KNOWLEDGE MANAGEMENT FOR SMALL OCCASIONAL CONSTRUCTION INDUSTRY CLIENTS: A THEORETICAL FRAMEWORK

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The role of a client has significant impacts on construction project performance. Major regular clients (the project owner) can afford in-house expertise to play the role as the client's representative (also called the project sponsor), to enhance the quality, value for money and suitability of the building procured. However, small occasional clients (SOCs) are not likely to enjoy the advantages stated above due to limited budgets and the occasional commissioning of projects. For this reason, it has been said that SOCs show a lack of knowledge that is necessary to act effectively as the client. To counteract the disadvantage, the theories and practices of knowledge management (KM) seem to present a logical way to support SOCs to acquire knowledge. Stemming from organizational competence theory, it could, in part, be adopted to facilitate KM for SOCs. Hence, this paper not only presents a review of several KM theories that appear to offer benefits, but it also addresses the limitations, supplemented by a societal-approached theory. The paper concludes with a societal-approached domain model to facilitate KM for SOCs, which is merely a basis for further research. The entire research framework will be briefly mentioned in the conclusion.

Keywords: client, knowledge management, facilitator

INTRODUCTION

A series of reports (Latham, 1994; Egan, 1998) have increased emphasis on the significance of the clients' role towards better productivity in the construction industry. These reports suggest that client performance should be enhanced, not neglecting the need for better performance from other parts within the industry.

Major regular clients have maintained 'intellectual capital' to achieve this goal. In contrast, small occasional clients (SOCs) are unlikely to follow this trend, as they lack sufficient knowledge (O'Reilly, 1987; Salisbury, 1990). Yet despite the difficulties the SOCs face, methods to aid SOCs, in acquiring the knowledge necessary, have rarely been discussed.

As a part of an ongoing research commencing from this need, a preliminary research study is performed. The intention of it is to clarify the scope of the research and discuss the potential difficulties that may arise while conducting robust and detailed, empirical investigations. This paper discusses the theoretical framework developed thus far and aims to present: the situations faced by SOCs regarding knowledge acquisition, theories and arguments in the KM field and a domain model to facilitate KM for SOCs.

SMALL OCCASONAL CLIENTS

The performance of clients varies and it is usually affected by their experience (CCF, 2000). In general, regular clients are very well informed, know what they want and take decisive steps to achieve it. In contrast, occasional clients are often at the mercy of the conservative construction process (Higgin and Jessop, 1965; Latham, 1994; Fisher *et al.*, 1997). Major regular clients have launched a steering group to assert their interest in the construction industry and have shown a capacity to manage the project with in-house expertise (HM Treasury, 1999; CCF, 2000). Hence, their levels of expectations are increasingly on the rise, requiring that the providers of the clients' services and products match the needs dictated by those of the market place (Egbu *et al.*, 1999).

Although the major occasional clients do not have as much power as the major regular ones do, they can still afford to hire advisors in the pre-project phase (HM Treasury, 1999) and/or project mangers to direct the project on behalf of them (Walker, 1996). Currently, they are the players in the spotlight, as they are regarded to possess potential in dramatically enhancing the performance of the industry.

However, some occasional clients have reported to have difficulties taking the role as the client (O'Reilly, 1987; Salisbury, 1990). Prior to making the first point of external contact, all clients are recommended to clarify their requirements (Kelly and Male, 1995), establish their role in the project (Baden, 1988) and obtain information on potential service providers, such as external project sponsors, architects, building surveyors, builders, etc. (Goodacre *et al.*, 1982). These strategic decisions are made in the pre-project phase and are the most important aspects of the project process (Kelly and Male, 1995). Given that the recommendations pertain to all clients, irrelevant of client experience and/or what their budget will allow, the main difficulties faced by the occasional clients are during the earliest project phase. CCF (2000) points out that: "Occasional clients rarely obtain independent advice, find it difficult to formulate their requirements and need much more time to consider their objectives/business case and commercial options before commitment."Before continuing the discussion, it seems necessary to define the term 'SOCs'. Although a couple of researchers have used the term in publications (e.g. Morledge, 1999), an authorized definition of it has rarely been found. In literal terms, 'small' refers to the project value and 'occasional' is indicative of the expenditure interval in the market. However, a definition based on these quantitative criteria could hardly be agreed upon broadly. In this paper, the term 'SOCs' is used to characterize the clients in terms of possession of intellectual capital, rather than the literal definition. In short, SOCs can be categorized as clients who cannot afford to hire external expertise, such as advisors or project sponsors, due to limited budgets and those that do not have in-house expertise to manage projects because of their random commissioning of projects.

