RELATIONSHIP AND KNOWLEDGE MANAGEMENT AMONG CONSTRUCTION DEVELOPMENT PROJECT MEMBERS IN THAILAND: THE CLIENTS' PERSPECTIVE

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The unsatisfactory performance of the construction industry in Thailand is influenced by the fragmented structure and the inefficient multi-stage project development process. Good relationships, the creation of new knowledge and effective knowledge management is crucial particularly at the development appraisal to achieve improved and sustainable performance in the construction industry. This study is an investigation of the relationships among team members and knowledge management practice in Thailand's construction industry. Semi-structured interviews conducted in the field research with a selection of large client organisations revealed that significant close or network relationship exists between clients and key project team members. However, knowledge management practices were heavily influenced by team members' self-centred nature. There is therefore a need to adopt knowledge management practices to improve project performance at the development appraisal stage as this could have significant knock on effects on subsequent stages. Failure to address relationship and knowledge issues could affect the uptake and sale of development projects.

Keywords: development appraisal, knowledge management, network relationship, project development processes, Thailand construction industry.

INTRODUCTION

There are two major factors or characteristics that contribute to unsatisfactory performance in the construction industry. Rethinking construction known as the Egan (1998) report recognised that the fragmented structure is the first crucial factor. There are at least seven influential groups of agents: employers or clients, architects, quantity surveyors, technical consultants, clerk of works, contractors and subcontractors who are involved in the product development and project implementation (Chappell and Willis 1992). A wide range of other professional and research organisations such as planning agencies, lawyers, bankers and higher education institutions are also engaged in the project development process. Low barriers to entry provide fair opportunity for agents and professionals to compete as suggested in Porter's competitive strategy framework (Porter 1980). There is a wide range of stakeholders involved who only focus on their own responsibilities, value and interests, known as fallacy of centrality (Westrum, 1982 in Weick 1995: 2). This creates a clash of self esteem strongly cultivated from the unique skills and

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professional training unavoidable (Davenport and Prusak 2000). Rothman and Friedman (2001: 590) argued that '… people and groups tend to forge their own sense of self in opposition to others...' They also seek appropriate sources of power to protect and promote personal psychological adequacy (Hosking and Morley 1991: 125).

The second distinct characteristic is the linear multi-stage (Sexton and Barrett, 2003: 619) and project based development process which can be identified in eleven successive sequences as shown by the Royal Institute of British Architects (RIBA) Plan of Work. However, it is the early 'promotion' stage where crucial decisions on development appraisal that would have significant impact on the subsequent stages in design construction and operation are made. The limited life cycle of a project causes learning difficulties as the team is quickly dissolved once the project is completed. There is therefore limited time for team members to review and subsequently learn to update their knowledge. Morris and Loch (2002) described this state of discontinuities as follows '…It is generally rare for project lessons to be reviewed during the progress of the project; and there is too often inadequate review of the project upon completion…'

In order to improve the performance of construction project development process, the fragmented structure of the team and the delivery process has to be addressed. The links between team members can be strengthened through appropriate project procurement systems to control and manage the flow of information. The creation of continual relationship beyond the constraints of the short-lived project nature can also be achieved through the increasing application of partnering principles where specialists and suppliers are repeatedly employed. However, understanding the nature of the relationship between key project participants and effective knowledge management practice is crucial to improve project performance through better use of existing knowledge and the creation of new one.

This study will investigate the relationship among construction team members as well as knowledge management practices at the development appraisal stage in Thailand from the clients' point of view. The specific objectives of the research are:

1. To identify the strength of relationship among key project team members and the efficiency of knowledge management at the development appraisal stage, and
2. To identify factors that influence the relationship between the key project members and good knowledge management practices

The next section is a review of the role of social network relationship and knowledge management followed by the research methodology. Case studies based on major commercial development projects in Thailand are then presented and discussed. The paper concludes with the key lessons learnt to improve the performance of future construction projects.

