# A COMPARATIVE STUDY OF PROCUREMENT SYSTEMS IN THE UK AND JAPAN

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## KEYWORDS

Procurement, construction management, client, Japan, UK

## Summary

Procurement system is different from country to country.  The purpose of this paper is therefore to make clear that procurement difference is based on cultural differentiation, in the case of Britain and Japan, which reflects the relationship between procurement system and clients' interest.  As statistical data of both construction industries shows, Japanese clients have focused on cost and time rather than quality which is the common sense to get standard quality to their projects.  On the other hand, British clients are much more interested in quality which is the most important factor to select adequate procurement system for them.  There are four main reasons, social, legal, physical and technological reasons to have these differences.

## 1 Introduction

The present Japanese construction industry has faced the business problem that construction output has deeply declined reflecting the current Japanese business situation. Moreover the Japanese construction market has been requested to open to overseas' contractors and consultants, which the public sector has to introduce open competitive tendering system and receive overseas companies' offers, because of the result to GATT Uruguay Round and US-Japan Construction Talks. That will make not only Japanese government but also private construction companies change their procurement system. In the UK, there has already been new procurement for variety of clients such as Construction Management (CM) and Design & Manage (DM). However, Japanese procurement is limited in Traditional procurement and Design & Build (DB). It is, therefore, important to learn the other countries' procurement in order to facilitate the adaptation of new procurement systems to Japanese construction market. In this paper, the difference of procurement system between the UK and Japan will be

made clear and the cause of the procurement difference shown.

Table 1: British procurement selection procedure (Score is an example)

**Procurement System(1):Traditional procurement**

| | SCORE (1-5) | RATING | Traditional | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Sequential | | Accelerated | |
| | | | Utility | Score | Utility | Score |
| TIME(Early Completion Required) | 4 | 0.148 | 10 | 1.5 | 50 | 7.4 |
| COST(Firm Price) | 5 | 0.185 | 90 | 16.7 | 40 | 7.4 |
| FLEXIBILITY(Variations Necessary) | 3 | 0.111 | 100 | 11.1 | 90 | 10.0 |
| COMPLEXITY(Advanced Technology Necessary) | 2 | 0.074 | 40 | 3.0 | 20 | 1.5 |
| QUALITY(Important) | 4 | 0.148 | 100 | 14.8 | 60 | 8.9 |
| CERTAINTY(On Time) | 3 | 0.111 | 50 | 5.6 | 30 | 3.3 |
| CERTAINTY(Within Budget) | 2 | 0.074 | 30 | 2.2 | 30 | 2.2 |
| RESPONSIBILITY(Single Responsibility) | 1 | 0.037 | 30 | 1.1 | 30 | 1.1 |
| RESPONSIBILITY(Professional Responsibility) | 2 | 0.074 | 100 | 7.4 | 100 | 7.4 |
| RISK(Avoidance) | 1 | 0.037 | 30 | 1.1 | 30 | 1.1 |
| RESULTS (Rank/Score) | 27 | 1.000 | 6 | 64.4 | 9 | 50.4 |

**Procurement System(2):Design & Build**

| | SCORE (1-5) | RATING | Design & Build | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | Direct | | Competitive | | Develop & Construct | |
| | | | Utility | Score | Utility | Score | Utility | Score |
| TIME(Early Completion Required) | 4 | 0.148 | 100 | 14.8 | 90 | 13.3 | 60 | 8.9 |
| COST(Firm Price) | 5 | 0.185 | 100 | 18.5 | 100 | 18.5 | 90 | 16.7 |
| FLEXIBILITY(Variations Necessary) | 3 | 0.111 | 30 | 3.3 | 30 | 3.3 | 40 | 4.4 |
| COMPLEXITY(Advanced Technology Necessary) | 2 | 0.074 | 20 | 1.5 | 10 | 0.7 | 40 | 3.0 |
| QUALITY(Important) | 4 | 0.148 | 40 | 5.9 | 40 | 5.9 | 70 | 10.4 |
| CERTAINTY(On Time) | 3 | 0.111 | 100 | 11.1 | 90 | 10.0 | 70 | 7.8 |
| CERTAINTY(Within Budget) | 2 | 0.074 | 100 | 7.4 | 100 | 7.4 | 50 | 3.7 |
| RESPONSIBILITY(Single Responsibility) | 1 | 0.037 | 100 | 3.7 | 100 | 3.7 | 70 | 2.6 |
| RESPONSIBILITY(Professional Responsibility) | 2 | 0.074 | 10 | 0.7 | 10 | 0.7 | 50 | 3.7 |
| RISK(Avoidance) | 1 | 0.037 | 80 | 3.0 | 100 | 3.7 | 70 | 2.6 |
| RESULTS (Rank/Score) | 27 | 1.000 | 3 | 70.0 | 4 | 67.4 | 7 | 63.7 |

