EVOLUTION OF A SUPPLY CHAIN FIRM CONSTELLATION FOR INNOVATIVE
CONSTRUCTION PRODUCTS: AN INSTRUMENTAL CASE STUDY

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ABSTRACT

The events that led to the development of a network of alliances forming a constellation of organisations are described through the key participants’ experiences. The constellation’s primary aim in the first instance is to pursue international projects to provide low cost affordable housing. This strategy is the entry strategy to the international market. The case study revealed a deeper layering of strategies and organisational structure associated with the constellation. The research inquiry is qualitative and specifically, based upon the methodology of constructivism. The case study is descriptive in the first instance but more importantly instrumental in providing particular insight into the importance of two elements of alliance network design—strategic rationale and structural form. The purpose of the alliance was both short term, related to a specific project and long term in relation to innovative product development. Its structural form was designed around a ‘tight’ core alliance organisation with equity partnerships. However a variety of alliance types develop related to the strategy for the core group. The governance structure is flexible and evolves as the strategic rationale evolves from the short term to the long term.

KEYWORDS

Constellation; economic organisation; qualitative case study, innovative construction products

INTRODUCTION

Alliances as a form of governance structure between firms has grown rapidly since the early 1980s (Gomes-Casseres, 1997). Alliances have proliferated in many industries. The growth of new products, the growth of the high technology industries globally and the growth of alliances seems to suggest some sort of correlation between the value of alliances as a governance structure for development of new ideas and new products and the growth of the industry. It is claimed that the advantage of alliances and the subsequent constellation or cluster of firms that forms is that they can assemble new capabilities more quickly and cheaply by using alliances for learning. Alliances can serve as channels for the transfer of technology and enable all manner of organisational learning. (Gomes-Casseres, 1997).

In construction, alliances have been suggested as a form of governance structure to solve procurement issues as ‘there is a need for improved inter-organisational relations between organisations’ (Love and Hampson, 1999). In some research the discussion has suggested that alliances have potential to solve the construction industry problems, for example to reduce costs or to improve quality. The literature regarding construction alliances is quite sparse, however attempts have been to describe different types of alliances. Love and Hampson (1999) described the ‘learning alliance’ for construction and developed a conceptual framework for developing an ideal learning model for a successful alliance. Learning alliances are but one type of alliance. Gomes and Casseres (1997) suggested there are three main motivations that characterise an alliance; learning alliances; supply alliances and positioning alliances.

The case study in this paper indicates the existence of all three types of alliances. In some cases all three elements occur within the alliance. The focus of this paper is not specifically on the type of alliance or a single alliance, rather it is on describing the context of the constellation of alliances, i.e.
the relationship between the network of alliances and the strategy for the group. There are alliances related to the construction procurement and instances of projects however they are simply one small part of the entire constellation. The governance structure is much broader than the usual individual construction project approach.

This paper describes the evolution of the constellation as the key decision makers learnt and reacted to the market environment. They structured their group according to the strategy to penetrate the international market for affordable housing. In this case study the affordable housing market is closely allied to the search for markets for innovative products. The process for innovative product development in construction is an important area of research as it supports the technical research on innovative products. The case study demonstrates some of the conflicts, constraints and issues that concerned the actors in small companies that are involved in the process.

The paper firstly introduces the context of the case study and then addresses selected literature related to constellations and alliances. This is then followed by a brief discussion on methodology and the results of the first stage of analysis. The results involve a description of the events that describe the evolution of the constellation which highlights the strategies and structural organisation. The second part describes the key relationships and the governance structure of the constellation.

**CONTEXT**

The case study evolved from another research study specifically designed to describe economic organisational properties of supply chains. In that study 10 supply chains have been examined in detail. The research involved collecting data on the characteristics of firms, their particular markets and the nature of contractual relationships of firms in the supply chain.

Primary data has been collected from approximately 80 firms supplying a product and/or service to the construction industry through 45 structured interviews and 35 questionnaires. The types of firms or organisations studied ranged from government departments acting as project managers on behalf of other departments, government departments acting as clients, developers, architectural and engineering consultants, contractors, subcontractors, materials/component distributing agents, secondary manufacturing firms, primary manufacturing firms and raw materials suppliers.

The case study reported in this paper evolved from an interview with the CEO of one of the architectural firms. One of their main clients was a large contractor and the type of relationship that the architectural firm had developed with this contractor over 15 years is best described as an informal strategic alliance. A current project that the CEO described was unusual in that it involved a select group of small firms that had formed to pursue affordable housing projects internationally. For confidentiality reasons the names of the key actors have been changed. The core group of firms have registered a company however they will be called the CHASE group for the remainder of the paper. There is literature on alliances, and specifically on constellations that would be useful to draw upon when interpreting this case study and this is now considered.

