The development of long term relationships between consultants and project managers in construction supply chain in Malaysia

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THE DEVELOPMENT OF LONG TERM RELATIONSHIPS BETWEEN CONSULTANTS AND PROJECT MANAGERS IN CONSTRUCTION SUPPLY CHAIN IN MALAYSIA

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ABSTRACT

Purpose: The purpose of the study is to explore the relationship development process between consultants and a project management firm in Malaysia.

Research approach: This qualitative study was based on 6 in-depth semi-structured interviews which were carried out with the owners and senior managers of five consultant firms (an architect, quantity surveyors and structural and civil consultants) and the director of a project management firm. The data were analysed using thematic analysis method.

Findings and Originality: Although theoretically, a well developed relationship has to go through five phases of relationship development process (awareness, exploration, expansion, commitment and dissolution), the findings reveal that every consultant’s relationship with the project management firm appeared to exhibit additional developmental stages to those which are established within the literature. The results revealed that the practices that lead to a successful or failed inter-organisational relationship are greatly influenced by interpersonal factors rather than the organisation’s performance-related factors.

Research impact: This study has explored various ways in which the cultural values play significant roles in the development of long term relationships among organisations in the construction supply chain.

Practical impact: This study brings new dimensions in the context of inter-organisational construction supply chain through the significant use of cultural values, which could be practiced by other supply chains.

Keywords: relationship development process, personal relationship, cultural values, indebtedness, construction supply chain

INTRODUCTION

There is no doubt that the relationships between project managers and consultants are important for the success of a construction project. Researchers and practitioners agree that every party can play an important role if they have harmonious working relationships manifested in mutual understanding, minimal conflict, open communication, team working, fairness and a high degree of trust and commitment (e.g. McDermott et al. 2005; Barratt, 2004). In the construction supply chain, many studies have been conducted focusing the importance of integration and collaboration and issues preventing collaboration (e.g. Dainty et al. 2001; McDermott et al. 2004). However, few have examined relationship development as a

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process. Moreover, previous research on the importance of developing harmonious working relationships has been mainly conducted in the western cultures such as the USA, UK and other European countries. Less attention has been paid to collectivist societies such as Malaysia that put much concern on relationships (e.g. Abdullah, 1992; Goddard, 1997). This paper reports on research which explores the process of how long-term relationships develop between the consultants and the project managers in Malaysia and how those elements emerge within the process.

**RELATIONSHIP DEVELOPMENT PROCESS**

A number of studies have examined the process of relationship development among organisations. These include work on buyer-seller relationships (Ford, 1980; Dwyer et al. 1987; Ellram, 1991; Wilson, 1995), pharmacist-physician relationships (McDonough and Doucette, 2001), alliances learning (Iyer, 2002), and franchisor-franchisee relationships (Doherty and Alexander, 2004). Each of these bodies of literature offers insights into the nature of how relationships develop in stages. The similarities of the studies lie on the fact that relationships evolve over time through a predetermined set of phases (Ford, 1980). However, although studies on relationship development process involved contractual and non contractual relationships, there is little consensus on determining when the contractual relationships begin in a complete cycle of the relationships. For example, Ford (1980) divided the relationships into five stages (pre-relationship stage, early stage, development stage, long-term stage and final stage). Similarly, Dywer et al. (1987) identified five stages (awareness, exploration, expansion, commitment and dissolution) and Ellram (1991) five phases (preliminary phase, identify potential partners, screen & select, establish relationship and evaluation relationship). However Ford (1980) identified contractual relationships started at development stage, as compared to Dwyer et al. (1987) at commitment stage and Ellram (1991) at ‘establish relationship stage’.

In the construction management literature, there have been many studies conducted emphasising the importance of integration and collaboration in construction supply chain as well as various issues that may hinder collaboration to occur (e.g. Dainty et al. 2001; McDermott et al. 2004). However, studies focusing on relationship development as a process, beginning from the early stage of the relationships to the dissolution stage have been paid less attention. Furthermore, studies conducted within a collectivist society like Malaysia have been widely neglected. Within Malaysia, it is well-known that there is a very high concern for relationships with others (Abdullah, 1992; Goddard, 1997; Abdullah and Lim, 2001).

