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Title:

The Suitability of IT as a Tool to Facilitate Knowledge Sharing in Construction Alliances

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Abstract:

The impact of environmental pressures has led many organisations to combine their resources and form alliances to develop and sustain competitiveness, profitability and long term growth. A review of the literature suggests that construction firms are not significantly different from others in their behaviour in meeting up the challenges imposed by the environment.

Trends of forming strategic alliances therefore have embraced majority of the sectors of the construction industry. Not only do alliances act as vehicles for efficient project management but also they provide the opportunity for the organizations to share participants' knowledge. In this paper, which is based on an ongoing study, we argue that IT could be used as a tool to leverage shared knowledge in alliances to improve organisational outcomes. Indeed the traditional belief among people that "knowledge is power", which inhibited intra-organisational knowledge sharing, continues to act as a major constraint in alliance knowledge sharing too irrespective of the degree of IT use. In this paper we demonstrate the use of IT to complement other socialisation mechanisms to create new knowledge. In the process we investigate the effectiveness and efficiency of knowledge transfer mechanisms and link organisational outcomes to new knowledge creation.

Keywords:

Knowledge transfer mechanisms, knowledge sharing, IT, strategic alliances

Introduction

Formation of strategic alliances has become increasingly popular in many industries and literature suggests that similar increases could be observed in the construction industry too. To a large extent the formation of these alliances have increased due to client pressures, complexity of projects, wide dispersion of project participants and the need to gain faster results.

Significant improvements in technology: particularly information technology (IT) has enabled these alliances to collaborate more efficiently to conduct the alliance activities. While achieving a successful project outcome has been the primary objective in project management, the significant improvements in technology has the ability to achieve more effective collaboration. As a result the participants are able to share their knowledge and capture new knowledge, which they can deploy in their future projects. However the industry has not sufficiently addressed the benefit of knowledge accumulation from project to project and from one context to another in achieving competitive advantage. This paper addresses the effectiveness and efficiency of the process of knowledge creation in project-based multinational strategic alliances.

First through a review of literature the paper presents a holistic picture about the changes that have taken place in the organisation of projects due to environmental influences, which explains why there has been an increase in formation of strategic alliances. Then it reflects how organisations in the alliance could accumulate new knowledge through improvements in knowledge transfer mechanisms. The paper then conceptualises the problem that is investigated in this ongoing study in a view to find solutions.

The Case For Alliance Formation

Increasingly alliances are being formed between firms on an international scale. Lorange and Roos (1993) state that alliances could range from relatively non-committal types of short term, project based



cooperation to more inclusive long-term equity based cooperation. Forming into alliances also increases the overall chance of successful project delivery, through combining and sharing of resources. According to Reid et al (2001) confirms this argument by stating that “accelerating competition, falling regulatory barriers and rising customer expectations have led many firms to improve their competitiveness by combining resources with other firms”.

According to Bleek and Ernst (1995), the incidence of alliance formation increased at 25% per annum in the first half of the 1990's (for all industries) and there is little evidence to suggest that this rate has diminished (Reid et al, 2001). Similar increases could be observed in the construction industry too (Siehler, 2000). As more and more alliances are formed to execute construction projects, participants have realised the importance of working through a diversity of work cultures and the need to engage in multinational teaming to collaborate the work of the project (Pietroforte, 1997).

Although project based alliances often try to exploit short-term results, they seek to develop their businesses in the long term. Further to achieve competitiveness in the long term, they need to capture new project management knowledge created in the alliance as a result of the collaborative work of the alliance. By accumulating new knowledge and better use of existing knowledge, the alliance partners could increase their competitiveness in their respective markets in the long term. Therefore it has been pointed out that alliances, which are increasingly being formed mainly as a result of environmental pressures could use the collaborative working environment as a vehicle to achieve improvements in performance by leveraging shared knowledge to achieve competitive advantage. The next section looks at the factors that influence this process and how IT could be used effectively to transfer knowledge.

Factors That Affect Transfer Of Knowledge

Knowledge transfer (KT) takes into account the different constituents of knowledge. Although different IT tools have been developed to capture existing knowledge and to create new knowledge in a collaborative environment, its complexity in terms of embodied knowledge (Blumentritt and Johnston, 1999) has made some of these tools inappropriate. Further according to Bhatt (2001) it is the embodiment of the new knowledge that is created, which makes it difficult to split into or unbundle into its constituent parts. For instance the seminal work conducted by Nonaka and Takeuchi (1995) saw a clear distinction between knowledge that could be codified (explicit knowledge) and knowledge that resides in the heads of people, which is hard to formalise, thus difficult to communicate or share with others (tacit knowledge). Therefore performing KT in a collaborative environment such as a multinational strategic alliance involves tackling many problems on the way before making it effective and efficient. Primarily the person who champions the KT process in a company has to overcome many differences that could exist in a multinational setting such as language differences (McDermott, 1999), cultural differences (Barlow and Jashpara, 1998), differences in individual characteristics and different levels of prior knowledge (Cohen and Levinthal, 1990). For a long period of time people believed that “knowledge is power” and sharing knowledge with others might result in loss of competitive advantage. Therefore through proper leadership, alliances have to carry out a cultural change so that people start to believe that “knowledge sharing is power” (Dixon, 2000). