the role of HKC-Ps requires them to be equipped with more than quality and productivity. *Task performance*, *interpersonal relationships*, and *organizational performance* are all essential for HKC-Ps (Leung et al., 2005, 2006, 2008).

There are three common criteria for measuring the **task performance** of HKC-Ps: the project duration, the cost, and the quality of construction projects (CIOB, 1996). To perform successfully in these three key areas, HKC-Ps must plan and control an effective schedule (i.e., time, which is especially important for project managers), meet various standards (i.e., quality, which is especially important for architects, engineers, and project managers), and complete the project within budget (i.e., cost, which is especially important for quantity surveyors).

Construction projects involve multiple stakeholders, such as the client, the design team, the consultants, the contractors, the sub-contractors, and so on. Communication and interactions between stakeholders directly influence the success of a project. Poor **interpersonal performance** by HKC-Ps (either with the various parties or with their colleagues, supervisors, and subordinates) will affect their task performance, the final success of the construction project, and finally the satisfaction of the construction client (Wolfgang, 1991).

In addition, an HKC-P's **organizational performance** refers to the withdrawal behavior of an HKC-P within an organization (Leung et al., 2008; Cox, 1993). Withdrawal behavior may occur whenever there is a gap between the organizational and personal values of employees (Defrank and Cooper, 1987). The most common forms of withdrawal behavior are absenteeism from project meetings or even leaving the company (Gupta and Beehr, 1979). All these withdrawal behaviors have a negative impact on organizations, especially where finances are concerned.

3. RESEARCH METHODOLOGY

500 sets of designed questionnaires were disseminated to construction professionals in Hong Kong through fax, email, or in person between December 2007 and January 2008. Of these, 139 were returned and accepted for the study, representing a response rate of 28.0%. Nearly half the respondents had more than 20 years of working experience in the construction industry. In addition, 31.9% were project managers, 21.7% were engineers, and 20.3% were quantity surveyors, while the rest included architects, directors, project coordinators, and so on.

The respondents were invited to rate the degree of importance of the 40 items of the CVS on a 7-point Likert scale ranging from 1 (not important) to 7 (supremely important). The three dimensions of self-evaluated performance of HKC-Ps (task performance, interpersonal performance, and organizational performance [Leung et al., 2005, 2006, 2008]) were also adopted in the study. The respondents were invited to rate the degree of importance of those items on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

4. RESULTS

To explore the impact of Chinese values on the performance of HKC-Ps, structural equation modeling was used to develop an integrated model through Lisrel 8.50. Six commonly considered fit indices—relative chi-square (χ^2/Df), the root mean square error of approximation (RMSEA), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the Bentler comparative fit index (CFI), and the incremental fit index (IFI)—were referenced, though only four were required to quantify the degree of a model's fit as recommended by Kline (1998). The fit indices of the model developed in the study were 1.35 for χ^2/Df , 0.050 for the RMSEA, 0.75 for the GFI, 0.71 for the AGFI, 0.85 for the CFI, and 0.86 for the IFI.

5. FINDINGS & DISCUSSIONS

The Chinese Value-Performance model was established using structural equation modeling. Four factors of Chinese values were identified, consisting of interpersonal integration, conservative personality, social conventions, and work-related ethos. In addition, the factors of HKC-Ps' performance included task performance, interpersonal performance, and organizational performance. The structural equation model of the various values and types of performance is illustrated in Figure 1. Only interpersonal integration and work-related ethos had a direct impact on the various types of HKC-P performance. However, conservative personality and social conventions acted as the predictor of interpersonal integration and therefore also had an indirect impact on HKC-Ps' performance.

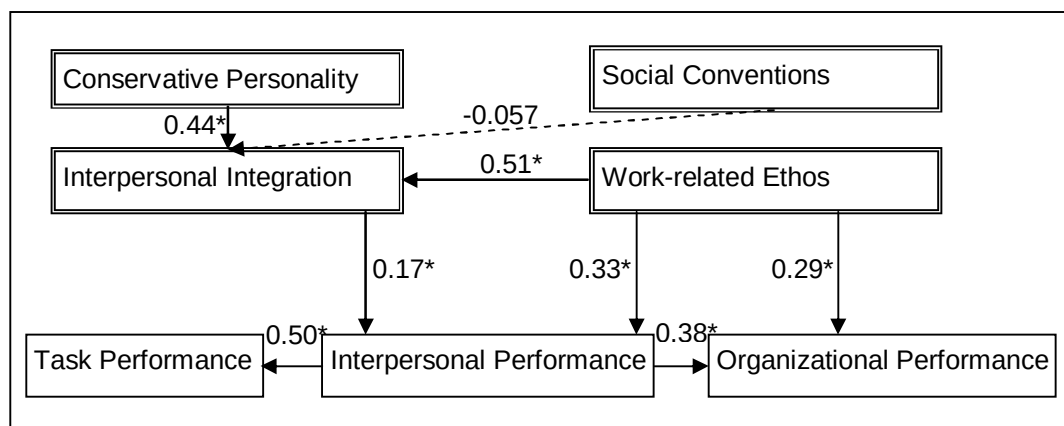


Fig. 1 An Integrated Chinese Cultural Value-Performance SEM for HKC-Ps

Note: Figures on the paths represent the maximum likelihood estimates revealed in the SEM.

- > - positive causal relationship revealed in the SEM.
- - - - -> - negative causal relationships revealed in the SEM.
- xxx - represents Chinese Cultural Values.
- xxx - represents Types of Performance.

Interpersonal Integration Enhances Interpersonal Performance

Interpersonal integration is one of the most representative values in Chinese culture (Chinese Cultural Connection, 1987). Chinese people, who have long been recognized as a collective nation, are very concerned about individual integration into the community. The study revealed that interpersonal integration influences the interpersonal performance of individual HKC-Ps positively and directly. As HKC-Ps with values of interpersonal integration are often integrated into the community, they emphasize their relationships with colleagues, leading to better interpersonal performance in the organization. Therefore, it is suggested that HKC-Ps become closely attached to their colleagues in the organization and to others in the community in a harmonious, humble, patient, and polite manner.

Work-Related Ethos Enhances Both Interpersonal & Organizational Performance

The study showed results similar to those of previous studies (Adkins and Naumann, 2001) that a work-related ethos has a direct and positive impact on both the interpersonal and

organizational performance of HKC-Ps. HKC-Ps with a work-related ethos of industry (working hard), persistence, resistance to corruption, knowledge, and solidarity with others have a higher loyalty and sense of belonging to the organization (i.e., high organizational performance). Hence, they are more closely attached to other individuals in the company and are consequently more likely to report higher self-evaluated interpersonal performance (Siu, 2003). To improve both the interpersonal and organizational performance of individual HKC-Ps, it is recommended that they maintain their work-related ethos, such as industry (i.e., working hard), persistence, adaptability, resistance to corruption, prudence, and so on, in the construction industry.

Interpersonal Performance Enhances Both Task & Organizational Performance

For HKC-Ps, good interpersonal skills have been recognized as a major key to achieving good performance (Bresnen et al., 1986; Djebarni and Lansley, 1995). It is obvious that poor interpersonal relationships will affect an individual's sense of belonging in the organization (i.e., organizational performance). Construction projects often involve multiple stakeholders, such as the client, the design team, the consultants, the contractors, and the sub-contractors. Communication and interaction between stakeholders thus directly influence the task performance of individual HKC-Ps, and more importantly, a project's success. Although Chinese values were found to have no direct impact on the task performance of HKC-Ps, the causal relationship between interpersonal performance and task performance shows that Chinese values still have an indirect influence on the task performance of HKC-Ps.

6. CONCLUSIONS

To explore the impact of Chinese values on the performance of HKC-Ps, an integrated structural equation model was developed. Four Chinese values factors (interpersonal integration, conservative personality, social conventions, and work-related ethos) and three performance factors (task performance, interpersonal performance, and organizational performance) were identified in the study. The results showed that conservative personality and social conventions had no direct impact on the three performance dimensions; they did, however, have an impact on interpersonal integration, which in turn had a direct and positive impact on interpersonal performance. The work-related ethos was also found to have a positive influence on both the interpersonal and organizational performance of individuals. Recommendations were given to HKC-Ps to maintain their interpersonal integration and work-related ethos values in order to enhance their overall performance in the organization and the construction industry.

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Cultural Risk Identification of the Life-cycle Project Management Agent System

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Abstract:

Based on the analysis of the characteristics of the Life-cycle Project Management Agent(PMA) from the point of view of PMA, a classification of the management risk is proposed. This paper presents that the cultural risk of PMA is the centralization and intensification of project risk, therefore it is necessary to do the course study and the programming study of the risk. With a case study, it shows the importance of the cultural risk identification and analysis before their occurring, and make a active, phasic, collaborative and intelligence risk management in the Life-cycle of PMA.

Key words:· the Life-cycle Projects Management Agent System, Risk management, Risk Identification

1. Summarize

Government investment projects management agent (PMA) system has been implemented by the National Development and Reform Commission and local government since recently years, and a growing number of non-governmental investors in its construction of the proposed use of agent System in the Life-cycle of project management mode. Construction projects are operated in complex and ever-changing natural and social environment, with a long construction period, lots of uncertainties factors and project participants, culture and environment for high-impact on, and other characteristics. At the same time the regulations relate to PMA are incomplete, its legal status is unclear. This makes the risk of construction PMA occur frequently and large losses.

For this new construction project management mode, research has been mostly started from a system of laws and regulations design, mainly studied the clients how to improve the efficiency of government investment, how to avoid client's Risks. But the study from the perspective of an agent system or from the Life-cycle of project risk management is few and far between. From the point of view of PMA, it has more concentrated risks, and risk management is more difficult and more operational requirements.

If PMA units lack of awareness of the risks, and cannot analysis to deal with risks in the projects process, and so on, it will lead to the projects not to achieve the desired goals, benefits of PMA units also be damaged. Within such circumstances, PMA units not only cannot establish the credibility of the market, but also cause unsustainable pursuit. As a result, to research risk management in the Agent System for the Life-cycle of project management and strengthen risk management practice, to realize the projects target and improve management skill, to establish the credibility of PMA in the construction market has a very important significance.

2. Concept of the Life-cycle project management

July 16, 2004 release of "the State Council decision on investment system reform" (State [2004] No. 20) pointed out that the "non-government investment projects to speed up implementation of the Agent System, that is, through such means as tender, the choice of specialization project management unit is responsible for construction, strictly control project investment, quality and construction period, after the completion of the inspection handed over to the users. " At present, around the introduction of the Agent System on the regulatory documents, the definition of the Agent System for project management is not exactly the same, but is generally close to the expression: "the Government or the investors for their investment in the construction project, in accordance with the public tender procedure to consign the social professional project management company as the PMA units who is responsible for the project management implementation, after the completion of the project delivered it to the user of project management unit. "

From the perspective of the process of project implementation, the Life-cycle of project management agent system is defined as: professional PM unit through a public bidding procedure, to get the dealership of owner's activities during the construction, through the rational allocation of right to build responsibility for PMA units, professional and technical PMA forces as the mainstay of the projects carried out on behalf of the Life-cycle of management to effectively control the scale of the project, investment, cost and time to avoid the waste and oversight of construction projects, and after the completion of the project to be delivered to the using unit.

Based on the above definition of Agent System project management model that can be shown in Figure 1.

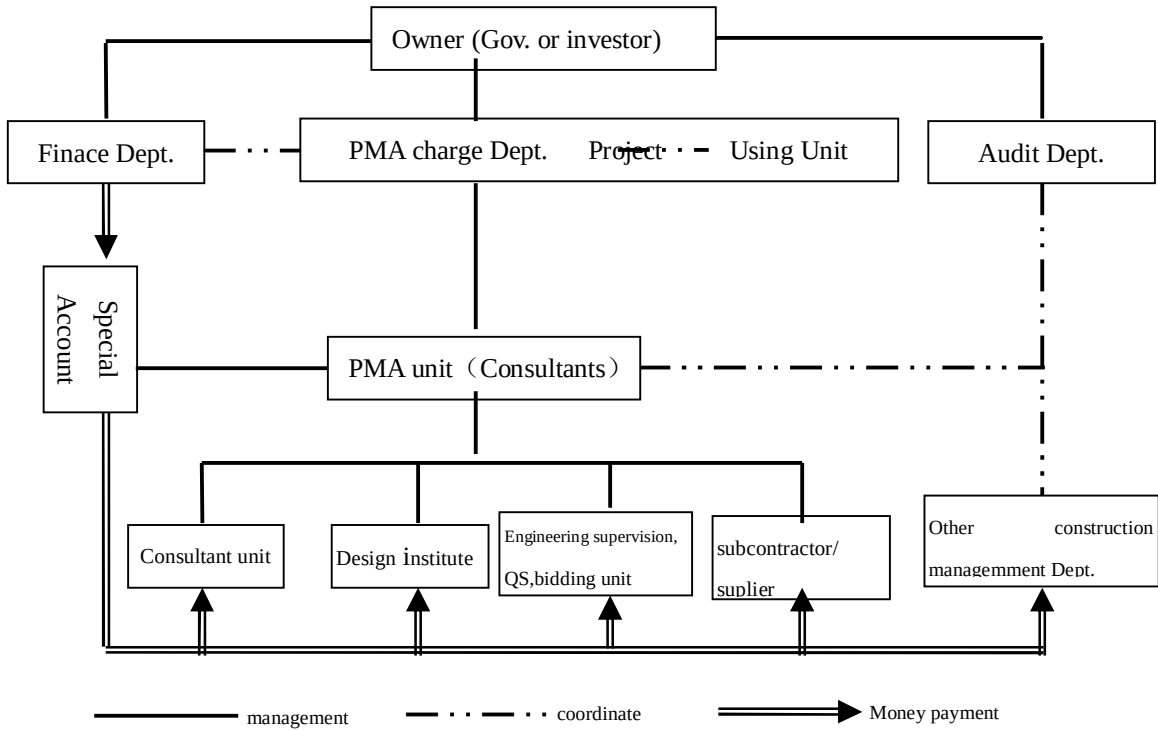


figure1 PMA project management model

2.1 Agent System project management content

The investment follows the general Life-cycle of project building as shown in Figure 2.

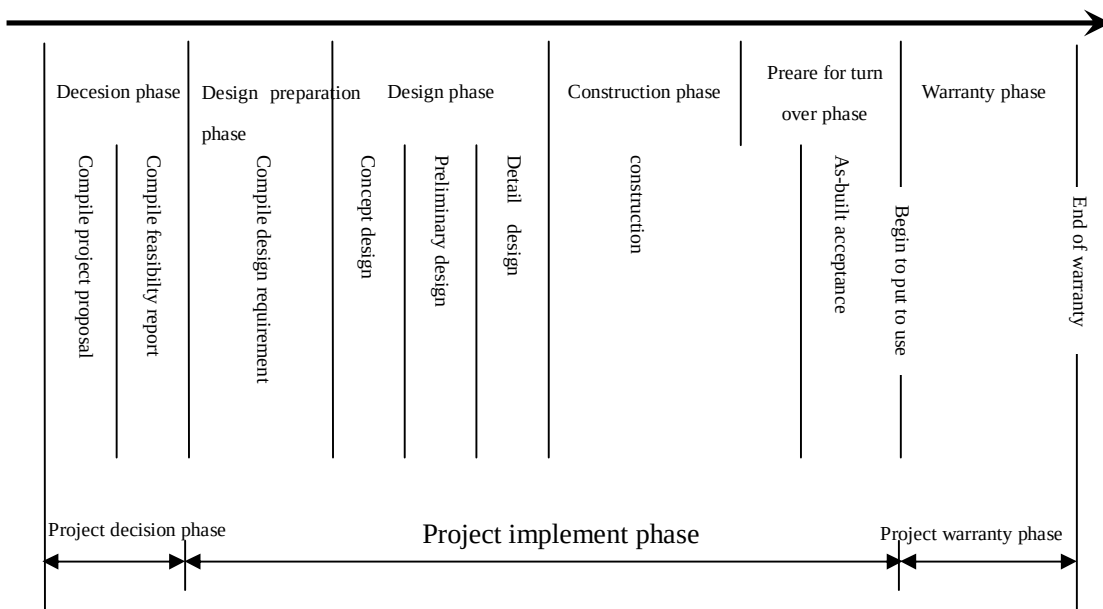


Figure 2 The general Life-cycle of project building

Note: The bidding for the work scattered in the design preparation phase, design and construction phase, and therefore can not listed in a separate phase of the bidding.

Agent System project management is the essence of the community to make full use of specialized technical and management experience, and to promote investor the construction management skill of investment projects and

investment efficiency, standardize the investment procedure.

Judging from the current practice of the case, in particular, the Life-cycle of PMA case, the Life-cycle of construction project management can be divided into four major areas: (1) pre-consultation; (2) the preparation of management; (3) The management of the construction period; (4) completion of the inspection and quality assurance phase of the management; by the four major components, mainly: (1) of the Organization of the preparation of feasibility studies and approval; (2) survey and design organizations , construction, equipment, materials procurement and tendering of the contract; (3) registration of land, planning, demolition, environmental protection, fire protection, municipal construction permits and other related procedures; (4) in terms of quality, schedule, cost of construction implementation of a comprehensive project management, organizational final acceptance, completed the as-built budget reported that the investor plans to invest charged departments for approval, and for projects transfer, etc.