**Procurement System(3):Management**

| | SCORE (1-5) | RATING | Management | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Management Contracting | | Construction Management | |
| | | | Utility | Score | Utility | Score |
| TIME(Early Completion Required) | 4 | 0.148 | 100 | 14.8 | 100 | 14.8 |
| COST(Firm Price) | 5 | 0.185 | 20 | 3.7 | 10 | 1.9 |
| FLEXIBILITY(Variations Necessary) | 3 | 0.111 | 80 | 8.9 | 90 | 10.0 |
| COMPLEXITY(Advanced Technology Necessary) | 2 | 0.074 | 100 | 7.4 | 100 | 7.4 |
| QUALITY(Important) | 4 | 0.148 | 90 | 13.3 | 100 | 14.8 |
| CERTAINTY(On Time) | 3 | 0.111 | 90 | 10.0 | 90 | 10.0 |
| CERTAINTY(Within Budget) | 2 | 0.074 | 70 | 5.2 | 60 | 4.4 |
| RESPONSIBILITY(Single Responsibility) | 1 | 0.037 | 30 | 1.1 | 10 | 0.4 |
| RESPONSIBILITY(Professional Responsibility) | 2 | 0.074 | 70 | 5.2 | 100 | 7.4 |
| RISK(Avoidance) | 1 | 0.037 | 30 | 1.1 | 10 | 0.4 |
| RESULTS (Rank/Score) | 27 | 1.000 | 2 | 70.7 | 1 | 71.5 |

**Procurement System(4):Design & Manage**

| | SCORE (1-5) | RATING | Design & Manage | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Contractor | | Consultant | |
| | | | Utility | Score | Utility | Score |
| TIME(Early Completion Required) | 4 | 0.148 | 90 | 13.3 | 80 | 11.9 |
| COST(Firm Price) | 5 | 0.185 | 30 | 5.6 | 20 | 3.7 |
| FLEXIBILITY(Variations Necessary) | 3 | 0.111 | 60 | 6.7 | 70 | 7.8 |
| COMPLEXITY(Advanced Technology Necessary) | 2 | 0.074 | 70 | 5.2 | 80 | 5.9 |
| QUALITY(Important) | 4 | 0.148 | 50 | 7.4 | 60 | 8.9 |
| CERTAINTY(On Time) | 3 | 0.111 | 100 | 11.1 | 90 | 10.0 |
| CERTAINTY(Within Budget) | 2 | 0.074 | 90 | 6.7 | 90 | 6.7 |
| RESPONSIBILITY(Single Responsibility) | 1 | 0.037 | 90 | 3.3 | 90 | 3.3 |
| RESPONSIBILITY(Professional Responsibility) | 2 | 0.074 | 30 | 2.2 | 30 | 2.2 |
| RISK(Avoidance) | 1 | 0.037 | 100 | 3.7 | 80 | 3.0 |
| RESULTS (Rank/Score) | 27 | 1.000 | 5 | 65.2 | 8 | 63.3 |

## 2 Analysis of Procurement

In the UK, NEDO(1985) suggested the selection procedure of four main procurements, Traditional, Design & Build, Management and Design & Manage. The procurement selection procedure of this paper is based on Bennett's(1990) suggestion. Table 1 shows category of four main procurements and nine minor procurements, which maximum score should be 100 points. The client of construction industry has advantage to select the procurement system by this kinds of preference. If the most concern of client is TIME and COST, the adequate procurement has would be Design & Build procurement as shown figure 1.