Hence, due to the characteristics associated with SOCs, a means to support and enable SOCs to acquire knowledge towards enhanced performance is required. Research in KM already conducted in the construction management fields (e.g. Winch and Schneider 1993; Egbu *et al.*, 1999) present its knowledge of body and the direction towards which further research is taking place. However, current research is mainly concerned with the competency of organizations in the construction industry and therefore, it necessitates a distinct or altered method to aid SOCs. To cull a method, theories and practices in KM need to be reviewed with a perspective that is not based on the conventional organizational competency theory.

KNOWLEDGE MANAGEMENT

KM is widely mentioned in literature to the point of overexposure. Hence, this paper presents not a detailed review of KM, but arguments and practical methods in the field. This section focuses on finding a potential method suitable to facilitate KM for SOCs.

Background: definition and crucial factors for KM

It is widely agreed that intellectual capital is a critical resource, enabling organizations to yield competent performance in the market place (Quintas *et al.*, 1997). KM is about the management of intellectual capital controlled by the company (Mårtensson, 2000) and it can be broadly defined as "encompassing any processes and practices concerned with the creation, acquisition, capture, sharing and use of knowledge, skills and expertise" (Quintas *et al.,* 1997).

One aspect of intellectual capital is knowledge. Sharan and Sharan (1992) define knowledge as being "what people construct out of elements of information, feelings, and experience with the requisite amount of repetition". Various classifications of knowledge have been presented and one of most common is that which divides it into 'explicit' and 'tacit'. Explicit knowledge is documented and public, structured in a fixed-context, externalized, and conscious (Duffy, 2000), as it is captured and shared through information technology (Mårtensson, 2000). On the other hand, tacit knowledge resides in the human mind through behaviour and perception (Duffy, 2000). Hence, this evolves from people's interactions and requires skill and practice.

Beijerse (2000) presents a practical perspective on KM for entrepreneurs. He believes that KM is the management of information within an organization from steering the strategy, structure, culture and systems (system-bound factors) and the capacities and attitudes of people (people-bound factors) with respect to their knowledge. In this case, the strategy serves to determine the goals with regard to the knowledge on a short and medium term. The structure is there to 'facilitate' people in making their knowledge productive, whereas the culture does this by primarily targeting the 'motivation' of people to actually employ the offered systems. The systems are targeted at the management of operational instruments to make information, capacities and the attitude within the organization, productive. Regarding people-bound factors, attitude is what makes people want to think, interpret and act, whereas capacity is that which makes information from data transform into useful and meaningful information.

From technology to people

In order to implement a proper structure and system, information and communication technology can be deployed. However, a biased technology-oriented approach may cause one to neglect people-bound factors.

A dilemma concerning the technology-oriented approach is that organizations attempt to manage explicit knowledge rather than tacit knowledge, as the former is more easily coded and structured than the latter (Scarbrough and Swan, 1999). Organizations are now beginning to recognize that technology-based advantages are short-lived and employees are the only sustainable competitive advantage they have (Mårtensson, 2000).

Recently, methods to manage tacit knowledge that resides in the human mind, behaviour and perception, are presented. Scarbrough and Swan (1999) have discussed the need for a community model to share tacit knowledge as a counterpart to the

cognitive model to manage explicit knowledge. Markus (2000) calls the technology-oriented trend 'engineering' and calls for a 'cultivation' of a proper context, in which tacit knowledge could be shared.