2.2 Agent System project management features

By the practice, as well as the above definition and sum up the Life-cycle, the project Agent System has the following characteristics:

(1) Coordination

On behalf of the party building for the completion of construction task to achieve the goal, we must strengthen coordination between the parties.,such as investor, examination and approval department, the user, government department, suppliers. To achieve the goal is equal to whether coordination is successful or not.

(2) Systemic

PMA units joined in the project start from the proposal had been approved, until the implementation of projects / termination; From the point of view of PMA, it's necessary to comprehensive systematically to manage projects and systematically consider the project and its risk management.

(3) Professional

As opposed to the use side, investors, etc., PMA units with the expertise and management experience, from the past to build on behalf of experience to this project known risk plan, known and unknown risks forecast, and so on, with an irreplaceable professional, and be able to accumulate experience to rich knowledge of risk management, to establish the risk knowledge base, and to achieve sustainability build on behalf of risk management.

(4)The Life-cycle

Since the project's risk characteristics of the Life-cycle, the parties must also be built on behalf of the entire process to be managed so as to embody the Life-cycle of Agent System.

3. Definition of PMA risk management

When project under the PMA mode, project risk will be in PMA contract type and translate to PMA achieve the goal of uncertainty or loss in the form of government under the relevant provisions. The author works on behalf of the definition of risk management projects are as follows: In the PMA mode, risk is PMA unit can not be achieved

make on behalf of the management of projects agreed in the contract of the project's goal of uncertainty or loss. On behalf of the management of projects agreed in the contract of the main objectives of the project, including investment objectives, quality goals, the target time for the three basic objectives, and there may be other contract-specific goals, such as the goal of excellence, or security goals, etc.

3.1 Characteristics of PMA risk management

PMA risk management with the general characteristics of project risk management- randomness, relativity, progressive, stage. At the same time, building on behalf of large investment projects, implement in long period, the complex principal-agent relationship between the PMA units and the use of units, as well as the goal is comprehensive, and so on, making the PMA risk management also have the following characteristics :

(1) Life-cycle and comprehensive

As the PMA project management spans the implementation of projects and the delivery, the PMA units must face the Life-cycle risk of design, procurement, construction and installation, maintenance and transfer; but the design and construction contractor generally contracting in the face of only the design and construction risks. Engaged in PMA risk management is built the Life-cycle from the (global) point of view for the overall management, rather than or in various stages of the process of separating project risk management.

(2) Strong sociality

PMA system involving members of society (stakeholders), relationship is complex. PMA risk management must determine the requirements of stakeholders, and then manage these demands and influence to ensure the success of the project.

(3) Expansibility

As the generation of PMA project management in our country is not long ago, relevant laws and regulations is not perfect, project risk management conditions and environment is not ideal, experience is quite poor, may easily lead to great risks. As a result, we should be based on China's national conditions and the actual situation of the projects to carried out down-to-earth research and innovation.

(4) Chance and inevitability

As a result of together action of a number of risk factors and other factors, the occurrence of any specific risk is a random phenomenon. Individual risk of accidents is accidental, chaotic; But observation data and statistical analysis of the risk base on a large number of incidents, it will find that it showed a clear movement, which makes it possible to use the probability of statistical methods and other modern methods of risk analysis to calculate the probability of the occurrence and risk of loss, but also lead to the rapid development of risk management. PMA risk management is the conflict and unity between the chance of a particular risk of accidental occurrence and the inevitability of risk of a large number of occurrence. Chance and inevitability of unity is precisely what works PMA Risk Management the foundation.

(5) Variability

This means that during the entire project period, a variety of risks change in the quality and quantity with the project progress. Some risk will be brought under control, some risk will be occurred and dealt with. At the same time, in every stage of the project could generate new risks.

(6) Multilevel nature and diversity

Construction projects generally long-term period, large in scale, involving in a wide range and risk factors, and the number of multi-species complex led to its full life cycle risks to a wide range. And a large number of risk factors inherent in the complex relationship between the various risk factors affect the cross with the outside world and also shows that the multilevel nature of risk, which is the risk of construction projects in one of the main characteristics.

3.2 PMA risk classification

Specific in PMA, as the PMA including the Life-cycle the project management from the project proposal approval to project transfer, all units involved in the project at all stages (the use of units, design, construction Units Professional Services unit, etc.) as well as the environment inside and outside the project would have on the uncertainty of the situation or the overall impact of the project shall be considered by the PMA. We can meet the risk characteristics of the construction project and the characteristics of some key factors for project risk type classification. See Table 1 below.

Table 1 PMA risk classification list

risk classification	contents
Target risk	The basic objective of building is not clear enough
Scope risk	the risks relate to the scope of change- such as beyond the scope of the contract to PMA or beyond the original scope of the examination and approval
Quality risk	Can not meet the requirements or achieve acceptance of the use of standard
Schedule risk	Plan period in excess of the target / can not be delivered on schedule
Cost risk	The costs exceed the budget plan (approved), or period of operation and maintenance costs increase
Contract risk	a clear liability of contract and law duty of various units involved in the project, contract changes
Safety risk	Safety accidents occurring
Organization risk	Project organization is complete, inside and outside information channels of communication
Management risk	Management system and the integrated level of coordination both inside and outside the management
Finance risk	payment can meet the requirements of the contract and the project schedule
Environment risk	Project address, social environment, culture, social relations, national policies, laws and regulations
Law risk	Licensing, patent, contracts expire, as well as force majeure, and other litigation-related risks

4. PMA risk management process and planning research

4.1 PMA risk management process and risk management features

According to the PMA risk management features, combined with current projects in risk management of the most cutting-edge risk management philosophy: a comprehensive risk management, the continued and integration of quantitative risk management, the process of PMA risk management should reflect the process of building project , an integrated, dynamic management, and other features. Available from the IT and technology we can lead PMA risk management throughout the Life-cycle. It will lead by PMA units and project stakeholders to participate in, to implement the risk management into initiative, phase, cooperative and intelligent. PMA risk management during the project cycle can be summarized in Figure 3. It reflects PMA risk management with the following characteristics:

- (1) Initiative risk management that means risk management must have initiative in order to truly grasp the Life-cycle, dynamic risk, so we must attach importance to risk management planning.
- (2) Phase risk management, risk management process work as risk identification, qualitative and quantitative analysis, the response planning, monitoring and control. All these stages will take place in projects in the course of the concept, design, procurement, construction and transfer. The Life-cycle of PMA has obvious stage.
- (3) Co-operation risk management The distribution of roles and responsibilities of PMA should include risk management. The participants in the risk management should include the member of using units and the main implementation unit at the corresponding stage, to establish risk management about carrying out the principles and system of communication and information exchange rules.
- (4) Intelligent risk management PMA has long been engaged in building construction services on behalf of the process, accumulate experience in management, thereby enhancing the ability to cope with risk and strengthening risk management, and refer to IT technical to establish risk library and triggered tracking and control the risk of incident and The incident, risk analysis in both qualitative and quantitative in order to achieve intelligent risk management.

4.2 PMA risk management group

PMA risk management projects to be carried out in an organized manner. In order to Life-cycle, dynamic manage project risk, you can set up the PMA risk management group, systematically and comprehensively grasp and implement risk management. The PMA risk management group in general should be set up at the same time signed the consign contract and set up PMA organization.

Responsibility for Risk Management Group will include:

- (1) Definit the risk event, establish the grade of risk events and explanation;
- (2) The input information classification and sorting, called the risk event-related principal to discuss on a variety of events to determine the risk of events as to determine the risk level, risk-related events on the quantitative analysis.
- (3) To reach the level of risk events to establish measures of risk and a written report.
- (4) Risk monitoring and control.

In general, PMA risk management group headed by the project manager, a full-time risk administrators, professional engineers who responsible for its professional in the field of risk management. At various stages, group should also join the main suppliers, contractors and so on into the head of risk management group. PMA risk management group must accept the leadership and inspection from the professional sector of the enterprise risk management.

4.3 PMA risk management planning

The PMA risk management planning means to decide how to proceed with and plan risk management activities. The process of risk management to ensure that the level, type and degree of knowledge and risk for organizations and projects commensurate with the importance of playing an important role. the PMA risk management plan basically include:

- (1) PMA contract and PM outline. Which gives the project description, management objectives, PMA organization personnel, constraints (the terms of the contract) and assumptions and so on.
- (2) PMA risk management policy, such as the existing risk analysis and response.
- (3) Clearly the roles and responsibilities. Pre-defined roles and responsibilities, as well as the decision-making authority will affect the level of planning.
- (4) Stakeholder risk tolerance. Different organizations with different personal risk tolerance varies. This will be the principle in its statements and actions demonstrated.
- (5) PMA risk management plan model.
- (6) WBS.

PMA risk management planning major completed by the project team to held a planning session. Participants include project managers, project risk administrators, the key stakeholders.

4.4 Contents for the risk management program

Programming is to be the result of the risk management plan. Risk management program describes the risk identification, risk analysis, response, monitoring and control of the project construction period and arrangements for the implementation of (non-response to deal with individual risk). The main contents include:

- (1) To identify the item on the implementation of risk management methods used, tools, and data sources.
- (2) To identify risk management action programs for each leadership, support and risk management team members.
- (3) The establishment of risk management budget for the project.
- (4) To determine the project construction period as a whole, the risk management process, how frequently next time.
- (5) Risk analysis methods and criteria.
- (6) Risk report format. By the provisions of whom, the manner in which to take action on the risk threshold.
- (7) Reporting format. General sub-topics and periodic reports, the report of an emergency.
- (8)Track. Record-risk activities with the various aspects of lessons to be learned.

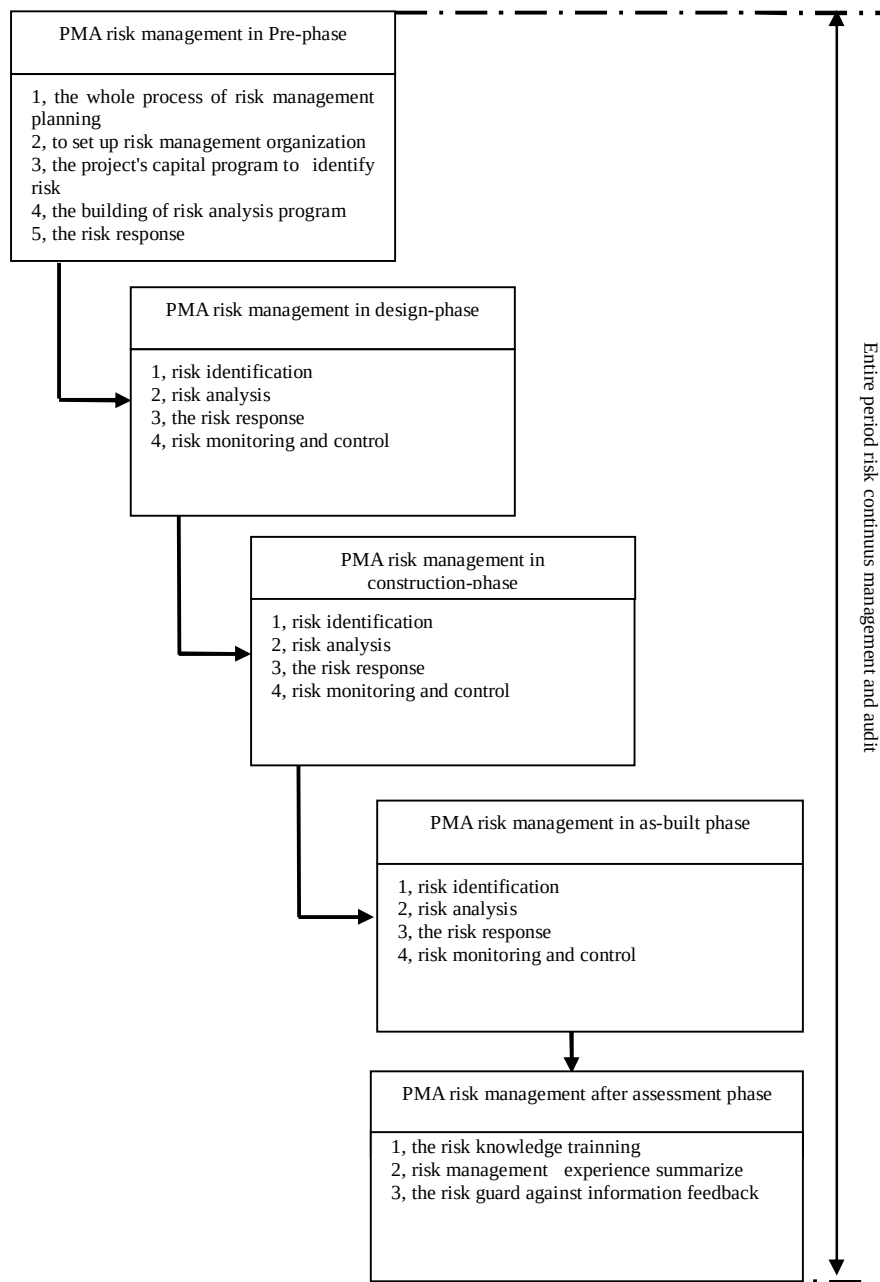


Figure 3 PMA risk management process

5. Risk identification and analysis of the PMA management

5.1 PMA based on risk identification

Project risk identification should be carried out at phase of the project plan, PMA risks identification basically include:

(1) PMA risk management program

The program describes the projects Organization division of the PMA risk management, risk management budget, with the progress of the project and risk management activities carried out by the schedule, risk administrators and people related to, the risk threshold to disposal, the report's format, and so on.

(2) PMA project documents

Including the project feasibility study, approval documents, design schemes and so on.

(3) PMA contract

Agreed in the PMA contract the management objectives and requirements directly consist of the constraints and legal risk factors for project management.

(4) PMA planning

Management planning contains a number of assumptions, including that the project scope illumination, work breakdown structure of WBS, the investment limit, major milestone, the organizational structure, and so on. At the same time, also recorded the unresolved issues and did not make the decision-making.

(5)The risk library and historical data

PMA built risk library in the past, as well as the risk of projects in the preservation of historical data can be used to identify the risk of the outcome of the record, which describes the problems and solutions. At the same time, from the published information can be found in a number of research results for reference.

According to the project's construction process characteristics, as well as PMA source of risk, the risk identification in accordance with the implementation of projects stages. The content of phase PMA risk identification in the following table:

Table 2-PMA risk identification at various stages

PMA project phase	Application of Risk Identification
Pre-phase	To identify design scheme and use of the units in line with the requirements of the degree of
	identify and design the investment unit of the investment limit in line with the level of
	To identify design and construction planning and environmental protection in line with the requirements of the degree of
	To identify and consider the constraints of projects management
	to assess the feasibility of the project management plan
	Assessment of projects management of the project may cost estimates
	determine the appropriate milestone
	Required to assess the key resources
Design phase	Change Assessment Program
	Designed to assess the reliability of
	Designed to assess the feasibility of
	To determine the implementation of standards
	Technical evaluation of programs to choose

	Design assessment of the budget
Procurement phase (in design and construction phase)	Evaluation of the procurement plan
	Evaluation of contract terms and conditions
	Determine the appropriate risk-sharing arrangements
	To evaluate and compare bids
	Design or plan to change the assessment of the impact of change
Construction phase	Completion of the revised project cost estimate
	To amend the completion of the construction project plans
	To identify the risks of delivery
	To assess the feasibility of delivery
As-built turn over phase	To assess the feasibility of meeting the requirements of
	To assess the extent of the realization of the objectives of the project
	To assess the effectiveness of risk management plan
After assessment phase	Risk identification and assessment of the effectiveness of the response
	Sum up experience and lessons

5.2 PMA risk breakdown structure

For PMA, as project management and risk management have the same life cycle and information produce, exchange, the same process and therefore can be used in project management of the WBS, the risk data will be organized and structured. Risk in the process of decomposition stage to emphasize risk management, so the risk decomposition in the order: (1) for the first time dimensional decomposition; (2) based on risk management objectives for the goal-dimensional decomposition; (3) based on risk factors factor dimensional decomposition; (4) will be the last of the three-dimensional integrated management.

Table 3 is the RBS and coding for a example PMA in the preparatory stage and the design phase of the project. There are four-level for this project RBS, the second-generation projects for the risk at contract phase, the design stage, the bidding phase, the construction phase, the transfer phase, and other risks. The third level is the main source of risk, the fourth floor of the risk factors for the breakdown. In order to facilitate the description of each layer of risk factors using a numeric code.

5.3 Case:

The risk identification, risk level and distribution of risk, and other measures for PMA project management in five-star hotel projects (see following figures)

6.Conclusion

In addition to the risk identification and analysis in PMA system mode risk management, the PM units should be phased establish an early risk warning system and develop the risk response plan, and there are plans to implement risk aversion, risk transfer, risk mitigation, risk acceptance or insurance, and other measures on the basis of risk analysis. Not only that, but it is also necessary to improve the sustainability of risk management, to submit a risk management report to update the project risk management plan and a rich library of knowledge and

Table 3 RBS and coding for a example PMA in the preparatory stage and the design phase of the project.