According to two dimensional analyses of procurement selection, the connection between clients' interests and procurements concludes as follows;

(TIME, QUALITY) = Construction Management

(TIME, COST) = Design and Build

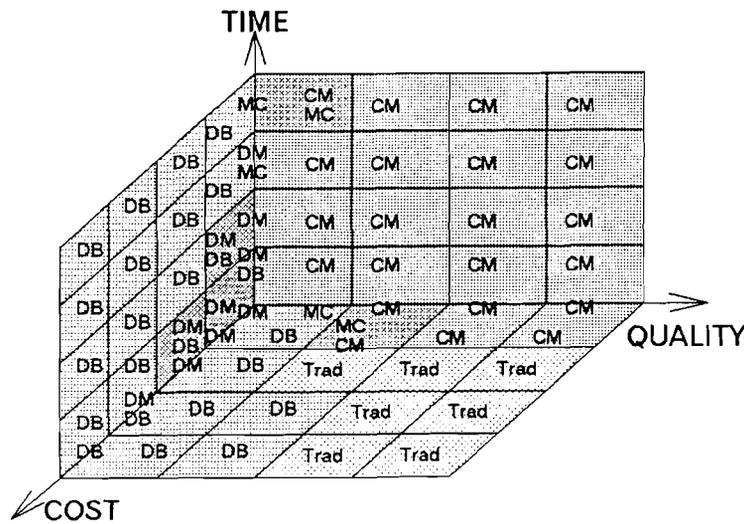(QUALITY, COST) = Traditional procurement



Figure 1: Procurement by two dimensional analysis

The most preferred procurement can be found by selecting the client's interests which are TIME, COST and QUALITY. Figure 2 shows an example of the relationship between the degree of client's interests to TIME, COST, QUALITY, and expected procurement system. This leads that it is important to select Construction Management for the client who is the most concerned with QUALITY. If it is COST, Design & Build (DM) is the better option.
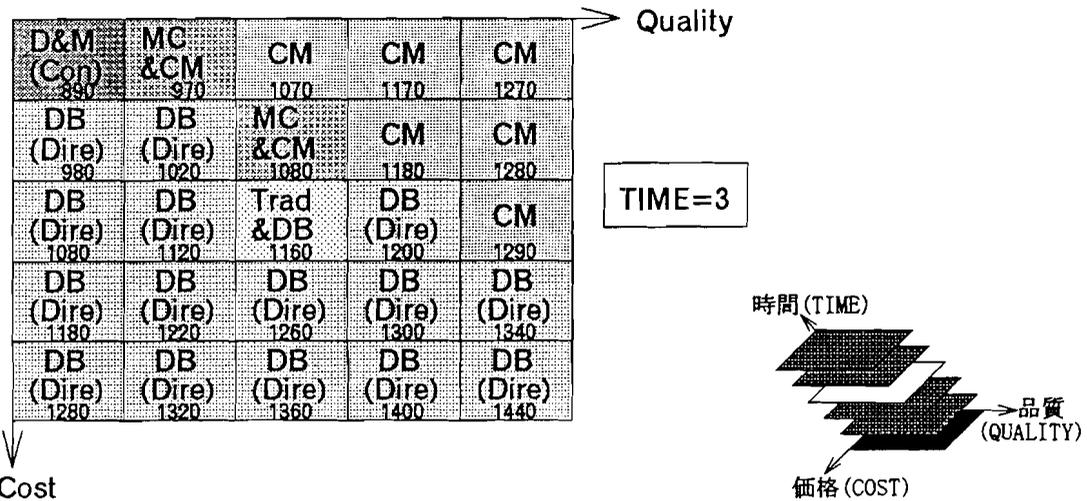
| D&M (Con) 890 | MC &CM 970 | CM 1070 | CM 1170 | CM 1270 |
|---|---|---|---|---|
| DB (Dire) 980 | DB (Dire) 1020 | MC &CM 1080 | CM 1180 | CM 1280 |
| DB (Dire) 1080 | DB (Dire) 1120 | Trad &DB 1160 | DB (Dire) 1200 | CM 1290 |
| DB (Dire) 1180 | DB (Dire) 1220 | DB (Dire) 1260 | DB (Dire) 1300 | DB (Dire) 1340 |
| DB (Dire) 1280 | DB (Dire) 1320 | DB (Dire) 1360 | DB (Dire) 1400 | DB (Dire) 1440 |

Quality

TIME=3

Cost

時間(TIME)

品質(QUALITY)

価格(COST)

Figure 2: Procurement Analysis (3)
(Each score: COST=1~5, QUALITY=1~5, TIME=3(1~5)

## 3 Present procurement system in the UK and Japan

### 3-1 Procurement in the UK

The output of the UK construction industry is from one eighth to one tenth of that of Japan. Furthermore, half of construction output in the UK is occupied by Repair and Maintenance, which has been declining by the study of Bon (1992).

However, The UK construction industry has many more kinds of procurement system, such as CM, MC, DM and so on, than that of Japan. This means that the UK construction industry serves their clients who request the efficiency of construction projects and client's involvement in their projects. The UK construction industry already has a niche market, in which clients are able to choose the most adequate procurement system on their own. This system produces profit to both clients and contractors.

A 1987 analysis of UK procurement by JO Survey (1994) showed that traditional procurement is the highest ranked procurement system, the second ranked procurement was Design & Build and the ratio of management contract is rather small. This survey concludes that traditional procurement was the main procurement method for British clients.

Traditional Procurement--------------73.2%

Design & Build Procurement---------12.2%
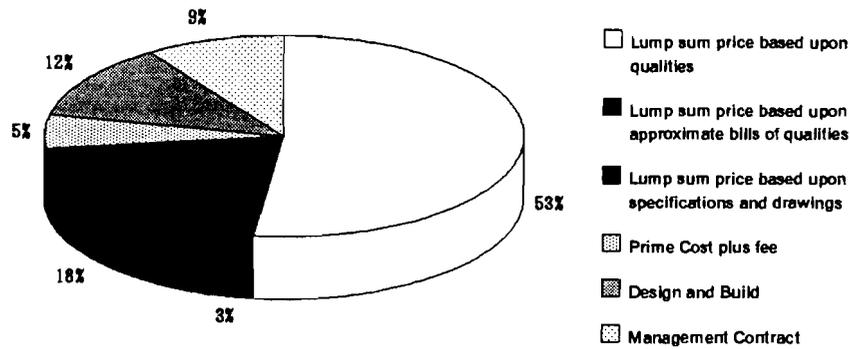
Management Contract---------------- 9.4%

392

Figure 3: British procurement system in 1987

## 3-2 Procurement in Japan

Japanese procurement system has been divided into Traditional procurement (i.e.: construction after complete design), and Design & Build (which is not same as British definition but similar to it that one firm or one joint company makes a design and constructs). Therefore, this paper treats that Japanese Design & Build as being the same as British Design & Build.

Traditionally, Japanese construction industry has developed through government orders that construction company receives. Designs are skillful done and completed by in-house government technical officials. This traditional procurement which divided design and construction completely has been the main procurement system in the Japanese public sector. This is Traditional procurement.

On the other hand, GENE-KON (General Contractor) serves Design & Build to Japanese client as package of design and construction in order to facilitate the extension of market share. This is Design & Build procurement.

As shown table 2, approximately one-half of Japanese procurement was Design & Build. This is much more a major procurement system than in the UK, which was 14.78 per cent in 1991. Accordingly, Japanese construction industry is based on both Traditional procurement and Design & Build procurement. Japanese procurement system in 1991 was estimated as follows;

Traditional Procurement--------------56.2%

Design & Build Procurement---------43.8%

393

Table 2: The ratio of Design & Build to total volume in Big five Japanese construction companies (Source: Nikkei Architecture (1994))

| COMPANY | Design & Build FY 1992 (UNIT: Million Yen) | Total Orders Received FY 1992 (UNIT: Million Yen) | D&B/TOTAL FY 1992 (%) | D&B/TOTAL FY 1991 (%) |
|---|---|---|---|---|
| TAKENAKA | 796,945 | 1,448,692 | 55.0 | 61.0 |
| SHIMIZU | 657,564 | 1,564,761 | 42.0 | 47.4 |
| KAJIMA | 491,778 | 1,283,451 | 38.3 | 42.1 |
| TAISEI | 486,130 | 1,267,886 | 38.3 | 49.3 |
| OBAYASHI | 465,805 | 1,055,746 | 44.1 | 50.5 |
| AVERAGE | | | 43.8 | 50.1 |

## 4 Clients' interests and favored procurement

From the result of construction procurement both in the UK and Japan, British clients tend to favour Traditional procurement more than their Japan counterparts. 73.2 per cent of all projects in 1987 was done by Traditional procurement. However, in Japan Design & Build was half of total construction output. 43.5 per cent of all projects which was received by the big 5 Japanese constructors was Design and Build procurement. As such the big companies hire thousands of designers as in-house architect. Accordingly, Japanese clients have focused on COST and TIME rather than QUALITY which is the common sense to get standard quality to their projects. Therefore, they do not emphasis on quality of construction projects.