Infield (1997) describes the flow of knowledge within an organization, in which individuals play the main role in its creation. Facts and data are organized in the system and these are filtered and structured as information. Next, individuals assimilate the contextual information and transform it into knowledge. This transformation process is affected by the individuals' experiences, attitudes, and the context in which they work. The final state of the continuum is behaviour (Mårtensson, 2000).

Luthans (1995) points out that the context is the most sophisticated form of perceptual organization. The context gives meaning and value to simple stimuli, objects, events, situations, and other persons in the environment. He too, describes knowledge as transformed information, which flows in the context that forms the individual's beliefs and norms.

To facilitate KM or to facilitate a knowledge stream?
Nonaka and Takeuchi (1995) argue that knowledge is the product of the interaction between the individual's explicit and tacit knowledge, i.e. knowledge cannot be managed but created. Based on their viewpoint, KM is a phenomenon in which the individuals play a main role to create knowledge and enable knowledge to flow within an organization. Egbu *et al.* (1999) support this viewpoint, as they describe KM as a 'process' and that it should focus on knowledge flow, rather than resources.

In order to avoid confusion, this paper introduces the term 'knowledge stream'. Beijerse (2000) describes a knowledge stream in an organization as the determination of the necessity and availability of knowledge and the gap between the two; the development of knowledge, its acquisition, lock and the sharing thereof; its utilization and the evaluation of the utilized knowledge. Hence, as the knowledge stream represents the 'process' of knowledge creation and use, focusing on the knowledge flow itself, the roles of the individuals and the facilitators can be defined in accordance with the knowledge stream.

Knowledge assets: transfer or trade?
The term 'knowledge assets' is broadly used (Mårtensson, 2000). Knowledge itself has value and can be used to add value into the activity of individuals or organizations. Lichbach and Seligman (2000) state that every individual or organization tries to maximize the value of activities in the given context. However the context cannot be fully understood by merely considering a singular factor, such as the individual, the group, the community, etc. There are various approaches to analyse how these contradictable activities can arise. One of these approaches is to conduct a social order study.

The social order study is a method to analyse various aspects in different levels of context: micro- individual, meso- (group and institutional), and macro- (societal) (Lichbach and Seligman, 2000). However, as the social order study is highly context-sensitive, it is very difficult to analyse (Luthans, 1995).

Lichbach and Seligman (2000) discuss the classification of social order through socialized and rational actors. By introducing a socialized actor's perspective, knowledge assets can be transferred to the community, based on trust between the

actors in the context. This resource is called social capital or assets (Gittell and Vidal, 1998). Social capital does not mean that knowledge is transferred for free, i.e. there must be 'mutual' economic benefits for the actors who transfer knowledge (Gittell and Vidal, 1998). On the contrary, based on a rationalist's perspective, knowledge assets are traded like goods or service in accordance with the 'contract' between the sellers and the buyers in the market.

KM FOR SOCS

A theoretical framework of KM for SOCs should be developed from considering critical aspects that are revealed from general arguments in KM. This paper adopts the 'knowledge stream' concept to present a fundamental structure of the theoretical framework. It consists of two main parts: the knowledge stream and the approach to facilitate it. The former is useful in defining the contents of KM and the latter provides a context of the knowledge stream for SOCs.

Contents of KM for SOCs: facilitator-led knowledge stream

Sharn and Sharn (1997) argue that knowledge creation or acquisition requires the repetition of act(s). Due to the SOCs' characteristic one-off project commissioning, this repetition is improbable. Therefore, in order to overcome this situation, the facilitators or analysts must perform a part of the knowledge stream on behalf of the SOCs. Based on the knowledge stream presented by Beijerse (2000), the facilitator-led knowledge stream for SOCs can be described through identifying the necessary knowledge for the client, investigating available knowledge for SOCs and analysing knowledge gap.

Necessary knowledge can be defined in terms of their recommended role and respective responsibilities. Several authors have proposed such definitions (e.g. Bennett, 1985; Walker, 1996). However, the necessary knowledge that the client should have obtained for a project is unique and is not dictated by their level of experience or project size. HM Treasury (1999) classified the knowledge necessary for the client as those of possessing adequate managerial and technical skills.