First level	Second	Third level	Forth level	Risk grade
1 PMA risk management	11 Risks at Contract phase	111 project and the associated risks	1111 Project left over problems	
			1112 the complexity and scale of projects	
			1113 policy change	
		112 Contract risks	1121 pairs of project management goals are unrealistic expectations	
			1122 performance penalty	
			1123 contract termination penalties	
			1124 margin detained	
		113 PM plan risks	1131 project manager experience	
			1132 skills of the project members	
			1133 related to the project's collaboration	
		114 Scheme risks	1141request to use the lack of clarity	
			1142 related to the design of a new type	
			1143 program less than estimated division	
	12Risks at Design phase	121 Design contract risks	1211 scope of the design	
			1212 design experience	
			1213 More units in collaboration	
		122 Preliminary design risks	1221slow progress	
			1222 program deviation	
			1223Design budget in excess of investment plans	
		123 Detail design risks	1231 slow progress	
			1232 standard changes	
			1233 budget for the construction exceed design budget plans	
			1234 Design Quality	

case. At the same time, it is also necessary on the risk management review, in order to identify problems and make recommendations to provide security for the success of the project. Upon completion of each project should be established and updated database of risk, summed up the risk management experience and lessons to improve enterprise management maturity. These mechanisms, the principles, methods and summarize for improving the PMA mode project management, raise the professionalism level of the PMA companies have a higher value. Due to limited space, this article will not go into.

Agent System construction project using theLife-cycle of project management mode is gradually developing in the growing market. The legislation for the Life-cycle project management agent, the qualification of PMA units and other issues are gradually improving by the government. I am due to the limited level of theory, practical

experience is still lacking, the study is not in enough depth and detail, operational requirements for the Life-cycle project management is also a greater distance to the theory. Hope that in future work on this for further reflection and study.

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Risk Identification - Analysis Table								
Project Name	Xx HOTEL EXTENSION PROJECT					Risk Aalysis Version		V-200x-01
Project Manager	MR. LIANG xxx					Date		200x-x-xx
Serial Number	Clarification	Item Description	Probability P	Impact I	Degree of Influence P*I	Terminate Point	Suggestions	Responsible
3	Time	Foreign responsible for the design of the slow progress	100%	4	4			Mr. Zhou xx
21	HSE	Construction phase of the environmental safety incidents	100%	4	4			Mr. Shen xx
5	Time	Seven months of demolition, installation, decoration lack of time	90%	4	3.6		The progress of the program refinement, demonstration	Mr. Ni xx
6	Time	November can not start business	90%	4	3.6			Mr. Ni xx
13	Communication	And the original designer of poor communication	70%	5	3.5			Mr. Liang xx
9	Social	Experts reject all designs	65%	5	3.25			Mr. Zhou xx
18	Supply/Procurement	International procurement of supply of longer term	80%	4	3.2			Mr. Ni xx
4	Time	Impact on the progress of the design	100%	2	2		Contract preparation	Mr. Ni xx

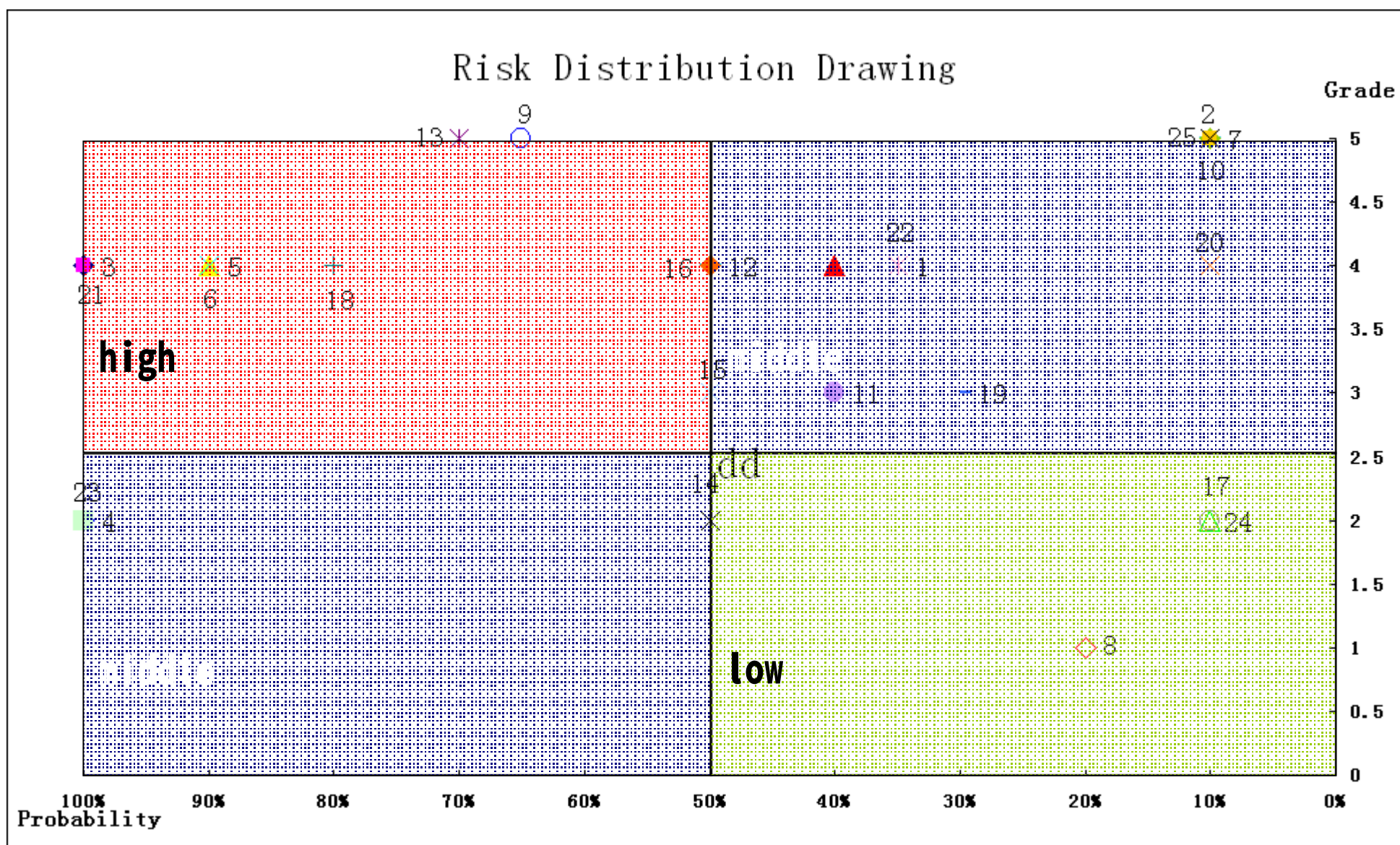
		contract					program	
12	Resource	Around the lack of municipal resources (not enough capacity)	50%	4	2		Immediately investigate	Mr. Zhang xx
16	Contact	Design and the text of the contract model does not apply	50%	4	2		To prepare ahead of time	Ms. Huo xx
23	Quality	Old and new floor, uneven settlement, cracking	100%	2	2			Mr. Zhou xx
22	Quality	The poor quality of design	40%	4	1.6			Mr. Zhou xx
15	Technical	Equipment in the basement as a high-enough level space	50%	3	1.5		Immediately argument	Mr. Zhou xx
1	Political	Government programs do not agree with the successful bidder for the design unit	35%	4	1.4			Mr. Zhang xx
11	Scope	The design work to clear interface	40%	3	1.2			Ms. Huo xx
14	Technical	South Square underground garage is not feasible to build	50%	2	1			Mr. Zhou xx
19	Culcutre	Community's recognition of the new owners do not	30%	3	0.9			Mr. Zhou xx
2	Political	City leaders to reject the project	10%	5	0.5			Owner
7	Commercial/Economy	Unsuccessful financing	10%	5	0.5			Owner
10	Law/Procedure/Policy	Government to reject the program (not targets)	10%	5	0.5			Mr. Zhou xx

25	Force majeure	Earthquakes, floods, high temperature, etc.	10%	5	0.5			Mr. Ni xx
20	Culcutre	Consultation with the owners of corporate culture in the team's integration	10%	4	0.4			Mr. Du xx
8	Finance	Investment breakthrough 720,000,000	20%	1	0.2			Mr. Huang xx
17	Environment	EIA not pass	10%	2	0.2			Mr. Zhang xx
24	Language	The lack of professional Japanese translation	10%	2	0.2			Mr.Liang xx
26	Industrial Relations				0			
27	Organiazation(HR)				0			Mr. Liang xx
28	Related Project				0			

Note:

Possibility	P Value
Decesion	95%-100%
High	65%-95%
Middile	35%-65%
Low	5%-35%
Can be ignored	0%-5%

Impact	I Value
Key	5
High	4
middile	3
Low	2
Can be ignored	1



Risk Response Measure Table					
Risk Title	Foreign responsible for the design of the slow progress	Serail Number	3	Responsible	Mr. Zhou xx
Probability P	100%	Impact I	4	Degree of influence P*I	4
To describe the consequences of risk					
■ Time	1. Plans to delay the design drawings, drawings cycle is too long to amend, delay in project				
■ Quality	1. Do not have enough time to each school to peer review, the types of drawings may not, during the construction period resulted in unnecessary rework and a large amount of change				
■ Cost	1. Due to the progress and quality of the drawings caused rework, so that construction delays and cost increases, design and construction changes and rework costs				
	2. Design changes on investment can not be controlled to achieve accurate, the owners have a negative impact on cash flow				
■ Others	1. Due to the project design process at a critical position, the design will delay the progress of the procurement, construction, hotel management and even many business has not been possible to predict the impact				
The risk of triggering the events described in					
1. Modification and design change					
2. Some of the functional requirements, equipment selection, and so is not clear					
3. Poor communication					
Measures to deal with the risks described in					
1. Clearly outside the requirements of design on-site design					
2. Contract with the latter part of a clear design or modify the work cycle					
3. Strictly control the design fee to cover the progress					

4. By selecting a reasonable framework for the design contract, clear and professional design inside and outside the unit's division of labor

5. Select a stronger force in the design and co-operation with foreign experience in the design, as well as the Chinese have a strong ability to coordinate the construction of the head of design

6. With the design of the leadership of the party's communication

7. To consider the full selection of equipment, such as the impact on the progress of the design, according to the arrangements for the early part of the progress of the design of equipment procurement

Risk Evaluation Update Date	200x-x-xx	Risk Analysis Version	V-200x-01	Project Manger	Mr. Liang xx

If this applies to, then use that ■

Xx Engineering Consultant Co.,Ltd.xxProject Department

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A Cultural Perspective on Stakeholder Management In The Hong Kong Construction Industry

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ABSTRACT

The Hong Kong construction industry is lauded for its “can-do” attitude and the apparently high levels of integration and cooperation that enables its high level of performance. An industry that can regularly complete four day floor cycles on high rise buildings over 40 storeys should be an innovative and relationship based industry. However, this is not the case. For example, the predominant form of procurement in Hong Kong is still design-bid-build (the “traditional” approach) and “partnering” has been introduced into the industry but in a piecemeal fashion and in a manner which is hardly effective. Still, the industry is characterised by hierarchy, tradition and procedures but the industry is also heavily influenced by the Chinese culture in which it was situated. Hence, values such as face, harmony and conflict avoidance are also embedded in the industry culture. In such a situation, the issue of stakeholders and their management has been paid scant regard; the government was used to making decisions on development rather than consulting widely and the other major players, the oligarchy of large property developers, adopted a simple, economic approach to their business plans and only over the past few years have issues such as corporate social responsibility reached their boardrooms.

Keywords: relationship management; stakeholder management; culture; Hong Kong

INTRODUCTION

In Hong Kong, large-scale infrastructure projects are often delivered by joint ventures of international and local construction firms (Walker and Johannes, 2003). Similar trends have also been observed in mainland China (Chan and Suen, 2005; Gale and Luo, 2004). For this type of international joint venture (IJV), at least one partner of the venture is headquartered outside the country where the construction project is undertaken (cf. Geringer and Hebert, 1989, cited in Ozorhon *et al.*, 2008). Notwithstanding the advantages of engaging in the IJV, due to the inherent complexity of IJVs which stems largely from a multi-cultural mix of nations, organisations, and their participants, IJVs are frequently mired with instability and poor performance (Parkhe, 1993).

In this context, the effective use of stakeholder management and relationship management can be said to be in their infancy in Hong Kong and China and in some ways run counter to the ethos and philosophy of an industry where speed and money are king. However, Hong Kong people have become much more demanding of their government and institutions and have demanded that they be consulted and involved in all major and minor developments (e.g. the Central-Wanchai reclamation, the new government offices). Indeed, during the Handover

period Hong Kong people took to the streets demanding freedom and democracy and those demands continue to this day as political reform has come slowly to the colonial and post-colonial systems.

Having briefly set this scene we present below two case studies, one a civil engineering project and the other a public housing project, which draw out a number of the themes alluded to above by way of example. We then attempt to draw together some generalisations on how stakeholder and relationship management are enacted in Hong Kong, identifying drivers and inhibitors to their successful implementation, and noting the impact of history, tradition and culture on how they are implemented and used in Hong Kong. We conclude with the assertion that stakeholder management and relationship management must be implemented in a context specific manner to be effective.

STAKEHOLDER MANAGEMENT

Project stakeholders are a person or group of people who have a vested interest in the success or failure of a project and the environment within which the project operates (Olander, 2007, p. 278). Vested interest, in turn, can be viewed as the actual or perceived benefits or risks/harms from the activities of construction project management (Donaldson and Preston, 1995). The project stakeholders may have a positive or a negative influence on the project. The challenge for the project team, hence, becomes one of implementing the project strategies such that positive stakeholder's influence is maximized and negative influence is minimized (Walker *et al.*, 2008). In analyzing stakeholder management activities, it is useful to categorise stakeholders into two broad groups –primary and secondary stakeholders. Primary stakeholders are people or groups that have a legal contractual relationship to the project. Secondary stakeholders, on the other hand, are those who influence or are influenced by the project but are otherwise not regularly engaged in transactions with the project (Cleland and Ireland, 2007, p. 151). It is apparent that the client; the main and subcontractors; the quantity surveyor; suppliers and the like belong to the former group while local communities and general public the latter.

RELATIONSHIP MANAGEMENT

Partnering, alliancing and relationship management require a change of mind set – a culture change – and the client side must change along with the contracting side. A fit is required between organisational structure and culture. Relationship contracting has the potential benefits of achieving stakeholder empowerment, facilitating regional development and delivering a sustainable industry. A change based on a sound understanding of underlying culture and attitudes is required for successful implementation of relationship management approaches. The change must be directed towards developing attitudes and a culture that are supportive of relationship management.

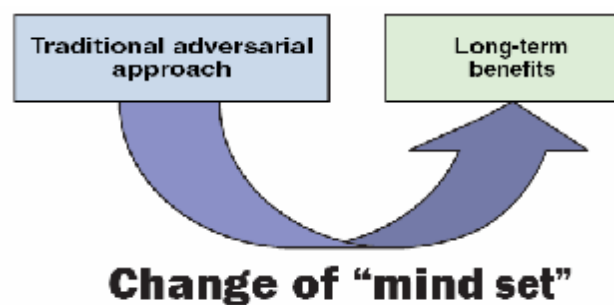


Figure 1: Change of "mind set"

BACKGROUND

The Hong Kong Special Administrative Region (HKSAR) government has embraced the world wide trend of sustainable development. Consequently, in the development front, the HKSAR government has emphasized sustainability and community development in procuring and implementing construction projects. Four sustainability dimensions have been adopted by the government when administering construction projects. These dimensions focus on economics, environment, society, and resource utilization. The client of the project A implemented the

four dimensions in all aspects of the procurement and the administration of the project. The thrust is based on sustainable construction, the aim of which is to progressively achieve sustainable development in public housing. The efforts are that of balancing the economic, social, and environmental concerns of all the stakeholders in the project. To achieve these goals, various issues are embedded in the tendering and contracting procedures in the implementation of the project.

PROJECT DESCRIPTION – Case A

Bearing in mind the foregoing discussion we now describe the context of project A. The economic dimension focuses on attainment of cost effectiveness of the project. Cost effectiveness is critical for economic sustainability because all aspects of the housing development, construction, through to operation and maintenance impact on the budget. Public funds are at stake. The environmental dimension concerns the maintenance or betterment of the environment where the development is located. Construction activities have to be undertaken such that the impacts to the surrounding residents and community are kept to a minimum. Better construction methods and the use of more environmentally friendly construction materials are two strategies to achieve these objectives. Resource utilisation is related to the environmental dimension. The main thrust is to properly manage and reduce the consumption of resources in the construction processes. The production of waste and the use of energy are the two main areas of concerns. The social dimension is grounded in the client's belief that public housing and its development and construction have to promote social stability, economic prosperity, and foster social cohesion. In the construction of the project, the client strives to provide a model working environment for those working on the site. As will become apparent, these dimensions are variously manifested in the procurement and stakeholder management of the project.

The project presented is one government project administered under such a backdrop. The project involves the construction of a public rental housing estate. Three 41-storey blocks are to be built. Each block measures approximately 50 x 34 metres on plan. The blocks are approximately 117 metres high from the ground floor to the main roof level. The three blocks consist of over 2300 rental domestic flat units of various types and sizes. Apart from these building works, there are also some civil engineering works. These works include excavation, filling, disposal, lateral support works for the raft foundations, and pilecap works for the three domestic blocks. The housing estate will be served by a neighbourhood elderly centre.