**LITERATURE**

**Constellations in High tech industries**

There have been limited studies on constellations. One of the key studies by Gomes-Casseres (1997) describes many constellations including a detailed analysis of 5 case studies; Fuji Xerox and Xerox; Honeywell and Yamatake-Honeywell, Mips group, Advanced Computing Environment (ACE), IBM-Motorola-Apple and Apple Newton group (table 1)
# Constellation Description and competitive context

<table>
<thead>
<tr>
<th>Constellation</th>
<th>Description and competitive context</th>
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<tbody>
<tr>
<td>Xerox &amp; Fuji Xerox</td>
<td>Long-lived constellation based on extensive &amp; contractual ties; some influence form Fuji Photo and Rank. Competed with global firms such as Canon and Kodak in copiers &amp; printers.</td>
</tr>
<tr>
<td>Honeywell &amp; Yamatake-Honeywell</td>
<td>Long-standing ownership tie was modified and augmented by broad contract. Competed with global firms, such as Johnson Controls &amp; Omron, in electronic controls.</td>
</tr>
<tr>
<td>Fujitsu &amp; Amdahl</td>
<td>Long-standing ownership and contractual ties. Competed with IBM and Hitachi in IBM-compatible mainframe computers.</td>
</tr>
<tr>
<td>Mips group</td>
<td>Over 20 firms tied to Mips through contracts and ownership; members from all branches of computer industry. Enabled Mips to compete with HP, Sun &amp; other large firms in RISC field.</td>
</tr>
<tr>
<td>Advanced Computing Environment</td>
<td>A loose group that began with core Mips allies and expanded to include over 200 firms with the intent to follow a common RISC standard. Competed with Intel and other constellations.</td>
</tr>
<tr>
<td>IBM-Motorola-Apple</td>
<td>Core of the constellation competing with Mips and Intel over microprocessor standards for PCs. Based on ownership and contractual ties.</td>
</tr>
<tr>
<td>Apple Newton group</td>
<td>Apple and allies that developed, made, and marketed the Newton and competed with other vendors of personal digital assistants (PDAs)</td>
</tr>
</tbody>
</table>

![Table 1 Selected constellations (table from The Alliance Revolution p 37)]

Of these constellations, the Mips group case study has the most in common with the CHASE group as they both have similar humble beginnings. Mips Computer Systems began as a Stanford University research project led by three professors, who went on to found the company in 1984. The professors intended to develop and commercialise the first microprocessor based on reduced instruction-set computing (RISC) principles. Their story is a striking example of how a constellation can create the scale and scope necessary to compete against single large firms. By 1991 Mips group had grown to include 21 alliances in North America, Europe and the Far East which included all activities in the supply chain where the RISC technology was utilised:

- Technology licensing partners: semiconductor manufacturing and computer manufacturing
- Systems Vendors: OEMs & other manufacturers, value-added resellers, distributors, system integrators

The focus in the early days had been on Mips as a designer of the RISC technology. By 1991 it had established itself as a one-stop source for RISC technology, designing RISC microprocessors, compiler and operating system software, board products and RISC systems. According to Mips vice president for technology products ...

> '.the foundation of the strategy is that one customer can buy at any level of integration. They are attracted at either part of the food chain. Sometimes they begin with a chip and move up or they begin with a box and move down to boards. Once we begin a relationship we build a business strategy around selling to them at all levels.' (Gomes-Casserres 1997)

Mips could never have hoped to offer such a menu of products and services without its network of partners. The organisation and the strategy for governance structure of the supply chain was integral to the success. For example, apparently computer companies in the US like to buy locally. As Miller said *The computer industry is a global business supported by domestic suppliers*. (Gomes-Casserres 1997)
However, the best technology, process manufacturing and marketing capabilities for semiconductors was often located outside the US. The major alliances and subgroups of alliances in this network played specific roles in the Mips strategy. In each part of its business, therefore Mips found partners – not one but many. This constellation was essential to whatever commercial success Mips achieved. The following figure 1 indicates the alliance group developed by Mips.

**Constellations in other industries**
Table 1 suggest that constellations exist only high-technology businesses. However alliances and associated constellations have emerged in a wide variety of environments. Other manufacturing sectors have seen a proliferation of alliances in recent decades, as have service sectors. In many cases the spread of alliances has created rival constellations like those in table 2. The following is a summary of selected constellations compiled in 1994.