Available knowledge can be verified by means of investigating the current contexts, in which SOCs have acquired knowledge. This context can be divided into pre-project and project phases. In the former context, the community or network may serve as the main arena to acquire and share knowledge. In the latter context, a project organization determines the structure and the system in which the knowledge is traded. As mentioned before, more attention should be given to the pre-project phase, as it is at this stage where the clients make strategic decisions (Kelly and Male, 1995). In order to explain the behaviour of SOCs in knowledge acquisition, their attitudes and capacities in the pre-project phase must be investigated.

By means of comparison between the necessary knowledge for the client and the available knowledge for SOCs, the knowledge gap can be analysed. If reasons for the gap are derived from system-bound factors, facilitating the knowledge stream should aim to generate a proper structure, system and/or culture. On the other hand, if the gap is caused by people-bound factors, facilitating the knowledge stream should incorporate methods to cultivate a proper attitude and instruct SOCs how to acquire knowledge.

To facilitate knowledge stream for SOCs: societal and market approach

As presented thus far, early parts of the knowledge stream can be led by the facilitators. However, this does not mean that the entire process is performed by facilitators. By introducing soft systems methodology (SSM) (Checkland and Holwell, 1998), facilitators can develop a framework to help SOCs identify necessary and available knowledge and recognize the gap between both of them by themselves. Due to the characteristics of SOCs, especially one-off project commissioning, initial testing of this framework should be carried out by the facilitators. In the latter part, during which the development, acquisition and sharing of knowledge would occur, the SOCs should play more active roles.

The client makes strategic decisions in the pre-project phase (Kelly and Male, 1995). During this stage, some clients may depend on acquaintances, such as relatives, friends and people in the same business field (Barrett and Stanley, 1999). Norm and belief are formed through contacts with these people in the network. For this reason, the community or network should be considered to facilitate knowledge stream for SOCs.

Although the consideration of community or network seems ideal, this approach has limitations. In a community or network, the knowledge stream cannot be facilitated under a unique goal or strategy, the way it can be done within an organization. In addition, structures and systems cannot be generated due to the roles and responsibilities involved in implementing them, as they do not belong to any part of the industry. Furthermore, they are vague within the client network or local community. In terms of cost, knowledge may not be transferred unless economic benefits are given to the individuals within the communities or networks.

Almost two decades ago, Goodacre *et al.* (1982) presented a solution. They proposed a system managed by a public non-commercial-based organization. This system would be designed to instruct the clients in the pre-project phase and to support their decision making on defining requirements. To this end, they suggested that data and information should be updated promptly. Their suggestion was based on a research project using a one-way instruction computer program, not considering the societal network between clients. At present, through information and communication technologies, especially web-based information sharing, one could present a system and a structure to facilitate a two-way instruction system and a virtual network.

A virtual network would enable the sharing of experiences between SOCs, whose project is recently finished and potential SOCs. The former could gain economic benefit in the form of opportunities to present feedback. Feedback about service and product quality could bring 'mutual' economic benefit, rather than a monetary reward. Through the feedback process, they could assert their interests to service providers and prevent potential negligence. However, the knowledge transfer between SOCs could be biased, resulting in improperly empowered SOCs. For this reason, the potential service providers should also be a part of the network. Consequently, they would be able to conduct, by means of consultation in the pre-project phase, a type of relationship marketing (Hennig-Thurau and Hansen, 2000). In addition, McIntosh *et al.* (1998) presents that this kind of corporation involvement in the community could enhance the reputation and is a way to fulfil their social responsibilities.

There is an example of a community-based knowledge transfer between service providers and the client in the construction industry. However, the service providers in this particular case are not a commercial institute but are university students. Students

at the Design and Planning Assistance Center (DPAC) at the University of New Mexico work on projects for clients who cannot afford professional fees. They are involving in programming, planning and schematic design projects developed at DPAC, since its inception in 1969, and this has resulted in many clients securing funds for other professional services and building costs (Cherry, 1999).