The client has adopted innovative procurement initiatives for the project with six Guaranteed Maximum Price (GMP) packages allowing design leverage and buildability scope on the part of the main and sub-contractors. In addition, several contractual initiatives have also been pioneered in the project. It is under these innovative initiatives that various stakeholders of the project are engaged. All works for the project were contracted via the traditional approach but special conditions were added to the contract for the six GMP work packages. The majority of the packages were design and build but the building services packages (i.e. the plumbing, electrical, and fire services) involve only installation works with design provided by the client. These packages collectively represent some 30% of the project cost.

The procurement method is essentially a risk-reduced model developed from the private sector approach to target cost and GMP contracting. The procurement approach enables the client to potentially reduce claims, integrate the diverse interests of a complex construction project, offers the contractor an incentive to provide value added services by assimilating the contractor's expertise in the design and innovations in construction methods and materials to enhance buildability (Chan *et al.*, 2007). For the latter consideration, the contractor is rewarded for his creativity and improvement efforts on the design and construction of the works.

Constructive engagement was implemented throughout the supply chain from the primary project stakeholders (the project team, the client, the subcontractors and suppliers), and secondary stakeholders (the community) in the project. These initiatives target each stakeholder's main concerns and attempt to match them. The avenues used in this aspect include shared saving among the main stakeholders of the client, main contractor, and

subcontractors; ensuring community benefits through various schemes administered by the main and sub-contractors endorsed by the client; ensuring workforce benefits and welfare; and project team members human resource development. From the perspective of stakeholder management, the two salient thrusts in driving these initiatives are client proactiveness and farsightedness, and the main contractor “coming-of-age” corporate social responsibility awareness and its manifestations.

Unlike the traditional GMP scheme whereby the sharing arrangement is only limited to the gain (Chan *et al.*, 2007), both the “pain and gain” are shared for the project. The cost saving for GMP packages is shared equally between the client and the main contractor, i.e. 50%:50%. However, the contractor is only entitled to 15% of his portion of the saving. The remaining 85% is to be shared between the contractor and the GMP subcontractor(s) on a pro-rata basis based on the contribution to net savings by both parties. This arrangement potentially motivates both the main and subcontractor(s). The project dispute resolution system is implemented to resolve disputes that might arise at source. Clearly, a collaborative environment is fundamental in smoothing project works. As with most of the government projects, team spirit of the project is developed through a partnering approach. While minor disagreements were present, generally it was observed that better communication and understanding were achieved among the main contractor and client teams. Informal “workshops” convened by the project architect especially at the beginning stage of the project were particularly effective in promoting cooperation among various parties. Although originally intended to solve technical problems, the constant contacts of participants throughout the workshop sessions had produced a “side effect” of improving relationships due to close and frequent contacts.

It is apparent that all the activities cannot be smoothly rolled out without active participation of the main contractor. In what appears to be the response to the client’s push for active community engagement at the beginning, the notion of corporate social responsibility (CSR) has gradually evolved throughout the organization of the main contractor over time. As a result of the increased awareness on the impact of their activities on the community, the contractor has been active in participating and responding to the client’s drive for community engagement, at times, going beyond the requirements of the client. Two incidents exemplify the contractor’s active involvement. The first involves contractor’s volunteer house improvement activities during a festival to help the elderly residents at the nearby estate. The main contractor dispatched two teams of personnel to help repair malfunctioning services within the flats of elderly residents. The second concerns the main contractor volunteering construction related information to the nearby residents in terms of prolonging construction activities beyond normal working hours (i.e. 7.00pm). The improved communication between the project team (both the client and main contractor teams) and the community resulted in reduced complaints and a more positive impression from the residents.

IMPLICATIONS

Passive reaction among the subcontractors and junior staff members. The passive reaction refers mainly to the initiation and participation of the parties in the implementation of stakeholder management. The situation is particularly evident in the management of secondary stakeholders. For the project, initiation of stakeholder management is mainly driven by the management of the client and the main contractor. Little effort came from the lower echelon of the project organisation. The contribution from this hierarchy of members comes mainly in the form of carrying out instructions from their supervisors/managers. It appears, therefore, that the members of the lower echelon are adopting a minimalist approach. For the members, engaging with the external stakeholder does not readily contribute to their immediate works. As both the main contractor and the client are fully committed to the stakeholder management paradigm, the issue is one of engaging the lower echelon of the project organisation so that a uniform and positive attitude can be inculcated.

The lack of a structured approach to project stakeholder management. The preceding observation is symptomatic of the present issue of the lack of a structured project stakeholder management system on the part of the main contractor. The deficiency is particularly acute with external stakeholder management. Despite considerable success in dealing with and

tackling issues with the community, the main contractor admitted that their approach was one of trial-and-error and experimentation. Most of the stakeholder management initiatives rolled out in the project were implemented for the first time, at times without thorough deliberation. For the main contractor, while there are elaborate procedures and guidelines dealing with the internal stakeholders, the guidelines for managing external stakeholders, especially the communal stakeholders (e.g. surrounding residents, property and estate management agency, and district councilors) had not been established. In particular, there was no structured approach to identify external stakeholders, their impacts, and the method of engaging them, yet methodologies currently exist for their identification and management (see, for example, Walker, Bourne & Rowlinson 2008). The main contractor appears to be passive in taking the cue from the client. While the efforts and achievement of the main contractor have to be commended, the situation reflects the somehow parochial mentality of the construction fraternity in terms of external stakeholder management.

No allowance for additional resources for stakeholder management. Despite the various external stakeholder management activities that had been carried out by the main contractor, there was no provision of additional resources available for the main contractor under the contract. The reward from the client comes in the form of recognition. Both the client and the main contractor are fully committed to making the project a success in most if not all aspects. In addition, given its status as a pilot project the ensuing image issues and the high stakes involved especially for the two primary stakeholders of the client and main contractor (Mahesh *et al.*, 2007), the main contractor resorted to adsorbing the extra costs. However, while the costs involved in carrying out those activities are not considerably large, the lack of compensation from the client may lead to only token efforts from the main contractor.

PROJECT DESCRIPTION - Case B

The project is an infrastructure project, comprising a 1.1km elevated viaduct dual three-lane carriageway (average 65m above ground) connecting a tunnel (under construction) on one end, to a cable-stayed bridge (under construction) at the other end. Together, they form an integral part of a 7.6 km long major highway. The project site is reclaimed land (to be handed over in phases) surrounded by industrial facilities, container terminals and an educational institution. The contract is a re-measurement type, traditional design-bid-build approach, with an initial contract period of 40 months. There is also a non-contractual partnering arrangement in place. The client is a major works department of the Government of Hong Kong and the contractor is a joint venture between a Hong Kong-based French company and a Chinese state-owned company. The consulting Engineer is a Hong Kong-based international engineering consulting firm.

The peculiar features of this project, especially its size, location (vertically and laterally) and technical complexity, brought together a myriad of stakeholders, whose interests needed to be aligned at various phases to successfully deliver the project. Incidents involving critical and contentious issues during the construction phase of the project, are used to illustrate how the stakeholders surrounding each incident were identified, managed or mismanaged individually and collectively in resolving the various issues, as in case A. The impact of the procurement arrangement on the configuration of the project stakeholders and the implications for their management are also discussed.

INTERFACE ARRANGEMENT

The contractor proposed sometime after the commencement of the project to change the nature of the original arrangement regarding the use of the deck of an adjoining bridge project (under construction), as a platform to station a launching girder in order to manoeuvre and launch viaduct segments. The proposed change was to position the launching girder beyond the point originally proposed in their Technical Proposal at tender and which was subsequently built into the contract as an interface arrangement. From the contractor's perspective however, the change was necessary to make the launching operation simpler and safer. Yet, given the significant shift from the original plan, the new proposal had various implications for progress and risks. In particular, late resolution of the issue could jeopardize the achievement of the project Key Dates. To resolve this issue however the input and buy-in

of a host of stakeholders was required. The stakeholders in this incident comprised the following, both internal and external to the viaduct project organisation;

- The Client (same for both projects)
- Viaduct Contractor (viaduct JV contractor)
- Independent Checking Engineer (ICE)
- Bridge Contractor (bridge JV contractor)
- Engineer's Representative (viaduct project)
- Engineer's Representative (bridge project)
- The Engineer (viaduct project)
- The Engineer (bridge project)
- Project Board of Directors (Viaduct JV Contractor)
- Project Board of Directors (Bridge JV Contractor)

A number of critical and contentious issues regarding the new proposal were apparent;

- The structural stability of the bridge deck to withstand the imposed loads beyond the original point needed to be established
- Cast-in items were required on the pier and bridge deck to facilitate the positioning of the launching girder
- Partial removal of some of the temporary supports to the bridge deck was required to avoid collision with parts of the launching girder
- The works programme could be derailed if the issue was not resolved in a timely manner, jeopardizing the achievement of Key Dates
- Responsibility for the risk and liability for any unforeseen circumstances regarding the proposed operations needed to be established
- Associated cost and time liability needed to be established
-

It was therefore the contractor's responsibility to obtain buy-in of the various stakeholders identified above to resolve all of the above issues of contention. In doing so, the stakeholders were engaged both formally and informally. For example, the issues regarding the structural stability, partial removal of temporary supports and cast-in items, which were within the domain of the Bridge Contractor, were discussed in the first instance at their regular monthly interface meeting. At this meeting the Bridge Contractor agreed in principle to check the feasibility of the issues raised and to give its response.

While the first three issues, which were technical in nature, were easier to resolve with the Bridge Contractor, the last three, which were contractual, were most problematic. In terms of risk and liability regarding damage to the bridge deck works, this was covered under an Owner Controlled Insurance Programme (OCIP) taken by the client to cover all the projects within the 7.6km highway. The contentious issue was however with potential claims from either contractor for extension of time and associated cost due to any unforeseen prolongation arising from the proposed arrangement. It became significantly more contentious when the client requested that the Engineers of both projects get undertakings from their respective contractors not to claim time or costs associated with the proposal if approval was granted. Apparently, a similar arrangement on one of the client's previous projects had resulted in huge prolongation claims from one of the contractors and thus reinforced the 'baggage' parties carry from one project to the other.

To obtain buy-in of all parties regarding the viability of their proposal, the Viaduct Contractor organized and delivered a presentation on the sequences involved in their new proposal regarding the use of the bridge deck. Yet, this did little to persuade the parties to shift their positions. The client maintained his position of no approval without waiver of rights to claim time and associated cost by the contractors. The contractors also maintained that they could not waive that right. While this was generally a contractual matter, it also highlights the cultural disposition of uncertainty avoidance in a Chinese work context and the tendency to work strictly according to the rules (or contract in this case). Not even the double assurance provided by the use of the Independent Checking Engineer to provide an independent assessment of the safety and structural soundness of the proposal could persuade the parties to reach an agreement.

To put an end to the “*ping-pong letters*” that were becoming the main mode of communication regarding this issue, a meeting was then scheduled to specifically deal with the issue. However, as the issue could not be resolved, the contractor was requested to revert to the original sequence of segment erection in the technical proposal at tender or submit alternative proposals for consideration. Out of options and running out of time as well, the contractor agreed to revert to the original proposal and thus prepared and submitted a proposal to the ER accordingly. This proposal included a method statement, risk assessment, detailed interface arrangement and various ICE certificates as required. This was approved by the ER. As this was also the outstanding issue making it impossible to have the revised programme of works approved, the contractor also prepared and submitted the programme in line with the original arrangement.

Evidently, about six months was spent needlessly, only to revert to the original proposal. Ironically, the segment launching operation which was the subject of about 6 months back and forth discussion and “ping-pong letters” actually took less than 3 weeks to complete after reverting to the original plan. It is interesting also that the various stakeholders in this, especially the client, took positions that appeared at variance with the spirit of the non-contractual partnering that was in place on the project and that was continuously reinforced through various workshops. Indeed, an attempt to use the partnering process to resolve this issue was met with silence from all parties, reinforcing the sceptics’ belief that many parties who sign-up to such non-contractual partnering arrangements have little commitment to working in “real” partnership. One of the client’s team members was particularly unequivocal when he put it rather bluntly in an interview that;

“Under the partnering spirit, we organize workshops and.....discussions with facilitator where we can express our opinion, ... but still the roles of the engineer, the employer and the contractor are still clear under the contract.

MISCAST SEGMENTS

67 pre-cast viaduct segments were miscast by the pre-cast subcontractor due to wrong setting-out information provided. This resulted in the incorporation of cross-falls in the wrong direction. The ER subsequently issued a non-conformity notice which required that the segments be scrapped and recast. In view of the significant and unrecoverable delay to the work that this error could cause, there was the urgent need to review the procedures relating to the production of the precast segments in the precast yard in Mainland China, by strengthening supervision. There was therefore an immediate review of the setting out and checking procedures for the production of the precast segments.

The stakeholders in this case included;

- Pre-cast Sub-contractor (in Mainland China)
- Contractor (Viaduct)
- Independent Engineering Consultant
- The Client
- Client’s Maintenance Unit
- Clients Audit Team
- Government Department (in charge of waste disposal site)
- The Engineer
- The Engineer’s Representative (ER)

When the error was detected, some of the wrongly cast segments were already erected. The consequence of the errors in the already erected segments was that the alignment of the finished road surface was unlikely to meet the requirements in the specifications. This therefore required that the approval of the client’s maintenance unit and the transport department be sought for the acceptance of those works. Given the implications of the lost production time had for the progress of the works, the contractor further proposed incorporating as many of the miscast segments as possible into the works since the errors had no implications for the structural capacity of the viaduct. In line with this a full report on the segment errors was prepared and submitted to the ER so that the feasibility of further incorporating as many of the miscast segments (without rectification) into the works could be evaluated. The miscast errors were also picked up by the client’s technical audit team following their prevention of substandard works audit and called for rectification.

While some segments were redeemed and incorporated into the works, about 35 miscast segments became redundant and needed to be discarded. However, the mode of disposal became another issue. The client proposed that the contractor could consider sinking the miscast segments to the seabed to form an artificial reef. The client however left it to the contractor to decide on his preferred method of disposing of the miscast segments and with a promise to assist as required. The contractor eventually decided to have them demolished. To facilitate their gaining consent to demolish the miscast segments at a waste disposal site from the government department in charge, the contractor requested the client to provide them with a support letter. The client agreed and provided them a letter supporting their proposal. The government department in charge however rejected the contractor's proposal to demolish the miscast segments at the waste disposal site and noted that the contractor can have them demolished in China where they are still stored in the precast yard.

It is clear here that, the consequence of the miscast error for all stakeholders was an incentive to work together for a fruitful resolution of the issue. This demonstrates the power of joint-interest or joint-risk in motivating stakeholders to work for the common good of the project. Yet, the inability to agree on how to dispose of the remaining precast segments also shows how lack of alignment of interests forestalls consensus building.

IMPACT OF PROCUREMENT ARRANGEMENT

This project was procured under a traditional design-bid-build approach. As the most common procurement arrangement in Hong Kong, it presupposes that the parties were generally familiar with the procurement route. Yet, it is apparent from the discussion so far that the arms-length mindset associated with this approach contributed to how some of the incidents played out. It is however commendable that the interface arrangements were built into the contract. This approach clearly defined the interdependence between the two projects from the onset as an issue to be managed during the project. However, the interface arrangement appears to have been structured without consideration for the uncertainties that can arise in a project of this size and complexity. This was further exacerbated by the inflexibility of the various parties. Ironically, there was a non-contractual partnering arrangement in place, in which the parties promised to work in partnership. Yet, when it mattered most all the stakeholders held on to their contractual rights.

The structuring of the project organisation also had implications for the number of stakeholders on any issue and thus their management. First, the client organisation was a plural one. On many issues three or more different departments of the client organisation needed to be satisfied, and this became more problematic when they disagreed. The fact that the contractors on the two adjoining projects were joint ventures also had implications for engaging them.

IMPLICATIONS

The incidents have been analysed above to show how stakeholder management on a Hong Kong infrastructure projects manifested itself. The different incidents showed management of relationships among stakeholders internal to the project organisation as well as relationships among stakeholders external to the project. In both cases it was clear that when the stake for all stakeholders on the issue of contention was high there was a tendency to reach an agreement easily. Culture specific dynamics also manifested themselves in the positions different stakeholders took on issues and there was a general tendency for rule following or adherence strictly to the contract. This may be attributable to the fear of blame culture pervasive in public project settings and the conflict avoiding view inherent in the Confucian value system.

Taken together however, this case study demonstrates an element of progress towards public engagement on projects in Hong Kong, an element which was unheard of a decade ago. Yet, the arms-length mindset, perpetuated by decades of use of the traditional procurement arrangement is still prevalent. Indeed, when collaborative initiatives such as partnering are bolted onto the traditional procurement system little evidence of real partnership is manifested. Thus, a shift in culture, both in terms of the way stakeholders are engaged and projects are procured appears a viable option for project delivery in Hong Kong.

LESSONS LEARNED

It is apparent from the case studies above that tradition, custom and practice, politics and culture have a major influence on how stakeholder management is undertaken in the Hong Kong construction industry. Without a strong tradition of democracy it is not surprising that the move to draw the public, green groups and other parties into the development process has moved forward slowly; there is no evidence of resistance to change, rather an inertia grounded in the traditional values of society and the structure of government departments and institutions which puts a brake on change. This is not totally surprising: if one studies the position of Hong Kong on Hofstede's dimensions of culture it is obvious that nations such as UK and USA have a value infrastructure which is more open to stakeholder involvement and empowerment (see Fig 2). The Confucian values of harmony and conflict avoidance are often an opposing force to the drive for stakeholder empowerment.