On the other hand, British clients are much more interested in QUALITY and COST which is the most important factor to select adequate procurement system for them than that of Japan. It is the fact that architect and GENE-KON (Japanese General Contractor) are fortified to achieve high QUALITY standard. As such, QUALITY is not the important factor to decide procurement. Furthermore, Japanese clients make much more severe demands for TIME, COST and QUALITY performance than UK clients.

A building in the UK has longer life cycle than that of Japan, so that QUALITY is much more important than Japan. Therefore, Traditional procurement has become centre role in the UK.

The causes of these differences of procurement and clients' interests reflect cultural background of each country such as social, legal, physical and technological reasons. Table 3 shows main differences between two countries.

394

Table 3: The causes of procurement difference

| Reason | UK | JAPAN |
|---|---|---|
| Social reason | Independent profession<br><br>Contract society | General contractor within many designers<br>Reliability<br>Homogeneous society (Reliability is important.) |
| Legal reason | Minimum regulation | Severe regulation |
| Physical reason | Long building life expectation (60 - 100 years)<br>Prospected nature | Short building life expectation (25years:tax payment period))<br>Uncontrolled nature (earthquake) - cost up factor |
| Technological reason | Moderate<br>Poor quality | Advanced<br>High quality |

## 5 Future procurement by value tree analysis

Green (1992) suggested that SMART (Simple Multi Attribute Rating Technique) methodology is useful to analyze Value Management (VM). In this section, the author adapts this SMART methodology to Table 1 (British procurement selection procedure), so that the difference of clients' interests between the UK and Japan will be made clear.

At first, the object of construction projects is set as 'Better Building'.

Second, the object, 'Better Building', is divided two categories. One is project oriented industry, the other is client oriented industry. Project oriented industry means that profit from a construction project is much more important for a construction company than long time reliability between client and contractor. Client oriented industry means that it is much more important to expand market share by increasing reliability between client and contractor than profit of a construction project. Japanese clients consider that reliability is the most important thing to avoid disputes and claims, therefore it is estimated that Japan is client oriented country, and the UK is project oriented country.

Figure 4 shows the result of value tree by rearranging the category of table 1 (British procurement selection procedure). As each score has differences by each client's interests, minor category is evaluated by same degree such as TIME, COST, QUALITY, and TECHNIQUE has same degree as 0.25 point each. For example, the

rating of "TIME (Early Completion Required)" in Japan has become that PROJECT(0.1) ✕ TIME(0.25) ✕ Early Completion Required(0.5)=0.0125 point by an estimation of Figure 4. The rating of British clients' interest to "Time (On Time)" is 0.9 ✕ 0.25 ✕ 0.25=0.05625 point. These ratings are the ratings of Table 1 (Selection Procedure). After all ratings are calculated, we can get the results (score) what kinds of procurements are favoured.

Table 4 & 5 shows the tendency in order to select procurement system, referring to clients' interests by using value tree. As the result of the analysis, the more Japanese construction industry has become client oriented industry, the more Design & Manage procurement increases. Therefore, it is necessary to introduce management system at design stage in order to respond Japanese clients' requirements as the corporate strategy for design firm such as Nikken Sekkei, Nihon Sekkei and so on.

On the other hand, in the UK, management procurement system such as Mangement contract and Construction management will become main procurement in near future, if the number of British clients who think the efficiency and profit of a construction project increase.

However, as the preference degree of this value tree is an extreme case, the real clients' interests are located between project and client oriented industry, therefore, many kinds of procurement system, such as Traditional, Design & Build, Mangement and so on, should be necessary in order that construction industry responds to clients' requirements.
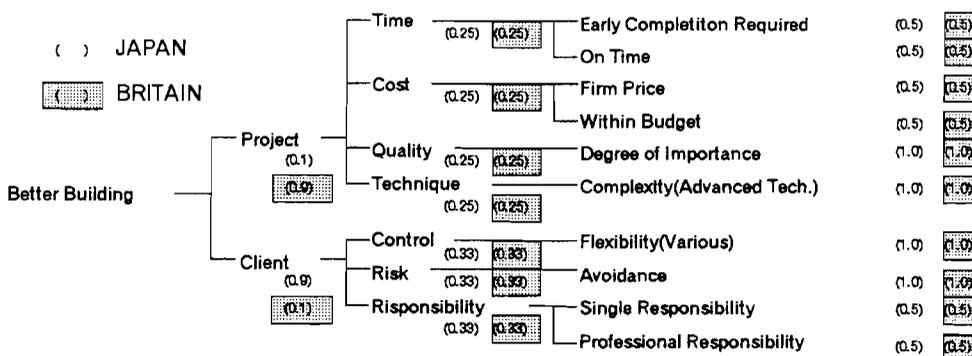


Figure 4: The Comparison of value tree in the UK and Japan
*( ) is the degree of client's preference

396

Table 4: The result of value tree analysis (Japan:(CLIENT))

| RANK | MINOR | MAJOR | |
|------|-------|-------|---|
| 1 | DM(Consultant) | Design & Manage | (71.4) |
| 2 | DM(Contractor) | Traditional | (61.8) |
| 3 | Trad(Sequential) | Design & Build | (58.2) |
| 4 | DB(Competitive) | Management | (55.5) |
| 5 | Trad(Accelerated) | | |
| 6 | DB(Develop&Construct) | | |
| 7 | MC(Management Contract) | | |
| 8 | DB(Direct) | | |
| 9 | CM(Construction Manage) | | |

*( ) is the score out of 100

Table 5: The result of value tree analysis (UK:(PROJECT))

| RANK | MINOR | MAJOR | |
|------|-------|-------|---|
| 1 | MC(Management Contract) | Management | (79.5) |
| 2 | CM(Construction Manage) | Design&Manage | (69.6) |
| 3 | DM(Consultant) | Design&Build | (61.7) |
| 4 | DM(Contractor) | Traditional | (49.6) |
| 5 | DB(Direct) | | |
| 6 | DB(Develop&Construct) | | |
| 7 | DB(Competitive) | | |
| 8 | Trad(Sequential) | | |
| 9 | Trad(Accelerated) | | |

*( ) is the score out of 100

## 6 Conclusion

It is made clear that Japanese construction industry has the possibility to use British procurement selection procedure. Because, Japanese clients' interests, as found by adapting British procurement selection, are explained by the present procurement selection in real construction business. Moreover, Japanese construction industry has the opportunity to expand their market by the adoption of new procurement system which produces niche market and brings to raise the degree of Consumer Satisfaction (CS) of construction clients.

Japanese clients tend to select their construction company by reliability first. Even though it is not cost effectiveness, they choose familiar company for clients. However, the main clients such as developer and real estate agency understand the advantage of Construction Management and other management procurement by pushing the cost reduction requirements especially during this recession. It tends to be that such advanced procurements will increase in near future, which would be the key point to enter the Japanese construction market by foreign management firms more

easily. This trends is similar to British clients, who would like to have higher quality with faster construction and cheaper cost.