LITERATURE REVIEW

Social network relationship and knowledge management

Social network analysis is a method for capturing the complexity of relationships in different environments. It involves mapping the relationships between people or organisations to gain a unique insights and better understanding of processes, groups, stratification, hierarchies and to identify key players (Hawe and Ghali 2008). The complex networks of communication channels among construction professionals,

multidisciplinary enthusiasts who share common interests under the communities of practice theory suggested by Wenger (1998) can be effectively captured using social network analysis. According to Scott (2000), numeric sociometry forms such as tables and diagrams can be used to represent the relationship and the information can be transformed into graphic forms known as sociogram. It is based on the graph theory to show particular features such as centrality and density of the relationship with the help of specially designed software such as UCINET. Centrality of relationships is calculated based on the extent a network is dominated by few people so people with the most ties have the highest centrality scores. Density of relationship reflects the 'amount of ties present as a proportion of the total possible ties' (Hawe and Ghali 2008)

Hawe and Ghali (2008) argued that 'social relationships affect the subjective domain of people's experience (how people feel) and also the instrumental aspects of human experience (what information or resources people can access). Data from social network analysis is therefore very useful in (1) identifying the connection of participants and (2) creating more effective networks necessary to facilitate knowledge sharing, reuse and creation to improve project performance.

The well regarded Nonaka and Takeuchi's (1995) knowledge conversion model as shown in Figure 1 can be used to understand how knowledge is created, used and managed through the dynamic interaction of tacit and explicit knowledge using four distinct processes/stages.
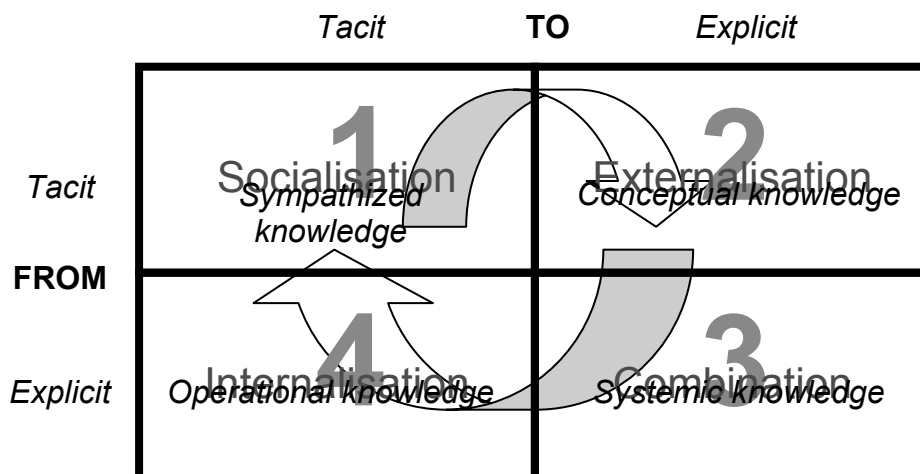

Figure 1: Four Stages of Knowledge Conversion

At the Socialisation stage, all project team members are expected to share and contribute ideas, values or emotions (Nonaka and Takeuchi 1995: 8) to create tacit sympathized knowledge. Dialogue and discussion among the engaged parties at the Externalisation stage will create three types of explicit 'hard' conceptual knowledge: technical, procedural and organisational (Kasvi et al 2003). Moreover, relational process executed at this stage through three tangible managerial actions: recognition, participation and symbolism (O' Reilly and Chatman in Hartmann 2006) also initiates the first significant types of tacit 'soft' knowledge: culture, values and norm at organisational level. The second types of soft knowledge are mental models that are composed of meaning, temporal identity and the sense of belonging to a new community (Wenger 1998) are usually developed at personal level through two consecutive steps: reflection and inquiries. New knowledge has to be appropriately captured and articulated as explicit systemic knowledge at the Combination stage. The

application of systemic knowledge to complete the tasks as well as the retrospective reflection and sensemaking (Weick, 1995) of the newly acquired experiences will create tacit operational knowledge in each of the team members' cognitive map at the Internalisation stage.

There is very limited research on the application of social network analysis in construction. Previous research in construction, for example, Pryke (2004a) explored the relationship between clients and contractors. The nature of social interaction or networks among key project participants in the development appraisal stage has not been addressed. Furthermore, most knowledge management research has focussed on the design and construction stages (Robinson et al 2005). There is therefore a need for better understanding of the links between the nature of the relationship and knowledge management at the development appraisal stage to improve the project development process and outcomes.

RESEARCH METHODOLOGY

To address the research objectives, a qualitative approach using the case study method was adopted to collect data and information about the nature of the relationship between project participants and knowledge management practices at the development appraisal stage in Thailand. A qualitative approach is deemed more appropriate as it provides an opportunity for a more in-depth exploration and understanding of the key issues compared to a quantitative approach. Qualitative approach is concerned with processes and peoples experiences. The researcher is therefore able to understand a situation better through observation, document analysis, and interviews.