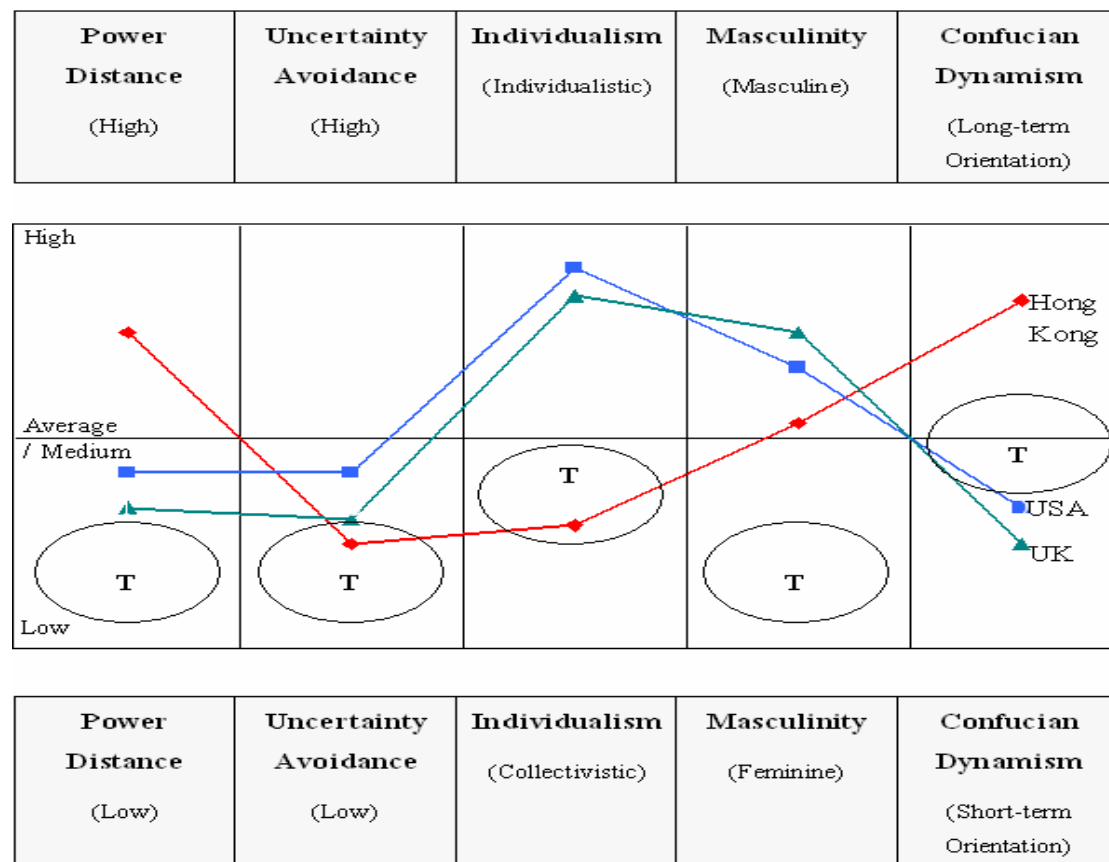


Figure 2: Comparison of Three National Cultures

This having been said, there is evidence from the case studies that a culture change is taking place. A move away from traditional procurement forms is now underway with the Hong Kong Housing Authority leading the way and the Works Bureau departments commencing a range of “experiments” with more open procurement forms. Indeed, the incorporation of partnering type agreements into many projects has contributed to a change in culture and lead to more open attitude to cooperation and collaboration in construction projects (see, for example, Anvuur, 2008). In line with this there needs to be a recognition that performance measures need to be refocused to take into account medium and long term objectives in line with the arguments put forward by Walker *et al.* (2008).

In recent years, employees and stakeholders have become much more aware of the need for firms and government to show a commitment to corporate social responsibility (see Rowlinson in Murray & Dainty, 2008) and this has raised awareness in all sectors. Indeed, major infrastructure and property developers have taken on board stakeholder management

as part of their corporate social responsibility commitment; time will tell whether this is a marketing fad or a genuine culture change in the industry.

CONCLUSIONS

For further progress to be made in stakeholder management the Hong Kong real estate and construction industry needs to address the following issues.

Relationship management is not a panacea; it is not suitable for all kinds of project. However it should be a major consideration in choosing project delivery process and cannot be bolted on to existing project delivery strategies in a piecemeal manner. Resistance to alliance contracting exists through the industry due to “it isn’t the way we do things” and a lack of trust – there is an industry wide issue on change of culture and development of real team. Relationship management is a sustainable approach to the industry in terms of people, environment and economics, help to satisfy client and stakeholder interests. Communication is a key issue; integrated communication technology (ICT) can be a facilitator for these changes.

Relationship management will not succeed unless it is implemented at all levels in the project. Relationship management must be continuously facilitated and maintained; it is NOT a one off process. There are certain projects which do not require relationship management, but it should be considered while choosing project delivery process. The question on whether relationship management should be applied to smaller projects has been a concern. The concept of relationship management should be promoted and certain relationship management components can still be applied in smaller projects such as a half day foundation workshop instead of a one to two days workshop and a shorter list of items for scoring during monthly meetings. Also, one should bear in mind that there are many examples of relationship management leading to successful projects, but it is not necessarily dispute free.

Relationship management is all about people. Individuals need to be educated and trained to provide essential skills for relationship management. Facilitation is essential to break down barriers and to enable blame-free and open communication. Facilitation should be a continuous process. Relationship management and novel PDS lead to new roles which must be recognised and defined – people must be empowered to play these roles. Informal communication is essential for relationship management but needs to be undertaken in an appropriately structure environment with appropriate procedures. Not everyone is suited to relationship management – this is a human resources issue which needs to address when employing and choosing the right team members: should relationship management be part of job specification?

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ENGAGEMENT AMONG RESEARCH POSTGRADUATE STUDENTS MIXING STUDY AND WORK

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ABSTRACT

Postgraduate research students (RPGS) are commonly expected to take up duties assigned by their supervisors and departments which are not directly related to their own research work. This study defines such duties as ‘work’, which may then be in conflict with ‘study’, and investigates the extent of this conflict and engagement among RPGS in Hong Kong (N=611). This study found that the intercorrelations between study-work conflict and the three dimensions of engagement: vigor, dedication and absorption, were all significantly negative. In addition, study-work conflict was found to be a significant predictor, negatively contributed, of the three dimensions of engagement, adding weight to the argument that study-work conflict is likely to be associated with lack of student engagement. The implications, importance and methods for minimising study-work conflict and enhancing student engagement at both individual and institutional levels are discussed. Suggestions for future research investigating the relationship between conflicts and engagement among participants in cross cultural environment within multi-national projects are provided.

Keywords: Engagement, research postgraduate, study-work conflict

INTRODUCTION

There has been widespread recognition that stress related to research postgraduate studies is characterised by overload, uncertainty, role conflict, role ambiguity and responsibility stemming from the learning environment, and that these factors can have negative ramifications on academic and research performance, leading to, among other things, physical and mental disorders, low levels of commitment, motivation, engagement and satisfaction towards studies and life in general (Phillips and Pugh, 2005; Cryer, 2006).

Evidence from surveys on postgraduate students have shown that their high levels of stress stem from issues related to study, finance and social aspects, resulting in; anxiety, doldrums and reduced self-esteem (SPHP, 2001). It is commonly recognised that studying for a research degree is a highly stressful experience (Mcfanwy, 2002). Such studies require the students to develop research skills such as critical disposition, creative thinking, production of innovation quickly; as well as a master data collection, its analysis and presentation of the results. In addition, research postgraduate education is largely a self-learning process, unstructured and often isolated. Thus, it can be very hard to maintain a positive attitude and

stay motivated. Issues related to stress experienced by research postgraduate students (RPGS) have attracted the attention of the higher education community, the Government and the public at large.

The primary role of research postgraduate students is dealing with work directly related to their PhD/MPhil studies. However, RPGS holding postgraduate research studentships are commonly required to perform a secondary role, which involves work assigned by their supervisor(s) and/or department which is not directly related their primary role. This can be regarded as work alongside study. There are benefits of combining research studies and departmental duties, such as becoming familiar with institutional administrative operations. However, there is the potential for work-study conflict.

STUDY-WORK CONFLICT

The conflict between one's student role and other life roles is an important aspect of the relationship between study and non-study life (Lingard, 2007). Much research and theory building has focused on the conflict between work and family. For example, Greenhaus and Beutell (1985, p77) defined work-family conflict as "a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible in some respect." In adult life, work and family are primary life domains and previous researchers have developed and tested various models of the antecedents (eg work hours, number of children etc) and consequences (eg absenteeism, low job satisfaction) of work-family conflict. Markel and Frone (1998) suggest that that in adolescent life work and education are likely to be primary life domains. Empirical evidence indicates that the number of hours spent at work each week is positively associated with a sense of conflict between work and education among adolescents and young adults (Hammer et al 1998; Markel and Frone 1998).

Empirical research demonstrates that inter-role conflict is a stressor which is consistently associated with negative consequences for individuals' well-being, engagement and performance. British research suggests that university students experience difficulty in balancing work and study and experience above average levels of stress as a result (Humphrey et al, 1998) and other studies reveal high levels of stress in university students (Abouserie 1994, Felsten and Wilcox 1992, Cotton et al 2002). Markel and Frone (1998) also report that work-school conflict is inversely related to student's engagement and hence academic performance.

STUDENT ENGAGEMENT

Engagement is defined as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). Rather than a momentary and specific state, engagement refers to a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behavior. *Vigor* is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. *Dedication* is characterized by a sense of significance, enthusiasm, inspiration, pride, and challenge. Instead of involvement we prefer to use the term dedication. Although, involvement – like dedication (see above) – is usually defined in terms of psychological identification with one's work or one's job (Kanungo, 1982; Lawler and Hall, 1970), whereby the latter goes one step beyond, both quantitatively as well as qualitatively. In a qualitative sense, dedication refers to a particularly strong involvement that goes one step further than the usual level of identification. In a qualitative sense, dedication has a wider scope by not only referring to a particular cognitive or belief state but including the affective dimension as well.

The final dimension of engagement, *absorption*, is characterized by being fully concentrated and deeply engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work. Being fully absorbed in one's work comes close to what has been called 'flow', a state of optimal experience that is characterized by focused attention,

clear mind, mind and body unison, effortless concentration, complete control, loss of self-consciousness, distortion of time, and intrinsic enjoyment (Csikszentmihalyi, 1990). However, typically, flow is a more complex concept that includes many aspects and refers to rather particular, short-term 'peak' experiences instead of a more pervasive and persistent state of mind, as is the case with engagement.

RESEARCH OBJECTIVE

The phenomenon of lack of engagement has been widely studied among undergraduate students (Schaufeli et al., 2002; Lingard, 2007; Yip et al., 2005;). Despite the fact that research postgraduate students may be a high-risk group for lack of engagement due to their study and work demands, there has been little research in exploring this particular issue. The objective of the present study is therefore to determine the relationship between study-work conflict and engagement among a sample of research postgraduate students in Hong Kong.

METHOD

A web-based self-administered questionnaire was developed to obtain data from research postgraduate students in Hong Kong. In 2008, the postgraduate student associations or equivalent from all of the universities in Hong Kong funded by University Grant Council distributed e-mail invitations to their RPGS inviting participation in the survey. An web addressed hyper-link was included allowing access to the questionnaire which was designed to be completed and submitted online. The survey was anonymous and the RPGS were invited to complete it on a voluntary basis.

A total of 611 completed questionnaires were returned. Since not all of the postgraduate student associations provided the number of invitations that were sent, the response rate of the survey is not available. Of the 611 respondents, 312 (51%) were male and 299 (49%) were female. 48% were Hong Kong Chinese, 45% were Mainland Chinese and 7% were from other countries. 80% were full time RPGS and 20% were part time. 59% and 41% respectively were candidates for Doctor of Philosophy and Master of Philosophy.

Study-work conflict was measured with reference to the instruments originally tapping work-family conflict and family-work conflict validated by Netemeyer et al. (1996). These two instruments are basically the same, but with the wordings of work and family interchanged, and investigate the conflict between the two domains. Based on this principle, in this study the wordings of family in the instruments were replaced by study so as to measure the conflict between study and work experienced by RPGS. The instrument comprises of 5 items, for example the item: The demands of duties stemming from my supervisor/department interfere with my research studies. Respondents were asked to rate the items on a seven-point Likert scale ranging from 0 (never) to 6 (always).

Engagement was measured using the Utrecht Work Engagement Scale (Schaufeli and Bakker, 2003). This 17-item inventory comprises three sub-scales assessing vigor (At my work, I always persevere, even when things do not go well), absorption (When I am working, I forget everything else around me) and dedication (I find the work that I do full of meaning and purpose). Items were rated on a 7-point scale ranging from 0 (never) to 6 (every day).

RESULTS

Table 1 presents descriptive statistics and correlations between study-work conflict and engagement. Study-work conflict was observed to be highly significantly and negatively correlated with the three dimensions of engagement: vigor ($r = -.477, p < .001$), dedication ($r = -.473, p < .001$) and absorption ($r = -.482, p < .001$). This suggests that study-work conflict may be a strong predictor of reduced levels of engagement.

Next, regression analyses were used to test the ability of study-work conflict to predict engagement. The results of the regression analyses are presented in Table 2. 22.8 per cent of variation in vigor can be explained by the regression model ($R^2 = 0.228$). Study-work conflict was demonstrated to be a significant predictor of vigor ($b = -.477$, $p < .001$). Absorption can be explained by the regression model ($R^2 = 0.224$). Study-work conflict was demonstrated to be a significant predictor of vigor ($b = -.473$, $p < .001$). Dedication can be explained by the regression model ($R^2 = 0.223$). Study-work conflict was demonstrated to be a significant predictor of vigor ($b = -.482$, $p < .001$).

DISCUSSION AND CONCLUSION

Study-work conflict is a phenomenon of serious concern because of the negative impact it can have on the lives of research post-graduate students, both in terms of academic outcomes and in terms of health. Previous research has demonstrated that long working hours can be particularly damaging to students' academic studies because they lead to students having less time available to study, to suffer from exhaustion and to miss lectures because of work demands (Lingard 2007). Previous studies have also suggested that study-work conflict mean that students' paid work makes it difficult for them to engage in independent study or research, a serious issue in the existing models of teaching and learning of today (Lingard 2005). Time constraints due to work obligations have been shown to cause students difficulty in undertaking sufficient readings such as literature review, preparing for lectures and tutorials and using library study resources. In addition, work-study conflict also has a negative impact on students health and well-being, with studies showing that excessive working hours cause higher than average levels of stress, tiredness and depression in students.

The results of this study on the struggle between work and study have indicated that study-work conflict is highly, negatively and significantly correlated with all three of the dimensions of engagement, suggesting that study-work conflict may be a strong predictor of reduced levels of engagement. Low levels of engagement are cause for concern because they usually lead to the antipode of engagement, burnout. Burnout is predicted by long hours, subjective overload (the feeling of having too much to do in the time available) and the requirement to fulfill the demands of conflicting roles (Schaufeli and Enzmann 1998), and RPGS are therefore a high risk group, particularly because research also shows that burnout tends to occur among younger people rather than those over 30 or 40 years of age and among the highly educated (Maslach et al 2001).

Burnout can lead to such mental health problems as psychological distress, anxiety, depression, reduced self-esteem (Maslach et al., 2001), and physical problems like headaches, sleep disturbances and substance abuse (Burke and Greenglass, 1986). Burnout and a sense of emotional exhaustion have been found to be negatively correlated with academic performance (Schaufeli et al 2002) and linked to students' disengagement from university life, therefore directly affecting their productivity and ultimately their academic outcomes as well.

In order to reduce study-work conflict and increase student engagement, institutional, organisational and individual measures should be implemented. For example, institutions should take into account their research postgraduate students' study commitments, and condense work within one or two days a week so that students have the rest of the week to focus on research, and extending library opening and closing hours would also allow students greater flexibility.

To increase students' engagement in their studies as well as in their work, the industry needs to focus on developing a partnership with universities so as to foster a synergy between work and study. Similarly, universities could design strategies to link academic theory with their practical experience at work, so as to encourage students to realize that research and departmental work are complementary rather than conflicting.

Students themselves can attempt to address the problem of work-study conflict through individually-oriented measures such as using coping mechanisms to psychologically adjust themselves to the situation, or perhaps by regularly seeing a counselor who can help them learn how to de-stress. Students who are engaged in work could also develop some sort of special arrangement with their course supervisor so that they can stay on top of their studies without missing work.

Work-study conflict should not only be of great concern to RPGS themselves, but should also be a serious issue for the academia itself. As Lingard (2007) stresses, students are of critical importance to the future of knowledge-based economies. Burnout amongst RPGS is likely to lead to under-achievement, potentially resulting in withdrawal and loss of talent from the academia. The academia is already suffering from a shortage of dedicated researchers, and if RPGS are suffering from lack of engagement and burnout before they finish their studies, they very well may go on to choose alternative career paths once they do their postgraduate degree, causing an even higher shortage of manpower and ultimately threatening the academia long term competitiveness.