Finally, even though there are some cultural differences between the UK and Japan, both will benefit from advantage to have the advanced procurement such as Construction management and Project management. The advanced procurement will increase in both countries and this procurement has the possibility to expand construction market. Moreover, the advanced procurement system will bring the opportunity of business diversification. It is necessary, therefore, to focus on the trend of procurement system in both countries.
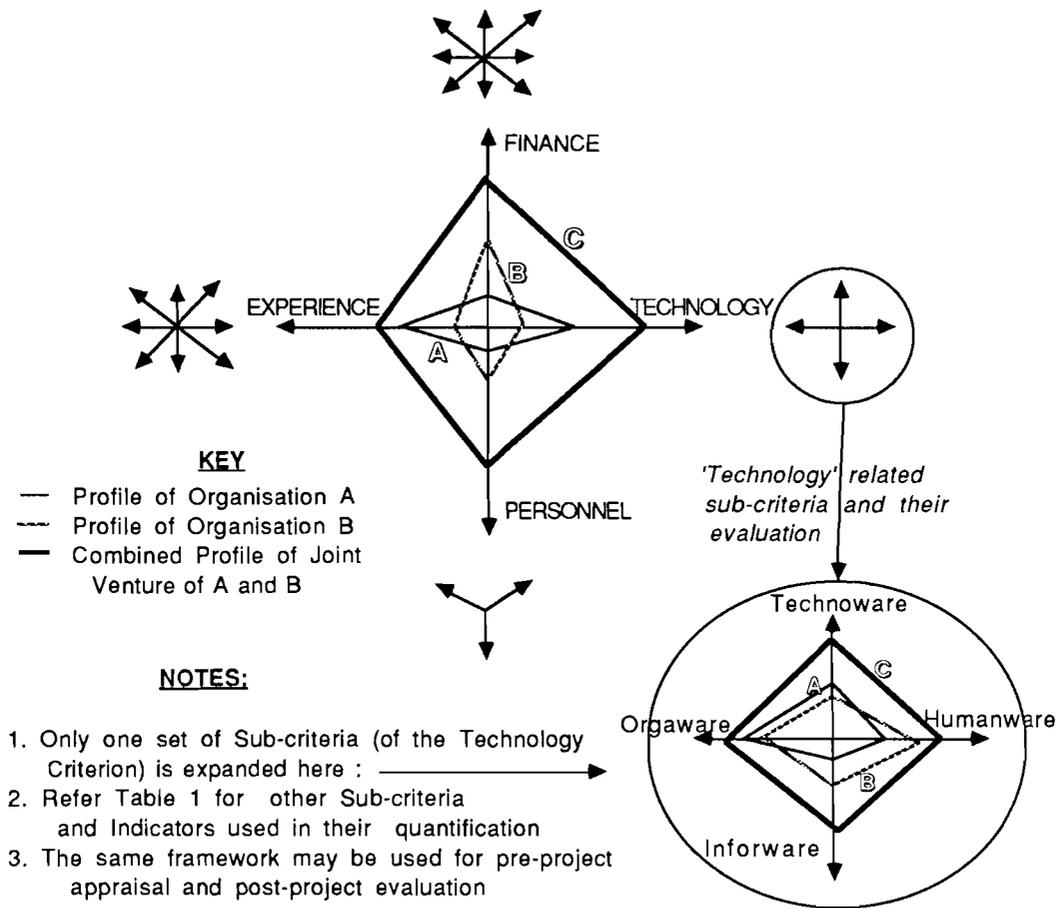
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**Does** A lack (a) needed skill/ re- source in short-term?

**Will** A lack (a) needed skill/ re- source in long-term?

NO

NO

YES

NO

YES

NO

Does B have that skill/ resource?

Will B have that skill/ resource then?

NO

NO

YES

NO

YES

Are their objectives & strategies compatible in the short - term?

Are their goals and policies compatible in the long - term?

NO

YES

YES

Are current systems & structures synergistic / compatible?

Can systems & structures be made sustainably synergistic / compatible?

NO

YES

YES

Will a short-term Joint-venture lead to long-term problems?

YES

NO

MIS - MATCH !!!

(AVOID JOINT- VENTURE)

| SHORT - TERM | LONG - TERM |
| --- | --- |

JOINT - VENTURE
can be considered

## BASIS OF A JOINT-VENTURE APPRAISAL

(By Party A of a prospective partner B)

## Figure 1

**KEY**

— Profile of Organisation A
--- Profile of Organisation B
— Combined Profile of Joint
  Venture of A and B

**NOTES:**

1. Only one set of Sub-criteria (of the Technology
   Criterion) is expanded here : ⟶
2. Refer Table 1 for other Sub-criteria
   and Indicators used in their quantification
3. The same framework may be used for pre-project
   appraisal and post-project evaluation

'Technology' related
sub-criteria and their
evaluation

**ORGANISATIONAL EVALUATIONS BASED ON CHOSEN CRITERIA (Finance, Technology, Personnel, Experience) AND RELATED SUB-CRITERIA**

**Figure   2**

400

**RESEARCH MODEL**

**1 - PROCUREMENT METHODS**

1.1 - Traditional
1.2 - Package Deal/Design & Build
1.3 - B.O.T.
1.4 - Management Contracting

**2 - PROCESS**

2.1 - Communication
2.1.1 - Head Office/Project Management
2.1.2 - Design Group/Execution Group
2.1.3 - Client/Contractor
2.1.4 - Contractor/Subcontractors
2.1.5 - Procurement Group/Site Management Group
2.2 - Integration
2.2.1 - Client/Project Management Group
2.2.2 - Project Management Group/Subcontractors
2.2.3 - Site Management Group/Workers
2.2.4 - Subcontractors/Subcontractors
2.3 - Control
2.3.1 - Design Control
2.3.2 - Quality Control
2.3.3 - Time Schedule Control
2.3.4 - Safety Control