Semi-structured interview techniques using standardized questionnaire were used to collect data about the case study organisations. The literature review provided the basis for developing the questions focused on key themes relating to the research objectives. The case study questions were structured to start with general information about research participant, the company and the selected project to provide the context for analysis. Questions were designed to obtain information about three aspects of social network relationships between clients and other key team members in the projects focusing on (1) whether a relationship exists, (2) the strength of the relationships based on the frequency of connection and (3) the quality of the relationships between project members in the development appraisal stage. Questions were also asked about the nature of knowledge sharing and management practices at an organisational and personal level using the four processes of Nonaka and Takeuchi's knowledge conversion and creation model.

Selected client organisations who are the most influential members of the project development process were targeted. Five out of eight companies contacted participated in the case study interview sessions. The client organisations are property development companies recently involved in the development of large commercial residential projects in central Bangkok. The projects were selected as a large number of key specialists were likely to be engaged in the development process which provides extensive opportunities to study relationships and knowledge management practices. The interviews were conducted with senior managers/directors from the five companies selected and each interview lasted between one to one and a half hours.

The data collected from the case studies are presented in the next section. Data collected on the relationship between team members was analysed and presented in

graphic forms using UCINET computer software dedicated to social network analysis. Information collected about current knowledge management activities was also evaluated using content analysis.

CASE STUDY FINDINGS AND DISCUSSIONS

In order to protect privacy of research participants and confidentiality of the recorded information, each of the five collaborating companies were given coded names S1, R S2, L and A. Most of the companies except L, started as small private companies during the last economic boom period in late 1980s to early 1990s. Their transformation to become public companies employing hundreds of people took place rapidly when the economic condition was at its peak. These large organisations were designed to run development projects from single headquarters using their in-house legal, financial, design and engineering as well as sales and marketing departments.

The development operations were monitored to meet deadline and budget constraints by subordinates who were closely supervised by senior executives.

Information about selected projects

A comparison of the profile of the selected case studies is shown in Table 1.

Table 1: The selected companies' general information

Case	Est. Year.	Year listed	Total employees	Project dev. dpt. employees	Registered capital (m Baht)	Paid capital (m Baht)	2006 revenues (m Baht)	2005 revenues wwwq (m Baht)
S1	1989	1993	300	N/A	1,770	1,570	4,563	3,444
R	1994	1994	100	N/A	2,978	2,108	930	1,755
S2	1994	1995	350	N/A	19,238	6,307	11,482	10,517
L	1973	1989	500-600	20	10,354	8,659	23,871	19,553
A	1991	2000	300	20	2,343	2,294	6,344	4,490

As seen in Table 2, all of the selected projects developed by the chosen companies were commercial residential projects in Bangkok's central business district (CBD). The high value of land plots had a significant influence on the development scheme as it resulted in high rise, high density and higher prices that can mostly be afforded by middle to high income customers. Executive project management/management contracting was mainly adopted as the project procurement approach under supervision of a project manager. There were also extensive arrangements to establish repeated collaborations in the subsequent projects in almost all cases.

Most of the projects took approximately two years from inception to allocation or project sale. The largest portion, around 50%, of the overall development budget was paid for the construction cost. Developer's profit margin came at 30-40%. It was followed by 10-20% of the budget for land cost that nowadays is paid to secure the site only in the short period before the beginning of construction works to minimise financing cost. The major source of project development fund came from local commercial banks. The gearing ratio that indicates the relation between bank loan and company's investment was different from project to project. As individual project financial data was considered as secret but information from case study R suggests that loan can be procured up to 70% of the development cost.