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Thus, it represents a very different cultural context for examining the development of inter-firm relations. The aim of the research reported in this paper is to explore the relationship development process between projects managers and consultants in Malaysia in order to establish the applicability of existing relational models to this very different context.

**RESEARCH METHODOLOGY**

This study employed a qualitative method and case study design. Since the relationship development process has received little attention in the construction management literature, in-depth semi-structured interviews were deemed appropriate as there was little priori knowledge from which a more structured research instrument could be deduced. The interviews were conducted with representatives from a range of five case study organisations operating in Malaysia.

In each case, the data was collected from a project manager, an architect, two quantity surveyors, and two civil and structural consultants. The main themes covered in the interviews concerned the background of the organisation, how long they have been in inter-firm relationships, and how they developed long-term relationships. The recorded interviews were transcribed verbatim and then categorised under conceptual headings. A research framework was developed following the tabulation of the research findings. A summary of the organisations taking part in the study is provided in Table 1 below. The client organisation is a large government agency which runs many development projects throughout Malaysia. The project manager (PM) has been in the contract with the client for 10 years managing these development projects.

**FINDINGS**

Based on the experiences of the consultants and the project managers indicated from the in-depth interviews, the stages of relationship development were labelled with a number. Level 1 (which includes consultants B, D and E) represented the ‘exploration’ stage. They did not know the project manager before the relationship began. Level 2, began at the ‘commitment’ stage and comprised the relationships between the consultant A and the PM. Level 3 represented the relationships of the consultant C and the PM began at the ‘indebtedness (terhutang budi) stage’.

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Table 1: The Background of Informants

<table>
<thead>
<tr>
<th>Position</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager (PM)</td>
<td>Previously, PM was the subsidiary of Client N that managed all development projects of the client throughout Malaysia. The consultants who wanted to carry out the project have to register with the PM by submitting their profile. The award was normally based on rotation. While procurement route for the contractors was based on traditional method. From mid 1990s, PM has become independent project management consultant and has been in the contract with client for 10 years.</td>
</tr>
<tr>
<td>Consultant A</td>
<td>Consultant A is a civil and structural firm. Two of its directors were the former staff of PM, who joined Consultant A after the firm has been in operation for a few years. Since they joined Consultant A, the firm has been awarded many projects within 10 years.</td>
</tr>
<tr>
<td>Consultant B</td>
<td>Consultant B is a civil and structural firm. It has managed only one of the PM’s projects, but many projects with other clients.</td>
</tr>
<tr>
<td>Consultant C</td>
<td>Consultant C is an architect firm, who is a sole proprietor. He started his own business with the help of the PM. He is also the former staff of the PM. He has been awarded a huge number of projects within the first 5 years.</td>
</tr>
<tr>
<td>Consultant D</td>
<td>Consultant D is a consultant quantity surveyor firm. It business has been in operation for 8 years. It has been awarded many projects from other clients and only one project from PM.</td>
</tr>
<tr>
<td>Consultant E</td>
<td>Consultant E is a quantity surveyor firm. It has some experiences handling a few of PM’s projects previously and has never been given any projects since then.</td>
</tr>
</tbody>
</table>

These stages are discussed in more detail below together with the other developmental stages discussed by the informants. Figure 1 shows the levels and stages of the relationship development process developed in this study.

**Stage 1: Pre-relationship stage**

The pre-relationship stage is where the contractual relationships between the project manager and the consultants have yet to develop. The informants suggested that during the early stage of relationship development, the recognition of the potential consultants was just based on their company’s profile and reputation. For example, the decision to award the project to Consultant D was based on their reputation for being competent to carry out the work required. However, the project manager was also influenced by the recommendation from a member of their staff that had a personal relationship with Consultant B. As stated by Consultant B; “...when I was given the first project, it was a continuation project of other consultant, who was insolvent. It was the PM’s engineer whom I knew and he recommended (to the Board of Director of the PM’s firm) me to continue the project.”

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Stage 2: Exploration stage

The exploration stage takes place when the contractual relationships begin. Exploration is a trial stage, in which both parties gauge and test their compatibility, expectations, trustworthiness and commitment to the relationships. At this stage, the PM assesses the degree of each consultant’s actual capability and performance in providing the service and fulfilling PM’s expectations. It could also be a point in which the consultant could be trusted in conducting future projects. In relation to this, Consultant B stated that:

“...in practice, when we get a project from them (PM/client), complete the project first, then only we asked for another project. I have to perform and the good performance would be the evident of my firm’s capability. The same goes to other clients; I’ll be the Civil & Structure Consultant for the wet market project (east of the city centre).”