Although not discussed in detail here the Mips case study assists in understanding the growth patterns of a small successful enterprise into a large and competitive constellation for an innovative product. The introduction of innovative products was made possible by the collective strength of the alliances. It also indicates the relationship between the alliances and the group’s strategy.
**Business or industry** | **Selected rival constellations**
--- | ---
Hardware and software for interactive TV | ▪ Motorola, Scientific Atlanta, Kaleida
▪ Time Warner, Silicon Graphics
▪ Intel, Microsoft, General Instruments
▪ HP, TV Answer
Video CDs | ▪ Sony and Phillips
▪ Toshiba, Time Warner, Matsushita, others
Global communications | ▪ AT&T Worldpartners (includes 12 partners)
▪ British Telecom and MCI
▪ Sprint, Deutsche Telekom, France Telecom
Automobiles and trucks | ▪ GM, Toyota, Isuzu, Suzuki, Volvo
▪ Ford, Mazda, Kia, Nissan, Fiat, VW
▪ Chrysler, Mitsubishi, Daimler-Benz
Biotechnology research | ▪ Genentech network
▪ Centocor network
Pharmaceutical marketing (US) | ▪ Merck and Medco (merger)
▪ SmithKlineBeecham and DPS (merger)
▪ Eli Lilly and PCS (merger)
▪ Pfizer and Value Health
▪ Pfizer, Rhône Poulenc, Caremark, others
Global airline services | ▪ Delta, Swissair, Singapore Airlines, SAS
▪ KLM and Northwest
▪ British Airways and USAir

*Table 2 Selected businesses with collective competition, c1994 (from The Alliance Revolution p 204)*

**STRATEGY FOR INQUIRY**

An inductive research approach was considered appropriate for this study. The research is interpretive and naturalistic in its approach to the subject matter and is qualitative in nature (Denzin and Lincoln 1994). In qualitative studies the net that contains the researcher’s epistemological, ontological and methodological premises may be termed a paradigm, or interpretive framework, a ‘set of beliefs that guides action’. At the most general level there are four main interpretive paradigms; positivist and postpositivist, constructivist-interpretive, critical and feminist-poststructural. For this case study a constructivist-interpretive approach was taken.

_The constructivist paradigm assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and subject create understandings), and a naturalistic (in the natural world) set of methodological procedures._

_(Denzin and Lincoln, 1994)_

**Study of the particular**

The *case identified is an instrumental case study*. An instrumental case is one that provides insight into an issue or refinement of theory (Stake 1997).

The theory to date to support the wider study has focussed upon supply chain literature and in particular the research field related to the industrial organisation of the supply chain (London and Kenley, 2000). The wider empirical study seeks to describe the properties of supply chain through describing the market structure and conduct of firms of supply chains for residential and commercial construction projects. It also seeks to establish the conduct of firms related to supply chain formation. Supply chain formation is in response to the project.

This particular case is focussed upon the conduct of the firms related to ‘supply chain’ formation for targetted markets. The core group has formed to seek out such markets as affordable housing projects and innovative construction products. It is aimed at studying the processes involved in the evolution of the constellation designed to develop innovative products.
Case researchers seek out both what is common and what is particular about the case, but the end result generally presents something unique (Stoufer 1941; as cited by Stake 1997). Uniqueness is likely to be pervasive, extending to:

- The nature of the case
- Its historical background
- The physical setting
- Other contexts, including economic, political, legal, cultural, institutional
- Other cases through which this case is recognised
- Those informants through whom the case can be known

Case study research can usefully be seen as a small step toward grand generalisation (Stake 1975) but generalisation should not be overemphasised in all research. In the first instance an understanding of this case is established.

Therefore the strategy for inquiry involves the following steps:

- Proposal of research questions for guidance
- Description of the research methods: data collection and analysis
- Results and further considerations

**RESEARCH QUESTIONS**

According to the literature there is limited research related to understanding the strategies and structure of small firms forming alliances to penetrate international markets. There is even less known about the development of a constellation designed to seek out specific markets such as affordable housing and innovative products to foreign markets. Questions are tentatively proposed in regards to the formation of the constellation:

**Research Questions**

- What stages of development and strategies can be identified?
- What are the characteristics of the governance structure and relationship types?

**METHOD & SOURCE FOR DATA COLLECTION**

There are many ways to collect empirical materials for a qualitative study – interviews, personal experience, interactions, observational, historical, published documents (Newman and Benz, 1998). This paper reports on the empirical material that is collected from three interviews. They are intended to be approximately 2-3 hours in duration. To fully document the case it may be necessary to draw upon other interviews or documents depending upon the nature of the initial interviews.

**Limitations to collection technique**

There are obvious limitations to collecting material from one source. For this reason data was collected from more than one person and the case study constructed from the transcripts. Typically ‘stories’ will overlap and match. There may be gaps in the events and interviewees may focus upon particular events as significant while not discussing other events.

**Data Source**

The interviewees or informants for the particular case were identified through a ‘snowballing’ technique. Each interviewee suggested other key people for subsequent interviews. At this stage 3 of the 4 central actors have been interviewed. The first interviewee, the architect Mr. Hammond, described a particular scenario and suggested I talk further with another key player, Mr. Garson. Mr. Garson, who had previously been employed as the Managing Director of one of the largest construction companies in the country was interviewed. He is now Managing Director of his own small consultant management firm. He subsequently suggested that I interview a Mr. Grahams, who was the third key player in the CHASE group. He was the person that had many personal contacts in the countries where the group were trying to develop projects. He had previously been an employee of...
the government in defense and diplomacy departments. He currently was the MD of a small management consultant firm. These three men are the core of the CHASE group. The names have been changed for confidentiality.

Each interview was approximately 2.5 hours in duration and took place in June 2000. The interviews were transcribed. The common question to the three interviewees was:

*What is your involvement in the Xanadu project for affordable housing?*

Probing questions included:

*When did you become involved in the project?*

*What is your role in this group? What is the purpose of the group?*

*How are you related contractually to the other members in the group?*

What other contractual relationships are there involved around the project?

**Additional data sources**

In this particular case study it was noticeable two of the interviewees were reluctant to discuss a particular event around a certain time period. Another person who had worked for one of the interviewees was interviewed to clarify this event. Coupled with this, a published biography on a central figure to this event was used as a reference source for contextualisation. This particular event is not central to the study of this constellation as it does not impact upon the ability to describe what the structure and central strategies were. However it explains periods that the interviewees were reluctant to discuss and assists in the interpretation of why certain relationships were formed, ie motivation of the key figure forming the constellation.

**Analysis**

The results reported here include the first stage:

Part 1: Identification and description of the events

Part 2: The Network of Alliances and Type of Relationship

This seeks to answer research question 1.

There are many events that are described by the informants. The central figure to the CHASE group is Mr. Garson and the key events he identified related to the case study will be described. Events range from specific decisions to general activities. It is expected that the other two interviewees will identify the event as well, particularly if they were involved. If there were conflicts in the descriptions these will be noted. The first summary is a table that lists the events as they occurred and were described by the interviewees; key quotes are used from the interviews. A diagram will be developed summarising the structural organisation of the group and the type or purpose of the alliance in the constellation. A brief discussion describing these will follow.

**RESULTS: DESCRIPTION OF STAGES, STRATEGY & STRUCTURE**

**Events in the evolution of constellation**

The following table summarises the events that have led to the formation of the group of firms. The interviews reveal that the actors involved in the constellation are joined by a variety of contractual arrangements. This constellation is still in the early stages of evolution and new relationships are being tested and formed all the time. The following table summarises the key actor’s roles:

<table>
<thead>
<tr>
<th>Person</th>
<th>Primary Historical Role</th>
<th>Current Roles</th>
<th>Current Role in Constellation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Garson</td>
<td>MD, Contractor ‘X’</td>
<td>MD, Management</td>
<td>MD, CHASE: ‘Managing Director’</td>
</tr>
<tr>
<td>Mr Hammond</td>
<td>MD, Architectural</td>
<td>MD, Architectural</td>
<td>Director, CHASE group: ‘Architect’</td>
</tr>
<tr>
<td>Mr Grahams</td>
<td>Defence Attaché</td>
<td>MD, Management</td>
<td>Director, CHASE: ‘Region Consultant’</td>
</tr>
<tr>
<td>Mr Bruce</td>
<td>MD, Contractor ‘Z’</td>
<td>MD, Contractor</td>
<td>Director, CHASE: ‘Building Systems’</td>
</tr>
</tbody>
</table>

*Table 4 Interviewee Historical and Current Roles*
One of the primary objectives for the CHASE group is to win projects for affordable housing in developing countries. The group was formalised so that they had an enabling vehicle and structure for these projects. At the time of the interview period they were in negotiations to sign a contractual deal for the supply of containers of steel coil for a large housing project. The intention was to ship the container from the country where the CHASE group are ‘resident’ to the ‘project’ country. The container will then be unloaded and transported to a factory. At the factory all the framing for the house is fabricated and then transported to site where erection takes 4 days. The housing system has generally been used for affordable housing (low cost), however for this project the housing has been termed ‘medium cost’. The following extract is from the interview with Mr Garson, MD CHASE group:

So it means that we assemble the materials here, we put them in the container. There is then an international certifying agency who will certify that we put it in that container and then the SOS Bank will pay us. They will then be shipped to Xanadu and it will be unloaded under our supervision but under a separate agreement by our training team over there, who will supervise the unloading of the containers. The local people will arrange the transport of the container to a factory. The factory will then manufacture the components under our supervision and on our machine that we own. It is a steel framed system where you can actually takes this machine to the site. It has a computer on it..it has the architect’s design. He puts all the ingredients in the computer he presses the button and some coils of flat steel. He then manufactures exactly every piece of steel that is required for that frame, with all the holes in the right places, with all the flanges in the right places with the edges and connections. All designed in the computer and then controlled by a cold rolling process...sheet steel comes in at one end and then exactly what you want comes out at the other. Then they will then be transported to the house sites and they will be erected by a team who have already been trained by us. It takes 4 days to erect the houses.

The following table describes the process for the formation of the group that led to this particular innovative system for affordable housing projects. In response to research question 2, At this stage of the analysis development stages have not been explicitly abstracted.

<table>
<thead>
<tr>
<th>Time</th>
<th>Description of event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>Mr Hammond approached Mr Garson and his contracting firm with proposal.</td>
</tr>
<tr>
<td></td>
<td><em>Mr Hammond, architect:</em> In 1980 we did a market audit and brought in a professional marketer who looked at the market place. What was happening was the municipal market was shrinking in jobs. Our presence in that market was also shrinking given that Contractor Y was taking these jobs as D&amp;Cs. So we decided to either join them or die. So we approached Contractor X.*</td>
</tr>
<tr>
<td>1984</td>
<td>First D&amp;C in country by Architect, Mr Hammond and Contractor, Mr Garson. Successful relationship.</td>
</tr>
<tr>
<td></td>
<td><em>Mr Garson, MD: And Mr Hammond was the architect, X was the contractor and I was MD and it was probably the first true strategic alliance that worked in my view.</em></td>
</tr>
<tr>
<td>1985-1990</td>
<td>Mr Garson moves to another major Contractor Y and continues to provide Mr Hammond with contracts, particularly D&amp;Cs.</td>
</tr>
<tr>
<td>1992</td>
<td>Interest in international markets problems in domestic market.</td>
</tr>
</tbody>
</table>
|             | *Mr Garson, MD: At the same time there was a whole other thing happening in the Construction industry and a group was put together called CIDA. The export side of that. We were successful in getting funds allocated from the Federal government to support the construction industry’s efforts overseas to pay for, or rather to arrange loan funds for people to be able to finance the long and tedious process of putting together projects in Asia. To put the money up to bring all this together and then when the project came off some repayments would go back to the government. So it was a financing process. This was an imperative because the original driver for this was the building contractor and the consortiums were not working because there was not an equal balance of all the people who were playing. The strategy that was accepted by the government was the strategy that allowed what was the best of what we had in our country, either building materials manufacture or construction expertise or be it in design, to forming a strategic alliance to be funded by the government. So there was no one who was sitting there thumping their chest and saying my money and do as I say, not like the D&Cs and joint ventures. So everyone had equal prominence. The Construction Industry Development Agency (CIDA) was established in 1992 by the Commonwealth and the construction industry to suggest reforms to industry practices that adversely affect the efficiency and integrity of the building and construction process.* (Clayburn)
1990-1993  Mr Garson and Mr Hammond’s relationship developed. Under Mr Garson’s directorship, Contractor Y had many international joint ventures and strategic alliances across many business groups, including infrastructure, pipelines, casinos, marinas, prisons. Alliances were with operators, designers and contractors. Mr Hammond was one part of this strategy.

Mr Garson, MD: Our entire business was designed around groups who specialised in certain things. Sometimes we marketed it ourselves under a different name and sometimes we all used our own firm names into a joint venture situation.

early 1993  Mr Garson lobbied national government to provide financial support for overseas construction ventures.

Mr Garson, MD: The ones who have been most successful have had a very active financing program from their own countries, the Japanese had concessional finance, the Koreans-concessional finance, the French and the British, the Americans to a lesser extent. So all they were doing was selling a finance package. Their own government were assisting them. We were aware of this ten years ago. A small group of us put some pressure on the government to allow us to compete internationally on a whole variety of projects including low cost housing. We went to the government and an Industry group was put together, of which I was Chairman at that stage. And we wrote a document called the Garson Strategy, which was for Export of Australian Construction Materials, Technology and Expertise into the huge market that we have out there.

mid 1993  Mr Garson and Mr Hammond – China Trade Commission

Mr Garson, MD: Now that brings in another element. The other element there is that once again Mr Hammond and I had experience in China where we went and tried to tackle that market. We looked at projects all over South East Asia before the burnout of SE Asia, particularly areas with marinas and water based recreational areas. Mr Hammond went around the world with some of the people from Y contractors and just spent time reviewing the best practice in the world and came back and tried to focus on that as part of our business strategy.

Architect, Mr Hammond: I went overseas on trade mission to China and ended up being a member of a consortium called the First Australia China Consortium and we started then to do work in China overseas. It was terrific in China, with PQR - the large building materials company. Part of the submission we made was for some walk up housing in Shanghai, it was formalised. A company was set up, we were the architects, only architects. There was a fitout interior guy in Sydney and then there was PQR and then there was the contractors Y. Mr Garson who was the head of contractor Y, headed up the Trade Mission. It was fantastic.

Mid 1990s  Hong Kong Airport project

Mr Garson, MD: Out of that (CIDA) came some pretty impressive things to do some really major work and in some respect Hong Kong airport which had Australian designers and a large use of Australian technology, particularly materials. A special agency was actually formed to access Australian materials for that project, there was a fellow on site who would say ‘All right, where can we buy that, I am the Procurement Officer and my job is to make sure that I maximise the Australian content and I am paid for out of this fund that has been set up buy the federal government and my job is to go and source that article, be it a steel bolt or a phone booth or whatever’

1995  Further D&Cs that included the Operator in the package.

Mr Hammond, architect: Then about mid 1995 back home, their was the prison projects program MPP. We joined Contractor Y and Group 10 were the operators. Group 10 and Ys had been wooing each other around the world. Group 10 are an operator, a prison operator, UK based. They’ve run a few other prisons, illegal migrant type internment also prisoner delivery.


Mr Garson, MD: Then we had a change in government, that government said there were some things that they were not going to do. The BIF program was a concessional finance. This program was dumped and has never been reintroduced. That was a bit of a blow.

1996  Mr Garson looks to other markets for international projects.

Mr Garson, MD: Affordable housing came along and that was clearly going to be the market for South East Asia. Virtually people were talking about building houses by the thousands. But, World Bank and Asian Development Bank and all those international lending institutions were saying we won’t lend money anymore unless the money goes into an area that has; social and environmental impact.

Mr Garson begins discussions to develop alternative financial packages for projects.

Mr Garson, MD: So World Bank and ADB had set down some sensible guidelines for what affordable housing was all about. Then there was the view that it was all going to cost too much, so I turned to finding finance.
Mr Garson is approached by Mr Grahams to assist a small contractor who has management and financial problems but has potential projects in PNG. Mr Garson advises that design assistance is needed.

Mr Grahams, entrepreneur: Now I had this guy come to me and say ‘Now look I have this beaut steel framed housing system for going to the Third World’ now he had rose tinted glasses on that he thought the Third world would welcome him with open arms because he had this steel framed housing system. Now when I stopped rolling around and laughing. I got together with Mr Garson. I met up with Mr Garson through some other people And he said ‘No no here I shall show you how to structure the deal and we put it together.’ So he went away to get an investor.

Mr Garson approaches Mr Hammond, who provides the design assistance.

Mr Hammond, architect: A particular company was going bankrupt. It was a company that was pretty good but just needed some management skills so he spoke to them. He said ‘Well you have some building skills and a bit of marketing you have contacts but you need some design skills. You are not doing this properly.’ So Mr Garson got in contact with me and said ‘Are you interested in this’” You will have to punt our time.’  So I said ‘Sure’.

1996-1997

3 design projects Xanadu – don’t proceed, client’s finance problem. PNG Design and bid project.

Mr Hammond, architect: 2 years has gone by. From 3 contracts in Ghana which have not come to fruition and then a Design Bid for Papua New Guinea.

EARLY 1997

PNG project: design and build 2.5 thousand houses. 2 display homes first.

Mr Hammond, architect: Then out of the blue there was this group who wanted two and a half thousand houses out of PNG. So we said ‘Alright.’ There was a developer or money man involved. That was good I said ‘I am not putting up any money.’ I wanted to get paid for what we are doing. That was fine. So it was design, document two project homes up in PNG as display as a precursor to the other 2.5 thousand. Port Moresby Armed Forces Superannuation Board.

MID 1997

Asian crisis is a catalyst. Mr Hammond’s PNG project fails. Client pulls out. Group realise that financing packages are the key.

Mr Hammond, architect: This PNG job has died completely and we got paid. Somewhere up there is a partially built house with a heap of material up there. We were the builder in that situation, we shipped up the materials and then sent a crew of three up to fabricate it. A factory was sourcing the materials from suppliers. The small contractor remained in PNG.

Mr Garson, MD: So then we decided, if the government is not going to help us we are just going to have to do it ourselves. And because of the Asia burnout we started to look around.

Mr Grahams, Regional Consultant: When the Asian currency crisis hit Asia was off the planet. I had been working in Indonesia and I had had a couple of deals that just evaporated overnight.

EARLY 1998

Group drops the relationships with small contractor from PNG, has three members and formalises company. CHASE is registered. Group realise that a method of production and the financial package are both critical to success. Begin negotiations with systems builders. Mr Graham’s role is to identify and capitalise on his contacts in countries-becomes integral player. He engages a Local Agents. Local agent seeks out local developer/contractor and potential ‘client’ groups.

MID 1998

Mr Garson approaches the systems building contractor, ‘Z’ and begins discussions. Building contractor develops system of prefabrication and has a successful project in Indonesian. Systems builder brings with him his supply chain relationships, namely his materials supply agreement and equity partners (Software company).