FUTURE RESEARCH ON ENGAGEMENT IN MULTI-NATIONAL PROJECTS

The present study suggested that conflicts experienced by research postgraduate students in their learning environment diminish their engagement towards study. This finding can be transferred to a working domain and provides strong grounds to suspect that project participants in multi-national projects are experiencing low levels of work engagement since there has been widespread recognition among scholars that multi-national projects are likely to induce conflicts as job stressors (Jeffery, 2004; Netemeyer, 2004; Hill et al., 2004; Liu et al. 2007; Jamal, 2008). Previous research which demonstrates high levels of burnout among participants in multi-national projects tends to support this hypothesis as engagement is assumed to be the positive antipode of burnout (Maslach and Leiter, 1997).

Future research is therefore suggested to be conducted within projects with diverse multi-national environments, aimed at measuring the levels of conflicts and engagement; and their relationships. Cross cultural differences between participants in projects with a higher than normal multi-national mix are identified to be one of the major challenges in that type of domain (Henrie, 2005). In fact, culture is found to have an influence on reactions to stress (Aryee, 1999). It is therefore interesting to investigate also the role of moderator culture plays in the relationship between conflicts and engagement.

Such work is important to the construction industry as there is an increasing trend towards the use of diverse multi-national groups within projects in this domain worldwide due to the benefits of knowledge sharing for large scale developments (Goerzen, 2005). As low levels of engagement induce a negative impact on the individual well being and productivity (Schaufeli and Bakker, 2004), intervention strategies designed to reduce conflicts arising at work may increase the levels of engagement and hence improve the performance of the cross-cultural working environment.

	Mean	SD	1	2	3	4
Study-work conflict¹	3.45	2.344	-			
Vigor²	1.38	1.856	.477***	-		
Absorption²	1.43	1.939	.473***	.964***	-	
Dedication²	1.41	1.907	.482***	.957***	.940***	-

Table 1. Descriptive statistics and correlations between study-work conflict and engagement.

Notes:

1. Items are scored on a 7-point Likert-type scale: 0 = never, 6 = always.
2. Items are scored on a 7-point Likert-type scale: 1 = strongly disagree, 7 = strongly agree.
3. Person product-moment statistics, pairwise. N = 611.
4. ***p < .001.

Dependent Variable	R²	β	p
Vigor	0.228	-0.477	0.000
Absorption	0.224	-0.473	0.000
Dedication	0.223	-0.482	0.000

Table 2. Predictors of Study-work conflict.

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**Dispute administration and resolution in international
construction projects**

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ABSTRACT

An international construction project could be profitable. When Chinese economics soars in last twenty years, many international contractors are sharing the opportunities of international construction projects in China while others are struggling against tedious disputes in projects. Usually the disputes are widespread in an international construction since the participants are impossible to understand local comprehensive cultures or administration structure well in such limited time. Since Chinese administration structure provides an effective approach to domestic construction dispute resolution, international construction dispute could be resolved by administration structure more effectively rather than international adjudication or arbitration. This paper presents a dispute resolution approach to international projects based on Chinese administration structure, and dispute administration and dispute arbitration is compared and discussed. Also this paper describes an effective dispute resolution mechanics combined with third-party and local authorities. Although dispute administration is not the ultimate or compulsory process in resolving the construction dispute, the administration structure might impact construction project management, and dispute administration is a unique and effective option in Chinese construction market.

Keywords: International construction project, disputes administration, Chinese construction market, construction participants, third-party.

1. INTRODUCTION

International construction projects could be more profitable than domestic ones in the view of a competitive contractor. International construction market volume increases steadily, and more and more contractors involve international construction projects. But international construction market is also full of risks since many international contractors go into bankruptcy. Risks in international construction projects are more critical than those in domestic projects. The research on international construction projects has been increased because the risk management techniques could increase efficiency of international construction projects and add value to project delivery systems (Tang et al., 2007). Participants involved in international construction projects are exposed to high degree of risks because of complex and dynamic nature of construction business (Bing et al., 1999).

When steady development of Chinese economics keeps on astonishing the world, many international contractors are sharing the opportunities of international construction projects in China while others are struggling against tedious disputes in projects. International construction projects in China are increasing and attractive since China became a member of World Trade Organization in 2001. Unfortunately, the disputes are widespread in an international construction since the participants are impossible to understand local comprehensive cultures or administration structure well in such limited time. An international contractor might obey construction drawings, contracts and specifications easily, but any misunderstanding or improper behaviors in the international projects would bring out conflicts and disputes over the implementation of the projects. Since the participants, who come from different countries, grow up in different social and cultural circumstances, they are easy to confront disputes and conflicts.

Conflicts in international construction projects are not easily solved based on international laws because construction management is more regulated by domestic laws rather than international laws. There are fewer international organizations that have set rules or customs for international construction, and those rules customs are not compulsive in project management. Though FIDIC has developed several standard contract forms and arbitration regulations in last 40 years, disputes are popular in international construction projects and the resolution is costly and time-consuming.

In fact, there are abundant of fast and easy approaches to solve those disputes in domestic administration and jurisdiction system. For example, Chinese administration structure provides an effective approach to solve domestic construction disputes, international construction disputes could be resolved by administration structure more effectively rather than international jurisdiction or arbitration.

2. CONFLICTS IN INTERNATIONAL CONSTRUCTION PROJECTS

International construction projects have maintained high levels of quality control while employing premium materials and tools. Project developers have invested heavily in importing expert resource, outsourcing skilled labor and purchasing certified and modern machinery. It is the successful execution of project processes that ultimately influences costs, timelines, business relationships and overall recognition.

International construction disputes primarily involve delays on interdependent construction phases due to mismanaged time, inefficient processes and unclear contract terms that all undermine the business relationship between contractors, consultants and clients. Project managers usually spend as much as 70% to 80% of their time resolving conflict and disputes. Construction professionals need more knowledge and skills to manage and resolve conflict and disputes efficient and effectively, and the project progress and quality of the product will be improved.

There are some leading key complexities faced in the international construction projects:

- (1) Validity of instructions from client or consultants to contractors and engineers;
- (2) Misconceived understanding by clients regarding the deliverables or services promised by contractors. Clients can assume they are entitled to ask for further support or specifications than the contractor has agreed to or can do;
- (3) Weak management skills in the areas of legalities and dispute resolutions that prolong conflicts;
- (4) Cultural diversity that leads in many cases to poor communication and understanding among the different parties to the contract.

Conflict is the nature of construction projects in either matured construction market or dynamic market. With obstacles of knowledge and experiences, international construction parties, who are different in professional orientation, might feel frustrated when conflicts are inevitable in international construction management. It is important for construction managers to avoid dysfunctional conflicts and promote functional views.

Project disputes could be resolved between the two parties: contractors and clients, but usually these disputes or disagreements require either a third party or legal consultant to review facts before arbitration or jurisdiction. The third party or consultant with project participants could try to restore amicable relations and reach at a mutually acceptable decision without causing major delays or setback to the projects.

If the disputes are resolved under a lower level, for example by participants only, or by

third-party, the relations between contractors and clients could maintain friendship and cooperation. If the disputes in an international construction project must be solved through arbitration or jurisdiction, the relation between contractors and clients would no longer be friendly, and they might become more hostile during arbitration or jurisdiction. But the hostile relations actually are not expected by either contractors or clients, because these relations could not help to implement any construction project.

3. CONSTRUCTION PROJECT ADMINISTRATION STRUCTURE

Contractors and clients are two main parties in an international construction projects and the disputes come mostly from these two parties. Besides these two parties, there are several important participants: design firms, supervision engineers, facility manager and others.

International construction projects are managed in a similar lifecycle which divides construction project into separate and successive phases: Concept and decision phase, Design phase, Construction preparation phase, Construction phase, Commission phase, and Operation phase (shown in Figure 1).

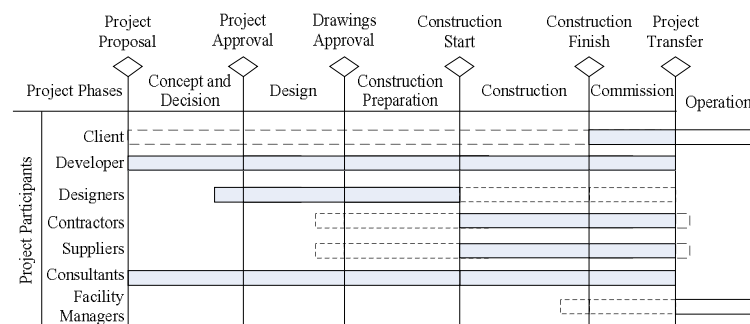


Figure 1 Participants and lifecycle in an international construction project

According to Chinese construction laws and regulations, the clients should hire a supervising engineer company as his deputy, who monitors and controls construction quality in the construction site. Sometimes clients transfer more responsibilities of construction site management including schedule management and cost control to the supervising engineer, but clients would like transfer the responsibility of cost control to a cost engineer rather than a supervising engineer since construction cost engineers are gradually accredited by formal institutions. A supervising engineer is obligatory in most international construction projects, but a cost engineer is not.

The roles and responsibilities of participants in international construction projects are classified as:

(1) Clients (Company). The client is a project's sponsor or developer, which is responsible for buying the project from construction contractors.

(2) General Contractor (civil engineering) (Company). A general contractor of civil engineering usually undertakes the whole civil engineering management services from the owner and he may transfer parts of those services to sub-contractors with the permission of the owner and the supervising engineer. A general contractor of civil engineering is only a management company whose members are managers rather than labors.

(3) General Contractor (Installation) (Company). A general contractor of installation is usually responsible for all installation duty in a building such as electric, plumbing, HVAC, elevator, fire control, telephone, cable and so on. He is also a management company which need buy equipments and labors from others.

(4) Sub-Contractor (Company). There are many different kinds of sub-contractors in a construction project. In China there are 66 kinds of special and particular construction companies which can receive contracts from owner directly or from general contractors. But a sub-contractor has to fulfill his duty by himself or with helps from construction labor companies. It is illegal for a sub-contractor to transfer any parts of his construction duty to any other contractors.

(5) Supplier (Company). There are many suppliers in a construction project and they provide construction materials, temporal tools, equipments, and others. Suppliers are the key factor in construction schedules and cost and performance. Sometimes owner would buy construction materials or equipments directly from suppliers, and sometimes contractor do it.

(6) Construction Labor (Company). Construction labors should be selected by contractors from construction labor companies, and there is usually a labor leader in labor teams to negotiate and bargain with construction contractors. Construction labors do not establish a direct contract relationship with the owner or other participants but with general/sub contractors. Chinese construction labors and their leaders are usually lack of formal educations and come from countryside.

(7) Design Firm (Company). A common design firm is usually large and the architects, civil engineers and other engineers are included in the same design firm.

(8) Supervising Engineer (Company). Supervising engineer in China is similar to the Engineer in FIDIC contract conditions, and he is very important in monitoring construction processes in site.

(9) Cost Engineer (Company). Cost engineer calculates quantities of the project and checks any construction bills which contractors submit. Though there may be an independent cost engineer company as a consultant of the owner, there are a lot of similar roles in other teams.

(10) Local authorities. All construction activities from preliminary design through completion check should be under monitoring of government departments. And also construction companies and individuals should apply for permissions or licenses from local authorities.

Traditional construction management structure is widely accepted in international construction projects in China, and this management structure reveals popular relationship among all construction participants. There is a typical construction organization (shown in Figure 2.) in international construction projects, where local authorities would monitor and regulate the construction management and help to solve disputes in the international projects in China.

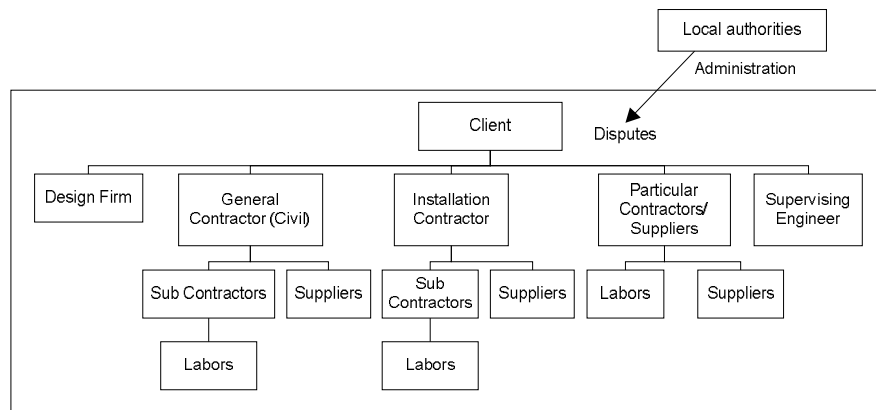


Figure 2. Organization structure and disputes administration in a typical construction project

4. MECHANICS OF DISPUTES RESOLUTION IN INTERNATIONAL CONSTRUCTION PROJECTS

A third-party is introduced to the traditional construction management structure in the international construction market. The third-party is the supervising engineer while the consultant engineer is the third-party in FIDIC construction condition, or the architect/engineer/ construction manager is one of the third-parties in AIA construction condition. The third-party could reduce disputes between clients and contractors by his professional knowledge. The third-party could negotiate with clients and contractors well as an independent participant, and the disputes might be solved under an amicable condition which will benefit both clients and contractors.

Chinese government system provides another efficient solution approach to international project disputes among construction participants. All construction participants and activities should be regulated by local authorities. In detail, Chinese government has set up many regulations and ordinances to monitor life-cycle of international construction project, and supervise the behaviors of each construction participant. Though local authorities regulate construction activities for secure construction safety and quality, these regulations from local authorities could maintain a fair and reasonable relationship among construction participants, and then local authorities could indirectly coordinate the disputes in international construction projects.

This mechanics of disputes resolution by third-party and local authorities is shown in figure 3.

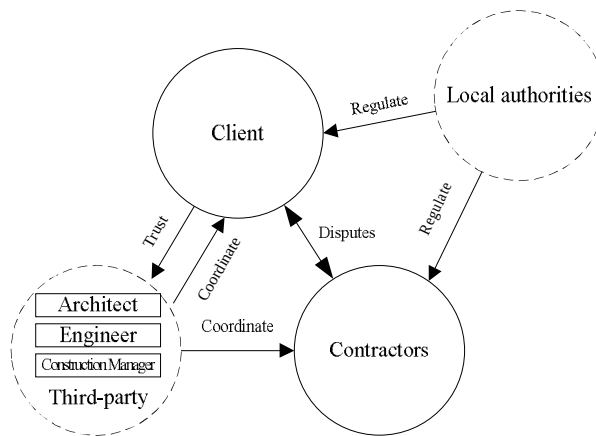


Figure 3. Mechanics of disputes resolution by a third-party or local authorities

The primary aim of third-party or local authorities in dispute resolution involves offering alternative dispute resolutions and explaining the applicability and feasibility of these alternatives to both clients and contractors in order to create a comprehensive understanding and satisfying solution for both parties.

If a dispute occurs in a construction project, construction participants should negotiate it in a friendly manner and solve it from lower levels inside construction project teams. Dispute resolution from lower levels could circumscribe project disputes and conflicts around amiable cooperative conditions for construction participants. The dispute resolution process is suggested for international construction projects in Figure 4.

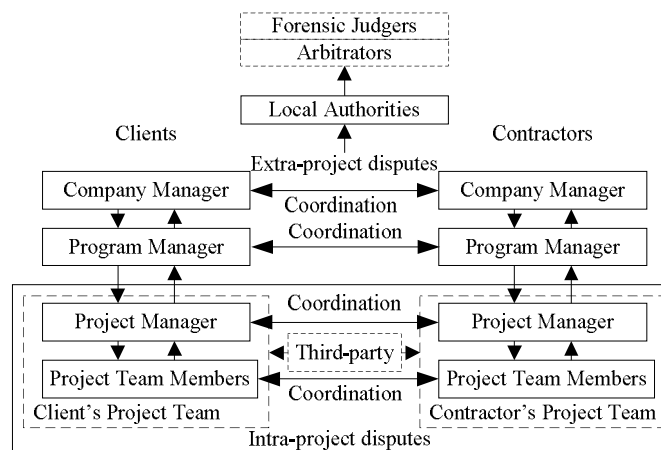


Figure 4. Dispute resolution process for international construction projects

Sometimes experts of construction laws are better equipped to understand the intricacies involved with international and local construction management. The disputes could be inside the project, and construction project team members or project managers could coordinate and negotiate directly and then solve the disputes, or the disputes could be resolved through third-party.

If intra-project dispute could not be solved in time, the dispute would become a extra-project conflict which need negotiation between client's company and contractors' company or regulation by local authorities, arbitrators, or judges.

5. CONCLUSION

International construction projects are not independent from domestic construction market. Disputes in international construction projects are popular, and could be resolved effectively through project internal structure and external third-party.

This paper presents a dispute resolution approach to international projects based on Chinese current administration structure. Since local authorities regulate and monitor all construction participants, which provides an efficient approach to coordinate international project participants.

Also this paper describes an effective dispute resolution mechanics. The disputes in international construction projects could be solved by third-party in an amicable relationships, or then coordination of local authorities. Though local authorities are not necessary in a free construction market, authorities are important in regulating or monitoring construction activities. By coordination or explanation of local authorities, construction disputes or misunderstanding could be reduced.

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Identification and control of payment risks in international construction projects

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ABSTRACT

Payment is the most important issue in international construction projects, and payment risks are popular for the client and contractors. Sometimes the payment is client's cost while the payment is contractors' income, so the client and contractors might view payment risks in different ways. Construction participants should be active in managing payment risks. If the payment risks were not identified and controlled during construction, construction participants would lose their profits or even go bankruptcy. The payment risks from the client, contractors, or other parties, are identified systematically in this paper. In order to reduce and control payment risks, the payment process is discussed and payment securing tools, such as guarantee, bond, and surety, are suggested for international construction projects. Since the arbitration is the last resort to solve payment conflicts in international construction projects, several popular arbitration rules are compared and recommend for securing payment of international construction projects.