Table 2: The selected project information

Case	Selected projects	Land area	Number of units	Unit area (sq. m)	No. of floors x building	Sale price	Project value (m Baht)	Project timeline
S1	Oriental Place	2 -0-139 rai (3.756 hectare)	302	40-126	20	48,000-50,000 (Baht/sq. m)	906	2004-2006
	Premier Place	Approx. 2 rai (3.2 hectare)	Serviced apt: 138	53-199	28	N/A	1,546	2003-2005
			Condo: 358	53-120	30	48,000-100,000 Baht/sq. m		
R	The Lakes	Approx 2 rai (3.2 hectare)	165	67-210	36	8-22m Baht/unit	1,600	2003-2005
	The Legend	540 sq.wah (2.16 hectare)	75	66-413	14	N/A	1,545	2004-2006
S2	Yenakat	481.50 sq.wah (1.926 hectare)	79	N/A	8	Resale:3-7m Baht/unit	354	2003-2005
	Sukhum-vit 10	2-0-9 rai (3.2 hectare)	118		8x2	Resale: 6m Baht/unit	630	2004-2006
L	Sub	3.7 rai (5.92 hectare)	155	51-122	8x3	4 m Baht/unit	N/A	2003-2005
	Narathi-was	8.4 rai (13.44 hectare)	294	56-164	8x5	4 m Baht/unit	N/A	2003-08/2005
A	BKK Siam	3-2-50.5 rai (5.8 hectare)	580	48-140	26x1 & 27x1	65,000 Baht/sq. m	2,500	2004 – 2007
	Address Siam	1-2-30 rai (2.52 hectare)	224	48-99	24x1	85,000 Baht/sq. m	1,000	2005 - 2008

The existence of social network relationship in the selected projects

Table 3 shows the reciprocal relationships between five key team members: client, investment/financial consultant, legal consultant, project manager and planning authority in all cases. However, building designers, another key team member, were not usually seen as significant as others. For example, in case S1, they were simply expected to create the habitable space based on the approved appraisal.

A number of lost links were also recognised. Firstly, there was no obvious link to potential users. Information needed to produce speculative development projects was mainly acquired from companies' database. Secondly, there was no dedicated public or private consultant who specialise in planning and regulation/legal issues. The tasks were carried out by agents in related fields. For example, legal matters were carried out by specialists in-house departments like in case S1 or by appointed legal firm, Alan and Ovary, in case R. Project investment and financial analysis were also mainly carried out by in-house specialists but this had to be approved by lenders such as commercial banks and investment funds as seen in cases S1 and R. Only in case R who aspired to achieve international standard of practice engaged specialists at every stage. Moreover, support from relevant professional organisations and higher educational institutions were marginal and infrequent as suggested in case R. Only active members of Thai Condominium Association like S1 who have long and continuous alliance with the organisation from its inception in 1980s would be able to take the advantages.

Table 3: The existence of relationships

Cases S1, R, S2, L, A	Client	User	Public planning agency	Private planning agency	Investment / financial consultant	Legal consultant	Project manager	Planning authority	Building designer
Client	-	0	0	0	1	1	1	1	0

User	0	-	0	0	0	0	0	0	0
Public agency	0	0	-	0	0	0	0	0	0
Private agency	0	0	0	-	0	0	0	0	0
Investment/ financial consultant	1	0	0	0	-	1	1	0	0
Legal consultant	1	0	0	0	1	-	1	1	1
Project manager	1	0	0	0	1	1	-	1	1
Planning authority	1	0	0	0	0	1	1	-	1
Building designer	0	0	0	0	0	1	1	1	-

Notes: 0 = no relation   1 = relationship detected

Strength and satisfaction of relationships

Clients' representatives were also asked to rate the strength and satisfaction of their relationships with other key team members from a minimum 1 (lower strength) to a maximum 5.

The result, as seen in Table 4, confirms that even though the prominent links between client, financial consultant and specifically recruited project manager in cases S1, R and A were detected, they were not very strong because of the more prominent role of in-house departments. However, strength of relationships with some exclusive members such as planning authority that possesses legislative power to grant or withhold planning consents was rated much higher. A dedicated department had to be set up in case L to guarantee the smooth relationship with this influential governmental body. In terms of satisfaction, it was generally high. However, the strongest relationship does not always imply that it is a satisfying one. As seen in the low level of satisfaction of the relationship between clients and planning authority. Moreover, size of the company was also influential to the level of strength and satisfaction. In case S2, strength as well as satisfaction scores were lower than in previous cases even though the project development process was not completely different. The underling reason given by the Vice President was the large size of the organisation. The vast number of ongoing projects at any given time was likely to confuse employees working in small units. The efficiency of the overall operation was inevitably decreased. On the contrary, in case L where a small group of people are working closely together, degree of strength and satisfaction were placed more highly.