Limitations

If researchers want to participate in the context, their role should be that of a catalyst communicator. They would act as a development facilitator through gathering people with common interests and concerns to encourage thinking, motivation, interaction, action, reaction, and reflection (White, 1999) for the development of the community. However, it is important to note that the researchers' involvement in the context to facilitate KM in this way would result in scrutinizing critics who do not support participant research (Kemmis and McTaggart, 2000).

CONCLUSION AND FURTHER RESEARCH

Arguments in the KM field could be summarized by the following: a technology-oriented approach has been supplement by a people-oriented approach, as the competent strength of organizations can be sustainable by individuals who possess knowledge; value contradictions could occur in knowledge transfer and in order to solve it, the structure, the culture and the system to present mutual benefits to actors who transfer knowledge are required. As knowledge transfer results from interactions between the actors in a sophisticated context, a broad approach by which the context could be analysed in various levels is necessary. One approach is to perform a social order study.

In practice, attempts to facilitate KM through managing knowledge flows, rather than managing knowledge as resources, have gained popularity. An example focuses on the use of a knowledge stream. The knowledge stream can yield a solution to clarify the existing confusion of roles between the actors and facilitators.

By considering the arguments and practices in KM, we develop a theoretical framework 'to facilitate the knowledge stream for SOCs'. SOCs should be the main actors to lead the knowledge stream. However, as SOCs have difficulties to conduct the early phases of the knowledge stream, the facilitator should present a frame by which SOCs can perform this part by themselves. The facilitator can initialize this frame by defining the necessary and available knowledge and analysing the knowledge gap. The latter part of knowledge stream such as knowledge development and sharing should be facilitated based on the societal approach, rather than the organization competence theory. In general, SOCs can hardly afford to acquire external intellectual resources, such as independent advice, during the pre-project phase. Hence, they require a non-commercial public system and a structure to support them in acquiring necessary knowledge. However, it is critical that this approach not be abandoned from the market. This is achieved by developing a virtual network or community (societal approach) and using the concept of trade (market approach) to supplement it. Yet, this is dependent on whether or not the service provider is able to present pre-contracting consultations. Service providers seem to enhance relationship marketing by doing this.

In academia, the capacity, attitude and behaviour of SOCs, relevant to knowledge acquisition in the context, should be investigated. This investigation should be regarded in continuum towards a practical tool to facilitate KM for SOCs. Hence,

further research will consist of three parts: pre-intervention surveys, intervention design and post-intervention surveys. The aim of the pre-intervention survey is to investigate the attitude, capacity and behaviour of SOCs in terms of knowledge acquisition. In addition, contextual factors, such as the system and structure, in which they have currently acquired knowledge, will be investigated. The possibilities for implementing societal-approached facilitation of KM for SOCs will also be investigated, by asking their opinions on knowledge sharing with other SOCs. In the intervention design stage, methods and techniques, that could appropriately facilitate KM, will be reviewed and a prototype system will be developed. This prototype system will be audited by SOCs who have recently commissioned projects. After potential SOCs have employed the prototype system, their attitude and capacity will be measured in the post-intervention survey.

REFERENCES

Baden H. R. (1988) *Managing Construction Conflict*. London: Longman Scientific & Technical.

Barrett, P. and Stanley, C. (1999) *Better Construction Briefing*. Oxford: Blackwell Science.

Beijerse, R. P. (2000) Knowledge management in small and medium-sized companies: knowledge management for entrepreneurs. *Journal of Knowledge Management*, **4**(2), 162-179.

Bennett, J. (1985) *Construction Project Management*. London: Butterworth.

CCF (2000) *Thinking of Building?*. CCF IS at: http://www.construction-clients.org.uk

Checkland, P. and Holwell, S. (1998) *Information, Systems and Information Systems: making sense of the field.* Chichester: Wiley.

Cherry, E. (1998) *Programming for Design: From theory to practice*. London: John Wiley & Sons.