Keywords: Identification of risks, control of risks, payment risks, international construction project.

1. INTRODUCTION

Payment, which is the value that the contractors have fulfilled and that client pays to contractors according to contracts, is the most important issue in international construction projects. The payment is client's cost while the payment is contractors' income. Since the payment process in a construction project is dynamic and complicated, there are abundant of payment risks for the client and contractors.

The client and contractors are usually opposite in payment risks. Lower risk is for the client, higher risk is for the contractors. Both the client and the contractor try to reduce payment risks and secure payment. What the client needs is the right delivery of project product from contractors, and the client makes the payment to the contractors after the client receives the project. What the contractor needs is the payment from the client if he begins to implement the contracts. Since the client and the contractors are difficult to build trustful relationships in an international construction project, they are suspicious of each other during implementation of construction.

Payment risks are popular in whole phases of construction project, and cultural heritages from different international construction participants worsen payment management. Construction participants should be active in payment risks. If the payment risks can not be identified and controlled during construction, construction participants would lose their profits or even go bankruptcy.

Nigel J. Smith (2006) introduces how to manage risks in construction projects and discusses basic payment management tools. Andreas Wibowo (2005) analyzes financial risks of project finance in Indonesian toll roads. Francis K. Adams (2008) describes risk perception and Bayesian analysis of international construction contract risks, and discusses a case of payment delays in a developing economy. But payment risks of international construction projects are seldom identified and analyzed systematically in previous researches and references.

Based on identification of payment risks in international construction projects, a systematic payment risk management process is suggested in this paper.

2. IDENTIFICATION OF PAYMENT RISKS IN INTERNATIONAL CONSTRUCTION PROJECTS

2.1 Payment risk awareness

Construction project conflicts are usually directly or indirectly caused by payment and financial problems. Since the client and the contractor can not establish trustful relationships in dynamic

international construction projects, payment risks might not be eliminated in projects but could be identified. Though the payment structure is complicated in an international construction project where construction participants include the client, general contractor, subcontractors, design firm, suppliers, and consultants, eventually all payment comes from the client. The payment structure should conform to construction project management approach.

The popular construction project approach is the traditional Design-Bid-Build approach where a general contractor is responsible for construction of the whole project and many subcontractors and special contractors work for and get payment from the general contractor. A typical payment structure is shown in Figure 1, and potential payment risks can happen between any two parties.

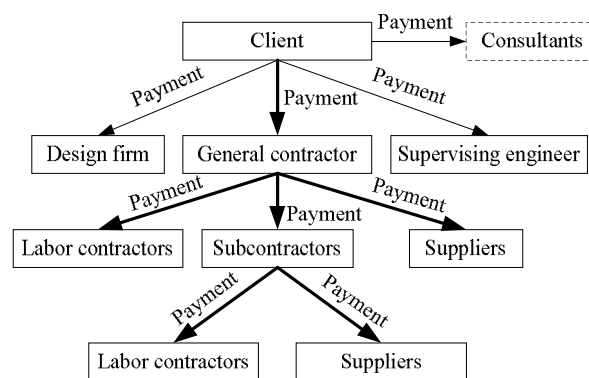


Figure 1. The payment structure in an international construction project

2.2 Origin of construction payment risks

The payment is usually a hierarchy structure in an international construction project, where most of payment from the client should be given to the general contractor, the general contractor would pay subcontractors and suppliers based on their assignment, and subcontractors might pay suppliers and labors. If the client defers or declines or refuses payment in this kind of payment structure, all contractors or suppliers have to confront with financial problems which would result in low construction productivity, retarding construction delivery, or inferior construction quality. Origin of construction payment risks is shown in Figure 2.

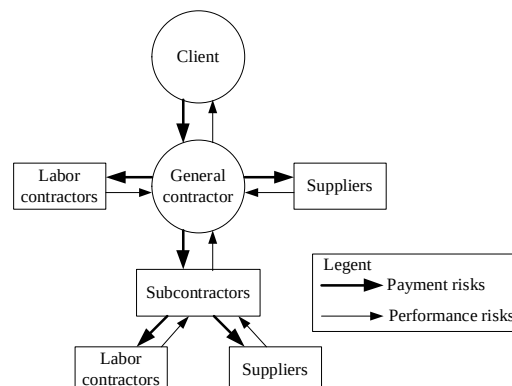


Figure 2. Origin of construction payment risks

Construction payment risks are sometimes entangled with performance risks when the client regards payment as the last resort in the contractors' poor performance. The origin of construction risks is the client's insolvency or the contractors' unacceptable performance.

3. THE CLIENT'S INSOLVENCY

The client's insolvency is one of original payment risks for contractors. When contractors have implemented the construction contract, the client should pay them according to contract conditions. Unpaid contractors have a right to place a lien on the properties on which the project was built. The properties include construction materials, machines, equipments, and construction products. The lien right gives the contractor a security interest in the international construction project. The lien right is one way for a contractor to manage the risk of client insolvency or failure of payment. But local laws in some countries do not provide the contractor with the lien rights.

Besides the lien right, contractors can also suspend or stop construction of the project. Contractors may file a claim or lawsuit for what they have completed. A standard contract, for example FIDIC Conditions of Contract for Construction, at least lists suitable rights for the contractor in case of the client's insolvency.

Only if the client is wealthy, the contractors may file a lawsuit in order to get paid. But this option of a lawsuit is not very helpful in a country where the chance of winning the lawsuit is non-existent.

Another way to manage against the risk of client insolvency or non-payment is to only work for those rich clients. A wealthy client is financial solvent and can pay contractors. But contracting with a wealthy client is not a guarantee of payment in an international construction project because the wealthy client might not trust in contractors or have unrevealed financial problems.

4. CONTROL OF SECURE PAYMENT

There are three principles to control and secure payment in construction projects. One is the advance payment, another is the third party guarantees, and the last is the legal remedies. The control framework of secure payment and performance is shown in Figure 3. The security of payment may include advance payment or down payment, payment bond, third-party guarantee, and other securities. The security of performance involves guarantee of performance, construction guarantee. Securities of payment and performance vary in different countries, and some securities of payment may not be available in certain countries.

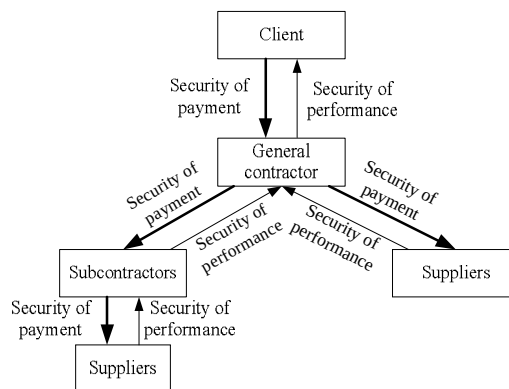


Figure 3. The control framework of secure payment and performance

4.1 Advance Payment

If the client will not provide any payment guarantees or security, the contractor or subcontractor can ask for advance payment or down payment from the client or the general contractor. The advance payment will reduce the risk of client's insolvency and secure payment.

The client could provide the advance payment or down payment of 10 to 30 percent of the contract sum, and the contractor provide a counterpart bond of the advance payment to the client. Both the client and the contractor could benefit from this payment and bond.

The advance payment provides a hedge against the client insolvency. The advance payment will be reduced proportionally as construction progress payment is processed. The sum of the advance payment will be deducted from construction progress payment before the end of the project. During construction progress, there still is some paid but unearned money in the contractor's possession so that the contractor can use it to cover non-payment in case of the client's insolvency.

4.2 Third party guarantee

The third party guarantee is provided by a third party such as banks, insurance companies, securities, or bond companies. The third party guarantee has many forms, including letters of credit, bonds, and bank guarantee.

Payment guarantee, which is often sought by international contractors, is becoming popular in international construction projects. FIDIC suggests a Form of Payment Guarantee By Employer as an annex in its standard construction contracts.

But the clients are often reluctant to provide third party guarantees. The guarantees usually are expensive and provide no value as far as the client is concerned. Though international contractors concern the clients' insolvency very much, the local contractors are not as concerned about the clients' insolvency.

If the client does not provide a third party guarantee, then the contractor will attempt to secure a legal remedy in case the client breaches the contract or becomes insolvent.

4.3 Legal remedies

Legal remedies are purely a matter of contract issue. Clauses of dispute resolution are the most important base that every contractor should review and consider in connection with international construction contracts.

An international contractor should never agree to have disputes resolved under local laws and in local courts. The local court systems in a developing or undeveloped country may be undeveloped, corrupt or biased against international project participants. In an international construction project, an arbitration award is usually much more enforceable than a court judgment. The legal remedies of payment risks in international projects are often thorough arbitration rather than court system. For example, the winning party by local court's judgment will obtain the judgment in one country, and then the winning party will attempt to enforce locally or in another country. But the ability to enforce a judgment in another country depends on whether there is a treaty between the two countries. Otherwise this judgment can not be enforced in another country and the judgment is invalid at last.

The key issues are to select arbitration rules, the venue of the arbitration and the applicable law before assignment of the international construction contract. If no arbitration clause is included in the contract, then the parties have, by default, agreed to resolve their disputes through litigation in the country where the project is located.

The most popular arbitration rules for international construction projects are International Chamber of Commerce (ICC), United Nations Commission on International Trade Law (UNCITRAL), and other country-specific arbitration rules.

The location of the arbitration does not have to be the country where the international project is located or even the country of the client or contractor. In fact, a neutral site is to be preferred, as it will tend to avoid prejudice in favor or against either party, and the neutral locale will tend to promote settlement.

The law of the country where the arbitration is taking place frequently applies to procedural matters. The law designated by the parties in the contract generally governs the substantive matters. In certain countries, the European laws frequently are designated as the applicable laws of the contract. The clients likely will be most concerned with the law. The international contractors should consider being flexible about which law to use.

4.4 Political Mechanisms

Politics is hardly separated from economic problems, and then political resort might be an efficient option to solve payment risks in some countries. Many developing countries are trying to favor international construction projects in order to attract international investors and to foster fair and open market. The developing countries provide political guarantee for public projects where international contractors do not face non-payment risks because of the client's insolvency. If the government does not pay its bills, it will cause tremendous negative consequence for the development of local economy and society.

Along Chinese development in last twenty years, international investors, who have been favored in taxes and guarantee from government, have promoted local economics. Construction participants in Chinese international projects have faced less payment risks than other projects. In case of any payment risks in an international project, local government would encourage construction parties to negotiate and solve the problem. Local government can handle out complicated payment risks through political mechanisms. The political pressure could help international contractors to get paid, even though the arbitration or litigation proceedings would not have been effective in securing payment.

5. CONCLUSION

Payment is the most important issue in international construction projects. The payment process in a construction project is dynamic and complicated, there are abundant of payment risks for the client and contractors. The client and contractors might view payment risks in different ways. Construction participants should be active in managing payment risks. The payment structure is introduced and potential payment risks from the client, contractors, or other parties, are identified systematically in this paper.

In order to reduce and control payment risks, the payment process is discussed and payment securing tools, such as guarantee, bond, and surety, are suggested for international construction projects. Since the arbitration is the last resort to solve payment conflicts in international construction projects, several popular arbitration rules are compared and recommend for securing payment of international construction projects.

In developing countries, political mechanisms are also resorts to solve payment risks in international projects. Political mechanisms are sometime much more effective than arbitration or litigation proceedings.

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INTERNATIONAL CONFERENCE ON MULTI-NATIONAL CONSTRUCTION PROJECTS
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An Investigation of the State of Trust among Construction Project Participants in South Wales

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ABSTRACT

This paper investigated the status of trust among major construction project participants in South Wales by identifying the key factors and processes that influence trust and distrust through the procurement, governance, personal and institutional behaviours of construction projects. The research highlights that trust is built upon personal interactions, the main criteria to build trust between organisations on a construction project is the competence of the parties, their economic record and strong communication lines, whereas, the form of procurement and the contract used, is the least important factor that influenced trust. However, all the parties agreed that trust can be influenced if an inappropriate choice of procurement and contract is used. The industry acknowledgement of the lack of trust, but the admittance to the positive distrust within construction projects.

Keywords: Distrust, Project Participants, South Wales, Trust.

1. INTRODUCTION

Trust is seen as the coordinating mechanism which binds relationship together, provides necessary flexibility, lowers transaction costs and reduces the complexity of relationships. Distrust not only increases transaction and collaboration costs, but also leads to the failure of the collaboration. Overall, trust is a key determining factor to commercial relationships wherever risk, uncertainty, or interdependence exist (McKnight and Chervany, 2001).

Trust is emphasized as a central mechanism of the collaboration among construction project partners. This is especially important as the industry is moving from the traditional approach to partnership and partnering where trust works as a corner stone. This research intends to critically analyse the theory behind trust and distrust and to gain an insight and understanding into the reasons that influences industry professionals to trust and distrust other firms on a construction project. It focuses on the South Wales construction industry and gauge the external and internal company and personal factors that influence the perceived levels of trust and distrust.

This paper starts by reviewing the major trust and distrust building theories; addresses the research methodologies adopted; then analyses and discusses the outcome of the survey conducted on this research project. Conclusions and recommendations are drawn based on the research outcomes.

2. THEORETICAL FOUNDATIONS OF THE STUDY

Due to the different research perspectives and constructs adopted to conceptualize trust, trust has been defined literally in dozens of ways. Researchers find these definitions either contradictory or confusing, or too elusive to understand, or too hard to define. Inconsistent or incomplete conceptualization leads to problems in the development, operationalization and measurement of trust. In this study, trust is defined as “The expectation that commitments undertaken by another person or organisation will be fulfilled, especially in relationships where the trusting party lacks control over the trusted party but must still depend on it” (Gefen 2002).

2.1 Trust Building Issues

As trust is so broad a concept and is defined in so many different ways, it is necessary to further explore the nature and characteristics of trust, issues for trust building and trust development process, which form the theoretical basis of this study. Blomqvist and Ståhle (2003) summarised that competence, goodwill, behaviour and self-reference are four key components of trust in partnership. Trust is increased by - and decreased by the lack of - evidence of these components in parties' actual behaviour and communication. McKnight and Chervany (1996) provided a typology of interrelated types of trust constructs that helps to distinguish and capture the conceptual meanings of trust and the key trust construct factors. They identified three major trust types: dispositional, institutional, and trusting beliefs.

- Dispositional trust comes primarily from trait psychology, which says that actions are moulded by certain childhood-derived attributes that become more or less stable over time. It means the extent to which one displays a consistent tendency to be willing to depend on others in general across a broad spectrum of situations and persons.
- Institutional trust derives from sociology, which says that behaviours are situationally constructed. In business context, it refers to the legal, regulatory, business, and technical environment perceived to support success. Institution-based trust consists of structural assurance and situational normality.
 - *Structural assurance* means that one believes that protective structures—guarantees, contracts, regulations, promises, legal recourse, processes, or procedures—are in place that are conducive to situational success (Zucker, 1986).
 - *Situational normality* means that trust is the perception that things in a situation are normal, proper, and customary, however, people do not trust others when they face inexplicable, abnormal situations (Garfinkel, 1963).
- Trusting beliefs means that one believes that the other party has one or more characteristics beneficial to oneself. It reflects the idea that interactions between people and cognitive-emotional reactions to such interactions determine behaviour. There are four types of trusting beliefs:
 - *Competence* means that one believes that the other party has the ability or power to do for one what one needs done.
 - *Benevolence* means that one believes that the other party cares about one and is motivated to act in one's interest.
 - *Integrity* means that one believes that the other party makes good-faith agreements, tells the truth, acts ethically, and fulfils promises.
 - *Predictability* means that one believes the other party's actions are consistent enough that one can forecast them in a given situation.

Trust, when referring to inter-firm relationships in construction, is as a multi-dimensional, multi-layered phenomenon consisting of dispositional, institutional and business variables discussed above. Wang et al. (2005) summarised fourteen specific trust attributes that would affect the trust level of construction partners, which include: competence of work; problem-solving ability; frequency and effectiveness of communication; openness and integrity of communication; alignment of effort and rewards; effective and sufficient information flow; sense of unity; respect and appreciation of the system; compatibility; long-term relationships; financial stability; adoption of alternative disputes resolution techniques; reputation; and satisfaction of contract terms and agreement. These factors mainly address the detailed business aspect of trust building between project participants. Apart from these, the issues such as procurement approach and contract adopted are generally regarded crucial for trust building in construction.

According to Ren et al., (2006), trust building involves two major steps: initial trust building and trust building during cooperation process. Dispositional and institutional trust contribute more to the initial trust building whilst trust is upon each other either strengthened or

weakened based on project partners' performance and the change of environment.

2.2 Distrust Building Issues

The common believe that distrust is the opposite of trust is a misconception with distrust being viewed as a more powerful phenomenon. If distrust was the opposite of trust, then the criteria that make up distrust would be different, but according to Keyton (2003) this is not the case. Even though academics argue on the relationship between trust and distrust, the two concepts have a common process; they occur in cycles which are positive and negative respectively (Locke, n.d.). Distrust may be characterized as: a) violations of trust, b) low levels of trust, the absence of trust, c) features that are opposite of trust, or d) orthogonal to trust. The result of distrust within a business relationship is likely to evoke competition that stimulates conflict and for each party to protect their vulnerability (Lewicki, et al, 2003). It is argued that the unresolved conflict between parties generated higher levels of intensity and emotional responses within the relationship, thus causing damage for future dealings (Keyton, 2003).