Consultant D also had a similar experience, in which he said that “there was once in a meeting with PM, in which the PM mentioned that the PM will only give other project to us after the first project completed”.

The ability to provide excellent performance in the first project is very important to gain the PM’s recognition on the consultant’s capability in conducting the project. This would in turn determine the PM’s willingness or unwillingness to continue giving projects in future. If the consultant is able to perform in the first project, it verifies that trust given by the project manager at the pre-relationships stage was warranted. From there, trust would develop and...
consequently PM would commit to give them more projects in future. The data showed that all Consultants have fulfilled their PM’s expectations. However, Consultant B highlighted that performance was not the prerequisite to get projects in future. In fact, he emphasised that a consultant should know how to persuade PM and learn their interest.

‘To get projects, you must lobby them and it should be for the common interest of both parties’. In fact, he said, ‘you must know them personally and they know you personally. In order to get to know very closely, I have to meet and visit them regularly’. Cons B also stressed that, ‘it has been a practice that we will have lunch or coffee together either at the meeting venue or any restaurant after each meeting. We normally join them until the function is over. The most important thing according to B was that ‘we have to be very close to the decision-maker of that firm and normally he is the owner of the firm’.

These quotations show that the technical aspect were not significant in obtaining the future projects. In fact, it was the relational elements that were more vital. It also demonstrated that the decision to continue a contract was not based on the performance alone, but it was based on ‘whom you know’ instead of ‘what you know’.

The exploration stage also occurred from the perspective of consultants to their PM. Consultant B developed trust in their PM when they did not face any problems working with the PM and they received all payments accordingly. ‘PM could be trusted as a good company. In terms of payment, I trust them. I received all my payments and they never deduct fees that I suppose to get’. This indicated that consultant B was satisfied with the PM’s service and their relationships. However, dependency on the same project manager did not guarantee that the consultant would get more projects in future. Consultant E stated that ‘we only have to ensure that we have good relationships with them, but that does not guarantee that we will get more projects in future. We cannot force them. We only rely on fate determined by God. In an uncertain situation, the consultant did not depend on the power of the PM in giving them projects preferring to rely on fate.

Stage 3: Indebtedness (terhutang budi) stage

 Consultant C entered the relationships with the PM at Level 3, i.e. the indebtedness (terhutang budi) stage. Indebtedness is the feelings of being in debt of kindness existed when he/she has been helped or obtained kindness from others. The owner of Consultant C was a former staff of PM and had established a long-term personal relationship. When Consultant C decided to set up his own firm, the PM offered their help in providing consultancy opportunities. The PM also agrees to incur operational expenses such as the office rental,
employees’ salaries payments and other expenses payments. This situation implied that the PM has placed a high degree of trust on Consultant C. When Consultant C was prepared for the relationship he said that, ‘I appreciated PM because they gave me the opportunity to learn many things. I consider PM as my university. It’s because I’ve learn many things about professional practice. If I didn’t work with them, I won’t be at this stage without their help’.

However, the expenses spent on Consultant C’s business were in the form of advance and Consultant C had to pay back all of these expenses when he received revenue from his projects. In addition, the PM also requested that the profits gained by Consultant C should be shared based on an agreed percentage. Thus, Consultant C’s willingness to partner with the PM by sharing his profits was resulted from the concept of indebtedness (terhutang budi) felt by Consultant C. This situation of indebtedness makes them feel ‘malu’ (literally shame) to the donor until he can repay such debts. The PM’s decisions in choosing Consultant C and giving them projects continuously represented the power of the PM. Consultant C became loyal to the PM only after the PM showed their commitment to partner with Consultant C. On the other hand, PM became loyal to Consultant C due to his commitment to carry out his responsibilities as a consultant and prepared to share his profits with the PM.