Architect, Mr Hammond: I knew this guy and we met him he has the machine that feeds the coil that makes the studs that makes the stumps that makes the trusses. He has done work using that machine, using that system in Indonesia. He has already built some houses.

Mr Garson, MD: Mr Bruce has had some experience in putting these houses up in Indonesia where he had a contract for some 10,000 houses.

LATE 1998

Xanadu project initiated. 25,000 houses. Design, building system, transportation of materials and production process established. Architect prepares designs and engages local architectural consulting firm to assist on cultural and technical design.

Architect, Mr Hammond: This is a new venture which we have been chasing for about two years and basically that is designing and building low cost housing. These ones are not particularly low cost housing, they are for the teachers in Xanadu and hopefully our letter of intent will be coming next week (June 2000).

EARLY 1999

Mr Garson and Mr Grahams discuss with financial institution in home country mechanisms for low interest rates. CHASE group acts as broker to arrange the financial package with three financial institutions. Negotiations take some 6 months. Negotiations includes loan and reciprocating project guarantees.
The most important thing for us is that we packaged up the finance.

EARLY 2000

Discussions with manufacturers and universities regarding alternative building products. MD discussing with Universities. Universities bring relationships with materials manufacturers through commercialisation of research products.

Mr Garson, MD: We are currently reviewing the use of materials. We are thinking about creating materials. Generally materials we are looking at are materials that are made from waste products, recycled products. That is where we are headed. Early this year we approached X University. They already have a prototype. This is in the early stages.

MID 2000

Certificate of Agreement about to be signed for Xanadu project for affordable housing. Prototype developed for machine to produce alternative board material using waste material. Regional Consultant introduces MD to Waste Management company that he has contracted to for last 5 years. MD talks to University group and Waste Management company (s) for the Future Products group.

MID/LATE 2000

Royalty discussions with universities for technology.

Table 4 Events of Development in the Formation of the CHASE group

The Network of Alliances and Type of Relationship

Figure 1 illustrates the organisational structure of the constellation at the time of interviewing. Centrally located is the CHASE group who is comprised of the Architectural firm, the Management consulting firm, the Regional Consultant and the house building systems Contractor. They each have 25% equity in the company. There are four main clusters of networks that are ‘attached’ to this core and they have been identified as: the client group, the affordable housing building system group, the financial group and the future products group. Each cluster has been developed because of their strategic importance to the core group.

Affordable Housing Building System group

There are two important elements for this group, firstly the software that has been designed to assist in prefabrication and secondly the steel coil for the structure. Therefore the key relationships have been developed to pursue these strategies. The software is important to the product as it represents an enormous amount of control over the quality of the construction process. The software has enabled sheet coil to be transported and still maintain quality control. It has reduced the shipping costs as sheet coil is cheaper to transport than the prefabricated components. It has allowed the contractor to build quickly, efficiently and with little waste. This has been important for house building in countries where skilled labour and supervisory labour has been lacking. It has reduced the number of supervisory staff required from the contractor’s company. All these factors have been important in reducing the cost so that the housing has become affordable for clients.

The systems building group involves a computer software company who developed the technology with the contractor. The software company has equity in the contracting company. The building systems contractor also has a materials supply agreement with the Materials Supplier for the steel. The agreement includes reduced rates for extra volume and is for a period of 12 months, whereby it will be renegotiated. The building systems contractor will also be instrumental in providing the training.
The Client Group
The CHASE group have contracts with a local developer in the foreign country for the supply of containers which include the raw materials for the construction of the shell of affordable housing (lockup stage) to an agreed design. They are also contracted to build a factory and supply training and supervisory packages to enable fabrication to take place at the factory. They do not license the technology to the developer as they want to maintain control.

The project is made up of numerous smaller contracts and the local developer and the CHASE group have packaged their contracts to correspond. The developer has the multiple project contracts with the Superannuation Board to build the houses. The Superannuation Board (government department) has arranged that the teachers will make payments to them for the houses and not a financial institution. The local developer is taking much of the financial risk, however once the developer has committed to the project he has a guarantee from the Board. The Regional Consultant is the key contact with the client group. He contracts the local agent to manage logistical issues in the foreign country on a per house basis.