**3 - VARIABLES**

3.1 - Economics
3.2 - Social Factors
3.3 - Environmental Factors
3.4 - Management
3.5 - Size of Project
3.6 - Type of Project
3.7 - Complexity
3.8 - Location

**4 - MEASUREMENT OF PROJECT PERFORMANCE**

4.1 - Quantitative
4.1.1 - Time
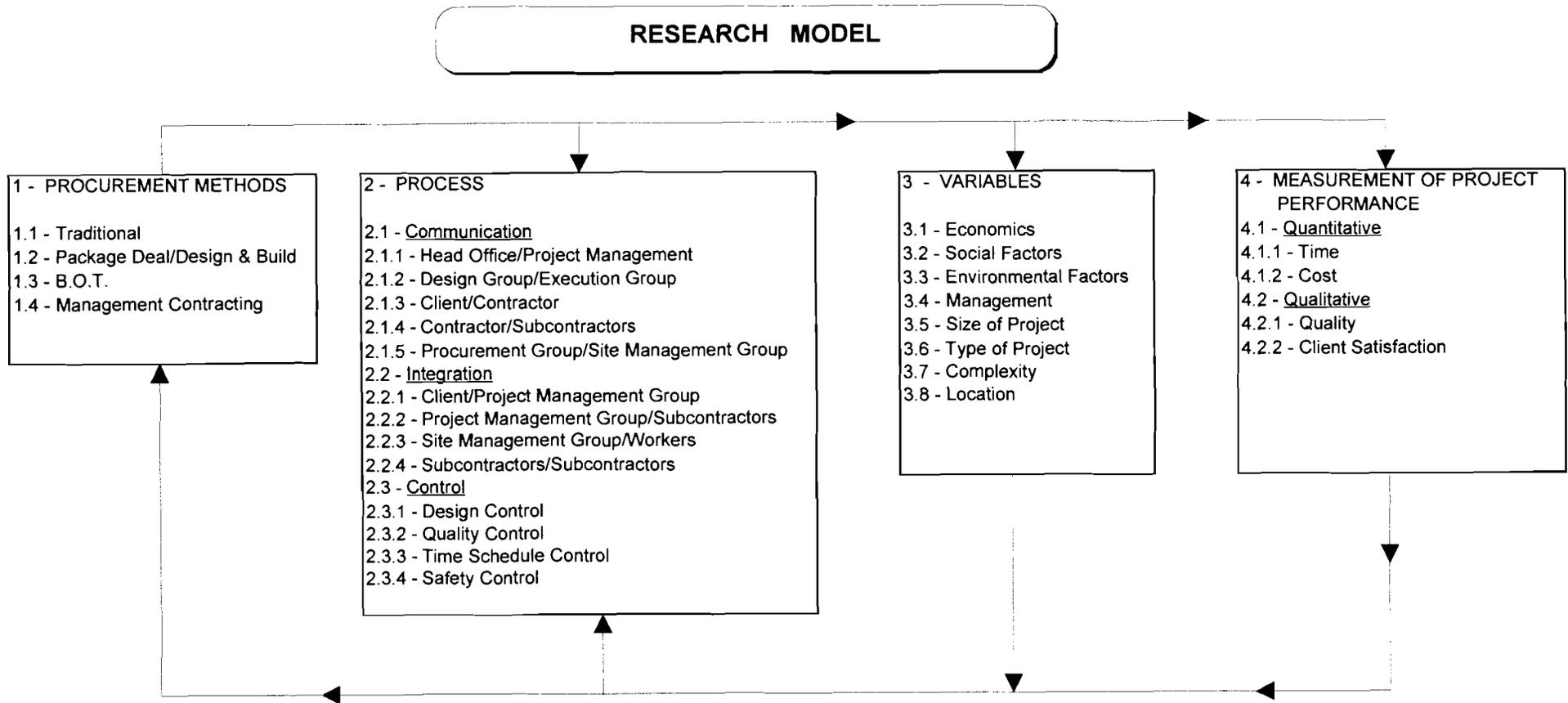4.1.2 - Cost
4.2 - Qualitative
4.2.1 - Quality
4.2.2 - Client Satisfaction

**Figure 1 : Research Model (Mustapha, Naoum & Aygun - p.229)**

401