**Stage 4: Commitment stage**

Commitment is the desire to continue the relationships in future. In this study, commitment appeared at level 2 of the relationships, in which Consultant A entered the relationships with the PM at this stage. This was because trust in Consultant A has been developed before Consultant A entered the inter-organisational relationships (two of the Consultant A’s directors were former staff of the PM’s firm). As a result, the PM awarded many repeat projects to Consultant A, ‘after I left PM in 1995, we immediately got projects from PM, from small to big projects,’ and ‘trust has already existed because the relationships with PM have already been established, especially when I knew the Executive Director, Managing Director and Chief Executive Officer personally and they also knew me personally. So, trust was there for quite a long time because we were the former staff of PM’.

Even though the interpersonal relationships with the senior management of the PM had been established, the relationships were not sufficient to form a collaborative relationship. As Consultant A stated, ‘we do the work on our own and PM just monitor. Whether we deliver or not, we designed as per client’s requirement. To me, the PM’s roles are quite minor’.

Consultant A perceived that the PM did not play an important role in delivering the service to

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the client. In fact, Consultant A was heavily dependent on the client who they believed had greater power to award projects than the PM. For example, if the client felt that the consultant chosen by the PM has too many projects, client may overrule this decision by asking the PM to appoint other consultant whom of which not within the PM’s consortium. As was stated by Consultant A, ‘...there was a situation where Client N decided that the PM has to appoint us as the consultant instead of Consultant P because Consultant P has a lot of projects in hand (Consultant P is a member of the ‘consortium’). So, at a certain point, we feel that we are competing with the PM. So, when we are working with the PM, we worked as a team, but at other time we have to compete with them to get the projects. These are the two situations that we faced. But, trust is still there’.

Accordingly, there, must be trust from both parties, i.e. the project manager and Consultant A, for the relationship to develop further.

**Stage 5: Dissolution stage**

Dissolution takes place when loyalty of the two parties deteriorates. Loyalty begins to deteriorate when either party realised that the relationships does not benefit them in bringing in more profits and that they have better options in dealing with this problem. Consultant C was not satisfied with the proportion of profits shared and started to consider leaving the relationship after five years. He believed that he could have had higher profits if he worked independently and did not rely on the PM. As a result of dissatisfaction with the PM, his loyalty started to deteriorate. As he stated, ‘I’m unhappy because for every profit that I get, I have to share with them. Whenever I get the payment, after deducting all the expenses, I still have to give them’. His statements implied the feelings of dissatisfaction with the PM due to the burden of sharing the profits with the PM. Accordingly, Consultant C decided to exit from the partnership. However, considering the huge amount of money to be repaid by Consultant C, the PM considered instalment method of payment instead of one lump sum. The act of tolerant (*tolak ansur*) shown by the PM was one example of the good manners found in the Malay culture. However, the end of the partnership did not totally end the business relationships. PM still awarded projects to Consultant C, but not as frequently as when they were in the good relationships. This reflects an element of normative commitment on the part of the PM.

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DISCUSSION

The results in this study present a number of issues worthy of discussion. Firstly, it was found that the existing inter-organisational relationship models in the literature did not accord with the Malay organisations. It is argued that there is a need for more culturally sensitive models which fit the Malay cultural context. As a result, a model that represented the Malay organisations was developed in this study. Three levels of entry to the relationships were found and they were incorporated in the model. Each level of entry differs in accordance with the degree of inter-personal relationships in the pre-relationship stage. The organisations that have no personal contact with the counterpart would enter the level 1 of the relationships. On the other hand, those who have close personal relationship would enter at level 2 (in commitment stage) or level 3 (in indebtedness stage) of the relationships (as shown in Figure 1). However, the commitment stage at level 2 and level 3 differed in that there existed two main cultural elements, indebtedness (‘terhutang budi’) and ‘malu’ (shame) at level 3. In this study, ‘terhutang budi’ and ‘malu’ were the pre-requisite to willingness for relationship. In the previous research, ‘terhutang budi’ and ‘malu’ were considered as strong values among the Malays in the perspective of socio-cultural relation (e.g. Dahlan, 1991; Goddard, 1997). However, studies that found ‘terhutang budi’ and ‘malu’ as the pre-requisite to relationships in the perspective of inter-organisational relationships were lacking.