Financial Group
The financial group is composed of three institutions, the local insurers, the offshore financiers and the institution in the CHASE group’s host country. The most significant component of the financial package is made available by the financial institution in CHASE group’s host country. There is a proviso from this institution that there is an 85% export content in the ‘product’ and for this the institution is prepared to provide reduced interest rates. The export content is made up of raw materials, consultancies and specialist labour/expertise. The shortfall of 15% for the loan is provided by the offshore institution, however the international financial institution has only made the agreement based upon the loan being serviced through a local financial institution. The Teachers Superannuation Board was required to provide a guarantee for the project to the offshore institution through the local institution. The Board has a loan with an international financial institution at a reduced interest rate. Repayments begin after the second year.
**Future Products Group**

For the future products many of the arrangements are still in the negotiation stage. The CHASE group are in negotiation with a number of different university led consortiums. In particular, one university has developed in conjunction with a major materials manufacturer a prototype for a new product based upon different types of waste materials. The manufacturing process is currently being developed. The university and the materials manufacturer have equity in a commercial venture designed to further develop the product and the manufacturing process. This venture is requiring royalties from the CHASE group to pursue the use of the product in developing countries, however the CHASE group would prefer some form of equity agreement. The CHASE group began negotiations initially with the materials manufacturing firm. This firm is quite a large firm and the CHASE group feel uncomfortable about this and are seeking smaller firms. The waste management company appears within this cluster appears as the Regional Consultant has had a number of consultancies with them previously. The CHASE group are seeking long term supply agreements with this company.

**Discussion**

The case study illustrates events and decisions related to the development and management of the constellation. The strategy of the core group has been to develop and to continue to develop contractual relationships that are appropriate for the long term economic benefit of the group. To enable this, a range of relationships and linking structures are pursued to improve commitment from partners/suppliers and to ensure stability in the constellation, for eg equity, royalties, supply agreements, loan agreements, guarantees and multi project contracts. The relationships and the structure has developed over 20 years and has involved consistent assessment of the market that is being pursued and the matching of the capabilities of the firms within the group to meet the market demands. It is clear that this constellation explicitly perceives that the strength of the network of different alliances will be an enabler for their success.

The organisation of the supply chain is critical to this constellation. The importance of the economic organisation of the supply chain becomes quite central to the problem. This is taking place by challenging and restructuring the traditional ideas of the construction supply chain and the traditional supply chain relationships developed through tendering on projects. The group is constantly attempting to source appropriate firms and partners and match appropriate contractual strategies to ensure control and integration of the construction supply chain. To do this the case study indicates that the capital and resources had to be leveraged, ‘amassed’ and managed through the constellation structure. In this overall structure it appears the model being developed is a system of ‘plug-in’ groups. This ‘plug-in’ strategy of economic organisation that has evolved to pursue innovative products for the construction industry by these SMEs is important to understand.

It is clear that the client groups may change as the CHASE group pursues other markets. The affordable housing market is the entry strategy and is not the market that the CHASE group will ultimately pursue. The affordable housing building system group then may be largely dispensable if and when new products can replace steel. The other markets come in two forms namely; different client groups and different raw materials. The projects are the mechanism for the outlets of the innovative products being developed. The project and the innovative product strategies are linked. The architectural firm and the financial group will more than likely form part of the same cluster in any future ventures as project design and project financing are important to the group. If projects are a key element to the viability of the constellation, then integral to the ‘plug-in’ strategy is an understanding of the role that finance plays for the viability of projects in developing countries.

The drivers of the innovative products are primarily project related firms, rather than a large manufacturing firm. Therefore it is not that surprising the role that projects play as an outlet for the product. The large manufacturing firm typically has enough capital and resources that they are able to devote to the research, development and production of innovative products. The commercial venture involving the large manufacturing firm and the university approaches the market with the attitude of
‘spilling’ the product onto the market. The project firms take the attitude of ‘pulling’ the product through a project.

CONCLUSION

This case study has highlighted the events that led to the development of a network of alliances forming a constellation of organisations involved in pursuing innovative products for the construction industry in developing countries. The initial aim was to pursue international projects to provide low cost affordable housing. The use of an innovative product— the building system and associated onsite computer prefabrication process became important for their success. Affordable housing and the building system strategy is the entry strategy to the international market. This provides access to clients in developing countries and also access to the waste material in the development of future innovative products.

The case study revealed 4 key clusters of firms around the core company. These clusters involved another set of deeply connected firms. The strategy of the core group is that each cluster merely acts as a ‘plug-in’ to the core group. As the core group attempts to ‘collect’, pursue or introduce another innovative product the new product becomes another cluster of firms. It has been recognised that SMEs have an important role to play in the development of niche markets for innovative products in other industries. They also can contribute to the development of innovative products in the construction industry globally. Therefore an understanding of the characteristics of the constellation and the concerns of the core group can assist in our understanding of the realisation of innovative products.

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REFERENCES

Buckley, P.J. 1989. “Foreign direct investment by small and medium sized enterprises: the theoretical background” Small Business Economics, 1, 89-100

Claybourn, CIDA Reforms Australian Property & Construction Law Bulletin, No 3, 1994


Strandskov, J. 1986  “Towards a new approach for studying the internationalisation process of firms” Working Paper No 4, Copenhagen School of Economics