Duffy, J. (2000) Knowledge management: to be or not to be?. *Information Management Journal*, **34**(1), 64-67.

Egbu, C., Sturges, J. and Bates, M. (1999) Learning from knowledge management and trans-organizational innovations in diverse project management environments. *In:* Hughes, W. (ed.) *Proceedings of the 15th Annual Conference of the ARCOM*, Liverpool, UK, 15-17 September, 115-123.

Egan, J. (1998) *Rethinking Construction*. DETR.

Fisher, N., Barlow, R., Garnett, N., Finch, N. and Newcombe, N. (1997) *Project Modelling in Construction: Seeing is believing*. London: Thomas Telford.

Gittell, R. and Vidal, A. (1998) *Community Organizing: Building social capital as development strategy*. London: SAGE publications.

Goodacre, P.E., Pain, J., Murray, J. and Noble, B.M. (1982) *A Design Cost Theory for Measuring Building: Client aid program*. Occasional Paper No. 5, Dept. of Construction Management, University of Reading.

Hennig-Thurau, T. and Hansen U. (eds.) (2000) *Relationship Marketing: Gaining competitive advantage through customer satisfaction and customer retention.* Berlin: Springer.

Higgin, G. and Jessop, H. (1965) *Communications in the Building Industry*. London: Tavistock Publication.

HM Treasury (1999) *Government Construction Procurement Guidance*. London: HM Treasury.

Infield, N. (1997) Capitalizing on knowledge: if knowledge is power, why don't librarians rule the world?. *Information World Review*, 130, 22.

Kemmis, S. and McTaggart, R. (2000) Participator action research. *In:* Denzin, N. K. and Lincolin, Y. S. C. (eds.) *Handbook of Qualitative Research.* 2nd ed., CA: SAGE Publications, 567-605.

Kelly, J. and Male, S. (1995) Facilities programming. *COBRA 1995*. RICS. 99-106

Latham, M. (1994) *Construction the Team*. London: HMSO.

Lichbach, M. I. and Seligman, A. B. (2000) *Market and Community: The base of social order, revolution, and relegitimation*. PA: Pennsylvania State University Press.

Luthans, F. (1995) *Organizational Behavior*.7th ed., London: McGraw Hill.

Markus, M. L. (2000) *Knowledge Management-Essays And Assays*. One-day Workshop, 10th July 2000, University of Warwick, Coventry.

Mårtensson, M (2000) A critical review of knowledge management as a management tool. *Journal of Knowledge Management,* **4**(3), 204-216.

McIntosh, M., Leipziger, D., Jones, K. and Coleman, G. (1998) *Corporate Citizenship*. London: Financial Times & Pitman Publishing

Morledge, R. (1999) Marketing – A solution to construction market failure?. *International Journal for Construction Marketing*. 1(1), could be found at: http://www.brrokes.ac.uk/other/conmark/IJCM/

Nonaka, I. and Takeuchi, H. (1995) *The Knowledge-Creating Company*. Oxford: Oxford University Press.

O'Reilly, J.J.N (1987) *Better Briefing Means Better Buildings*. Watford: BRE.

Salisbury, F. (1990) *Architect's Handbook for Client Briefing*. London: Butterworth Architecture.

Quintas, P., Lefrere, P. and Jones, G. (1997) Knowledge management: a strategic agenda. *Long Range planning,* **30**(3), 385-391.

Scarbrough, H. and Swan, J. (1999) *Case Studies in Knowledge Management*. London: Institute of Personnel and Development.

Sharan, Y. and Sharan, S. (1992) *Expanding Cooperative Learning Through Group Investigation*. NY: Teachers College Process, Columbia University.

Walker, A. (1996) *Project Management in Construction.* 3rd ed.*,* Oxford: Blackwell Science.

White, S. A. (ed.) (1999) *The Art of Facilitating Participation: Releasing the power of grassroots communication*. London: Sage Publications.

Winch, G. and Schneider, E. (1993) Managing the knowledge-based organization: The case of architectural practice. *Journal of Management Studies,* **30**(6), 923-937.