Secondly, the model in this study showed that the contractual relationships between the PM and its five consultants started at various levels, i.e. the beginning of each level; exploration stage in level 1, commitment stage at level 2 and indebtedness stage at level 3. It differed from the previous models, which the contract started in the middle of the whole stages of the relationships. For example, at level 1 of this study, the contractual relationships began before the exploration stage started. The PM was willing to have the contract before receiving and experiencing any service from the consultant. Exploration did not occur before the contract started as other models. This is because PM did not buy any one-off service from the consultants before making decision to have the contract and thus, did not know the competencies of the consultants. In fact, the PM only relied on the consultants’ company profile and their reputations before signing up for the contract of the projects involved.

Thirdly, the results also demonstrated that the PM’s willingness to partner with the Consultant C could be viewed in the perspective of entrepreneurship to set up a new organisation. The roles of the PM did not only restricted to a normal project management consultancy but also

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acted as a ‘venture capitalist’, which involved in helping to set up, manage and oversee the founding and development of a new firm (Thornton, 1999). As a new firm, Consultant C relied on the PM’s organisation for continuous projects in order to be secured in business. Accordingly, the formation of a new entrepreneur (Consultant C) was one of the examples that PM helped the Malays to actively involve in business.

Fourthly, the findings from the case study exhibited the existence of the main relational norms at every stage, i.e. power, trust and personal relationships. The power to appoint the consultants for any projects has been the main factor to continue the relationships. As indicated in the previous literature of relationships, if one party has a strong power to appoint, the party that would be potentially appointed would be highly dependent on this party (e.g. Cox, 2004). Interestingly, this study found a different perspective of dependency, in which the consultant was not highly dependent on the project manager. In fact, they were highly dependent on their fate or have faith on God’s power to determine whether they would be awarded more projects or vice versa. The value that they practice from the religion they embraced has been cultivated in them and thus has emerged as their attitude in dealing with these relationships. (e.g. Abdullah, 1992; Rashid and Ho, 2003)

This study also found that trust existed at every stage of the relationship development. But the level of trust demonstrated by both parties differed at every stage (e.g. Naismith et al, 2005). For example, the project manager’s trust in consultant B at the beginning of the relationships was based on recommendation from project manager’s staff. Doney and Cannon (1997) describe that gaining trust through third party’s definition of another is the basis for defining that other is trustworthy. Here, trust was transferred from a trusted proof source, i.e. the project manager’s staff to the project managers (Milliman and Fugate, 1988). In addition, the written document indicating the rich experience of the consultants and their recognition as a chartered consultant was based on the institutional trust, in which they gained a third party certification that defines their trustworthiness and expected behaviour (Zucker, 1986; Pavlou, 2002). The level of trust would keep increasing especially when the consultant demonstrates competency and credibility in providing the service as required by the project manager in fulfilling the contractual obligations (e.g. Anderson and Weitz, 1989; Naismith et al, 2005). The element of personal relationships seemed to be a vital factor at every stage. In a collectivist society, personal relationships could be the measure of success or failures of

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certain relationships. The connotation of ‘whom you know’ demonstrates that decisions could be based more on connections rather than on merit (Javidan and House, 2002).

Fifth, dissolution of partnership occurred when the parties involved felt that they were not receiving benefits from the partnership. However, a surprising result found in this study was that even though the consultant had already exited from the formal contractual relationships with the project manager, their long interpersonal relationships led them to continue to award projects to the consultants. It implied that through the dissolution of formal relationships, the consultant did not have to share profits with the PM and that ended the inter-organisational contractual relationships, but not the interpersonal relationships. This result differed from the previous literature, in which the business relationships ended at the dissolution stage when the parties involved started to look for other business network to continue their business.

CONCLUSION

Theoretically, the framework developed in this study (as shown in Figure 1) demonstrated that indebtedness (terhutang budi) and ‘malu’ (shame) are two important cultural Malay values, in which they act as the antecedents to the relationship. Thus, any local or foreign parties who would like to deal with Malay organisations should receive their repayment for any helps that are given to them, whether it is in the form of tangible or intangible gift. This is because they have a strong belief that any good deeds that they receive should be repaid. Long-term commitment emerges as consequence of these values rather than transactional requirements emerging out of contractual relationships. This study provide guidance to any foreign construction organisations who are interested to deal with and entered the construction industry market in Malaysia with regard to the specific characteristics of Malaysian construction industry market.

REFERENCES


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