There are two accepted types of distrust; functional and dysfunctional. The former can have value for organisations (Lewicki, et al, 2003). It protects the self-interest of parties in a business relationship against and promotes self-governance systems (Locke, n.d.) which can help other parties develop their own protection. This, in an adverse affect, can create a low level of trust between parties. The latter, by contract, is the extreme of the trust spectrum and is associated with paranoia.

3. RESEARCH METHODOLOGY

To investigate the development of trust building within construction project partners in South Wales, a series of surveys were conducted from 2006 to 2008 including both questionnaire and interview. The questionnaire includes 15 questions which cover culture, social and legal infrastructures, procurement approach, and specific trust building issues at project operational level. The questions were complemented by interviews undertaken by different research groups.

Sample questionnaires were first issued to gauge how respondents' opinion before issuing it to a wider population. Altogether 242 questionnaires were distributed to 47 construction companies (including Client, Contractor, Sub-contractor and Consultant) based in South Wales with majority is small and medium sized companies. 108 responses were received. Since the majority of "sub-contractor" regarded themselves as "contractor", thus sub-contractor and contractor were merged as one category in the analysis.

4. RESULTS

Both quantitative and qualitative analysis approaches were adopted to analyse the outcome of the survey. Below are some of the essential results.

4.1 Procurement Route

As procurement approach is generally regarded as one of the most important elements of the construction project, 78% respondents believed that the procurement option chosen would have a significant influence on the trust between construction organisations. Figure 1 illustrates the impact of each particular procurement method to trust building on construction projects.

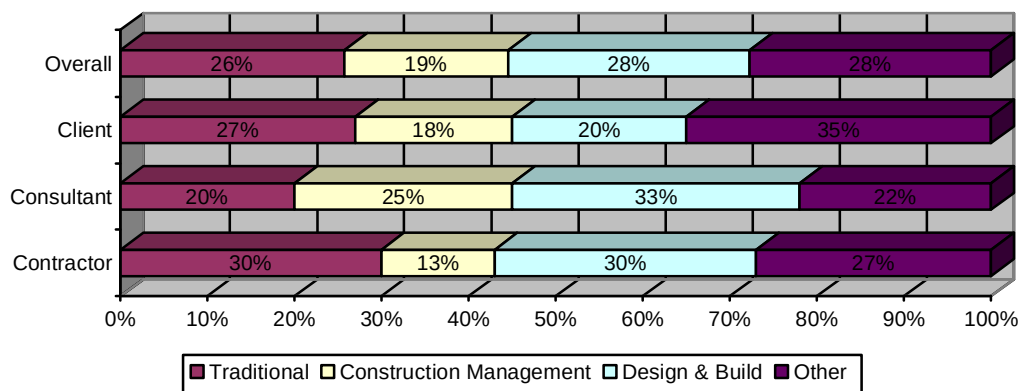


Figure 1: Procurement route

The results show that others (i.e. partnering) (28%) and design and built (28%) are the most trusted route by the parties, followed by the traditional procurement route (26%), with construction management (19%), scoring the lowest. When this question was further explored with interviewees why partnering, design and built and traditional procurement approach were ranked similarly despite the adversarial reputation of traditional approach, they reported that a lack of experience with other procurement approaches was the major reason behind this ranking. Another question reveals that *over 75% of the projects we have been involved with, were procured traditionally* (Interview).

Conversely, the parties were asked to state which procurement route lead to the most distrust in a construction project. The results indicated that the majority of Contractors thought the traditional procurement route brought most of the distrust between project participants (42%). This seems to indicate that the Contractor has distinct experiences in the methods that result from the traditional approach to procuring construction projects in South Wales. The reasons why the Contractor has this experience may be from the relationship between the other parties and the ‘one-off’ project conditions (Interviewee).

4.2 Aligned Goals and Strategies

Despite the different specific objectives of project participants, 89% of recipients agreed that trust could grow if the strategies and goals of organisations in a construction project were properly aligned. This result suggests that a ‘partnering’ or similar collaborative framework

would be beneficial for all parties to enter. This is echoed by the ‘most trusted procurement route’ result profile above with partnership obtains the highest ranking. On the other hand, although the recipients are in full agreement that goals and strategies should be aligned for building trust and even the project as a whole, they are unfamiliar or reluctant to adopt less traditional means of procuring construction projects.

Even though 89% of the overall recipients agreed that goals / strategies should be aligned, interestingly, a proportion of the Client and Contractor disagreed with the norm and only the Consultant in full agreement. As the Client and Contractor have **vested interests in remaining independent because of commercial reasons** (Interviewee) and to understand the Client’s needs (Interviewee) which the Consultant would want, this would explain why some of the Contractors, in particular, would not want to align goals and retain a degree of autonomy in a construction project.

4.3 Contracts

The majority of organisations trusted the standard form of contract (58%) with 15% trusting both the standard and bespoke types and 15% having no trust in either form of contract. This shows that project participants feel more comfortable with the standard form of contract because they are easily understood, simple, standard clauses and fair, whereas the bespoke form may favour one party over another.

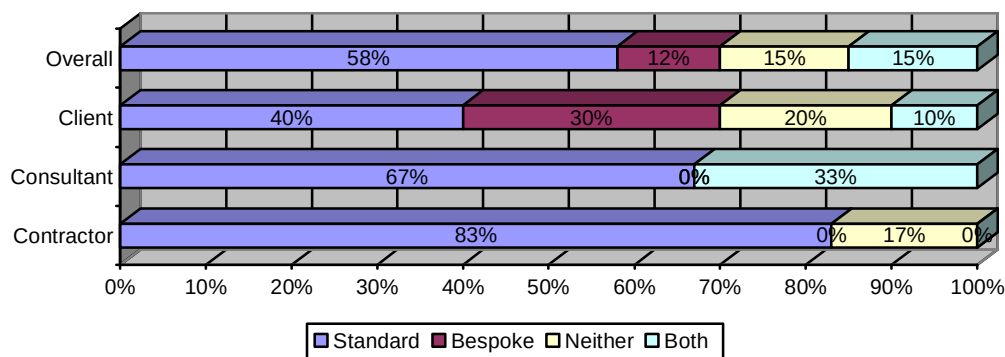


Figure 2: Contract form

The overall results are reflected further through the organisational breakdown, with all parties having the most trust in the standard form. However, the trend shows that project participants have different attitudes and levels of trust towards the standard forms, with the Client (40%), the Consultant (67%) and the Contractor (83%). This indicates that the Contractor has most trust in the standard form than any other party *because we do not have enough expertise to develop a new contract* (Interviewee). The Client is split in which standard form to trust, with bespoke (30%), neither (20%) and both (10%).

Respondents were further asked which types of contract are best to facilitate trust building between project partners. Figure 3 shows that the majority of respondents trust the NEC (52%) compared to JCT (28%), ICE (8%), FIDIC (4%).

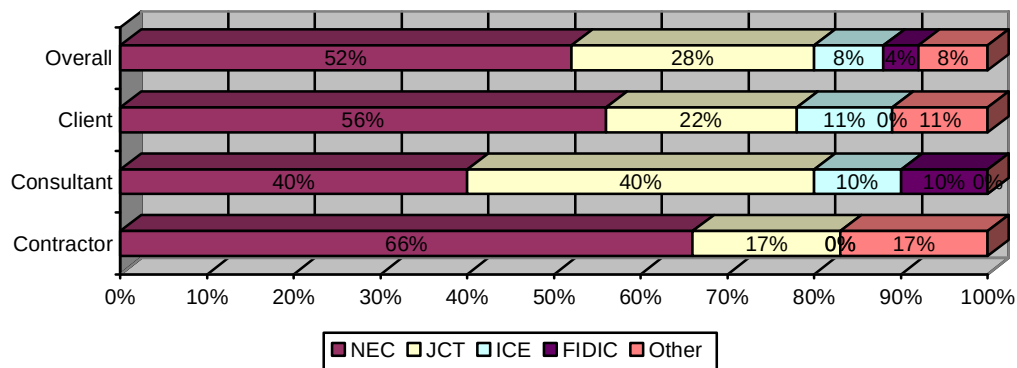


Figure 3: Trusted standard form

The favouring of the NEC is not surprising as the range of this contract suits the degree of risk that each party is willing to take, with the Client (56%), the Contractor (66%) and the Consultant (40%). The results from the Consultant were the most interesting with a split between the NEC and JCT (40% each) family. The reason behind this may be in the type of work Consultants undertake *sometimes we have to advise on the most suitable form for the work, Client and project risks; if that's the NEC or JCT* (Interviewee). The results show that the FIDIC form of contract is the least trusted (4%) and greatest distrusted (19.33%) form of contract.

4.4 Trust Building Factors

Figure 4 shows that competence (23%), consistent performance (22%) and economic prudence (17%) are the most trusting attributes existed between project participants. The results for communication (15%) and reputation (15%) as trustworthy attributes by construction organisations was a surprising result, with a “strong safety record” being highlighted in only 9% of the ‘other’ responses.

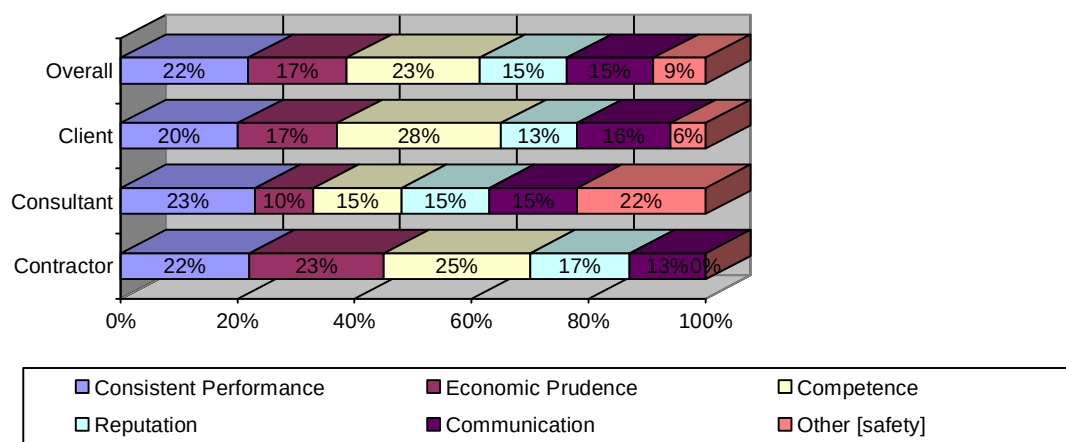


Figure 4: Trustworthy attributes

The Client is divided between ‘consistent performance’ and ‘competence’ as the most valued trustworthy attributes in its construction projects. The Contractor shares the Clients view but also includes ‘economic prudence’ as an attribute worth having. The Consultant is the

organisation that shows more consistency across all attributes listed, with economic prudence being the lowest valued attribute. Even though the Consultant does not favour any one attribute, this may be the result of the position many Consultants find themselves in a project by being the link between Clients and Contractors and trying to see the project as a whole for much of the time.

4.5 Distrust Attributes

Figure 5 shows the profile of the distrust factors with poor or inconsistent performance (24%) and broken promises (22%) being recorded as the most distrusting attributes on a project. This result highlights the fundamental argument that distrust may be the exact and opposite of trust. It is important to state, all these attributes scored highly overall and such, are seen as critical factors to ensure distrust is not established. The most trusting attribute showed that competence was the highest attribute. Distrust, stems from the performance, promises and communication of the parties, similar to the values which the respondents believe builds trust.

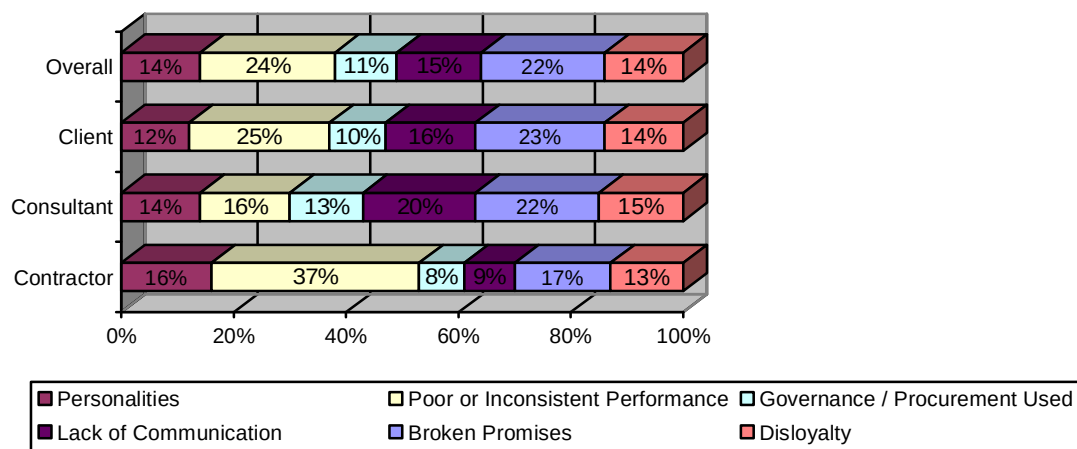


Figure 5: Distrusting attributes

The interesting feature about the distrust result is that the Consultant places more importance on broken promises (22%) and communication (20%) than any other attribute. This echoes the Consultants view in previous profiles, with the role being seen as *impartial and representing the Client* (Interviewee), with the Consultant role relying on the other parties having strong lines of communication undertaking exactly what was agreed.

The procurement route and governance has come out last overall (10.33%) which reaffirms that this is the least important attribute that will affect both trust and distrust for the Client (10%), the Contractor (8%) and Consultant (13%).

Regarding to the arguments whether an element of distrust can be of benefit to an inter-organisational relationship, the recipients are generally split, with 25% agree and 31% disagree. A further analysis indicates that Consultants are relatively neutral to this statement whilst both the Client and Contractor (37%) also agreeing that this is good for a relationship.

The Client and Contractor have good reasons to create distrust in a relationship and to ensure their self-interests are protected. Whereas, the Consultant *is employed to give advice and protect their Clients interests, whether the Client is the Contractor or not* (Interviewee). It was seen that only the Client (67%) agreed that there is little trust between parties with 13% of Contractors and 1/3 of Consultants agreeing to this statement.

4.6 Most Distrusted Organisational Relationship

Shown in Figure 6, the ‘Contractor – Sub Contractor’ relationship has the highest amount of distrust surrounding it from the recipients (28%), with 4% having no distrust in ‘any of the parties’ and the ‘Consultant – Sub Contractor’ relationship.

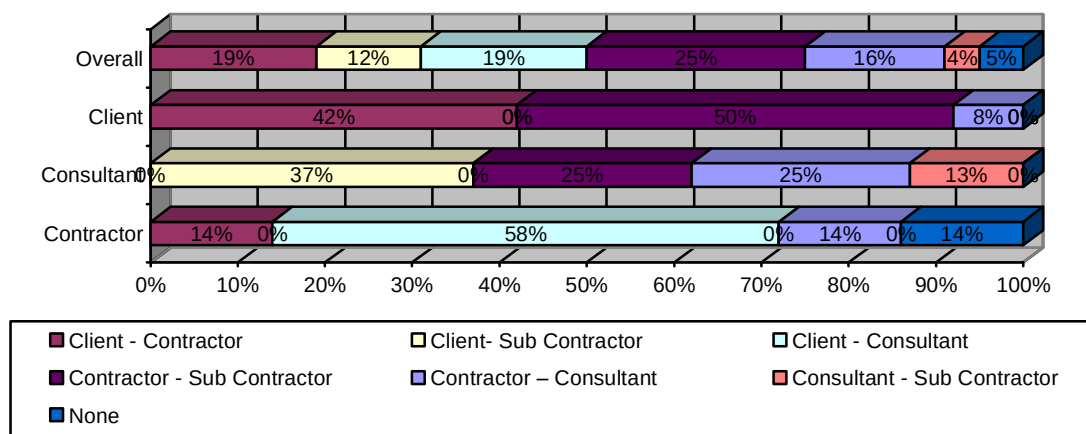


Figure 6: Most distrusted relationship

This question was further extended by asking who the most distrusted party within this game is. In 64% of the responses, the Contractor was judged to be untrustworthy, the Client (50%), Sub Contractor (42%) with the Consultant being judged as the most trusting organisation in the project with around 35% of respondents having little distrust. A reason why other parties have trust in Consultants can be (Interviewee) from the impartiality of the role with other parties.

5 CONCLUSION

This research assessed the theory and practice surrounding trust and distrust in a business relationship within the South Wales Construction Industry, with a focus on the understanding on the factors and processes of trust/distrust building between organisations involved in a project. A mixed approaches have been adopted to collect and analyse the status of trust in South Wales construction industry and the reasons behind.

The impacts of the issues such as the aligned goals, procurement route, the form of Contract and trustworthy attributes have been explored. Even though this research highlighted trust, conversely the author envisaged a more important role in assessing the factors that influenced

distrust. The primary research highlighted that project participants have little trust in the relationship they are not privy to. The Contractor is the most distrusted organisation with the Consultant the most trusted. This research also confirms that trust does change as the construction project proceeds. As trust changes, the factors that influence trust and distrust also change in order to maintain the healthy balance.

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