Table 4: Strength and satisfaction of relationship with clients

Cases	Financial consultant		Legal consultant		Project manager		Planning authority	
	Strength	**Satisfaction**	**Strength**	**Satisfaction**	**Strength**	**Satisfaction**	**Strength**	**Satisfaction**
S1	2	5	5	5	3	5	5	2
R	2	5	5	5	3	5	5	2
S2	4	3	3	3	3	3	3	2
L	5	4	5	4	5	4	5	4
A	3	4	3	4	4	4	3	2

Knowledge management practices

In terms of Socialisation stage to share and create knowledge, strategic support was generally available. Every company's annual report, promises to encourage socializing activities that leads to the creation of tacit sympathized knowledge. Top executives were also in full support by actively playing the role of knowledge champions. As in case A, strategic problems can be effectively solved through Chief

Executive Officer's (CEO) intervention. Moreover, the team's morale can be extensively boosted by the executive's regular site visits in case S1. The overall satisfaction of activities at Socialisation stage was very high in most cases. Lower score of satisfaction was initiated by either the aspiration to achieve better result like in case S1or the still unsolved problems such as the long line of command in case S2 that makes effective information exchange hard to achieve.

Dialogue or verbal communication and discussion like informal discussions and formal meetings were used as the brokering technique to initiate 'hard' conceptual knowledge at Externalising stage. Metaphors and analogies to the past projects were also used to clarify the ideas. Each of the team members generally employed the convenient overlap practice that does not require change of identity while negotiation with others would take too much time and efforts. Negotiations were supported by education and training programmes in the form of seminars and courses arranged by both the company's HR department, employees representative like Staff Council in case R or external well-regarded institutions. Good performance recognition and reward programmes like Year of Service Excellence (YSE) programme, as seen in case S2, were widely used as incentives to encourage further externalising and learning in every case. Apprentice-type coaching between newcomers and veterans were also used in smaller scale as in cases S2 and L. To avoid disintegration among the team members, structural conflicts that emphasises the differences between current status and the ultimate goal to encourage learning to improve personal capability were toned down in all cases. At the same time, people's ideas were always appreciated and valued. It can be seen from a number of campaigns and activities, some with prize money like in case A, that there is a drive to promote knowledge sharing. However, it was noted that the level of participation was not so high. The sharing culture was more apparent in the intimate environment with shorter line of command as seen in case R's financial department. Level of satisfaction at this stage was as high as in Socialisation stage.

Written document was the primary type of media being produced to systematically codify tacit ideas and to integrate explicit project documents at Combination stage. The application of document management technology can be seen in case L where online project management system (OPM) like Lotus Notes was introduced to executives and operation staff. The successful application of the new technology influences the high level of satisfaction. The newly created explicit systemic knowledge can be used for the application to secure planning permission and financial supports.

At the Internalisation stage, it is confirmed that there was limited time for reflection and learning practices at the end of each project. It made the development of new tacit operational knowledge hard to achieve. Only in some projects like case L that an executive project development report was produced for learning, reflection and future application. In other cases, just informal documents and personal notes were prepared and used in a limited circle.

CONCLUSIONS

The outcomes from field research confirm the close link between relationship, knowledge management practice and the overall project performance. However, the unsupportive industry structure compromises the opportunity to establish a long lasting relationship and sustainable improvement in performance in Thailand's construction industry. For example, the attempts to improve the quality of relationship

and collaboration in a particular project were restricted by the type of procurement system. Only two systems have been widely adopted: traditional and executive project management/management contracting. However, the concept of partnering has also been recognized by clients and generally applied to complete a series of projects.

Even though the extensive range of collaboration among members is strategically encouraged through the Socialising stage, strong dependency to particular agents and organisations especially in house departments can still be detected. The engagement with fewer project members can be seen as the effective solution to reduce the number of participants to address the problems created by the fragmented structure of the project process. However, it is likely to minimise the scope of knowledge sharing, and the potential to create new knowledge. Overlap brokering style were generally adopted by most of the self conscious team members who still strongly guarded their own importance. It made the cultivation of true companionship as the basis of successful knowledge sharing harder to achieve. The strong existence of fallacy of centrality together with the distinctive Thai culture that values modesty and hierarchy based on seniority also hindered the full development of efficient mental models. At the Combination stage information technology was effectively used to develop tangible documents. However, limited availability of time for reflection and inquiries of the past experiences in the project-based environment made it hard to utilise the existing systemic knowledge as well as to create new operational knowledge.

Additional field research is planned to further explore relationship and knowledge management practice using the same projects but from other stakeholders perspectives such as governmental planning agencies, construction professionals and bankers. These findings will be used to develop a framework to improve relationships between key participants and to promote effective knowledge sharing and creation to facilitate continuous performance improvement in the construction industry in Thailand.

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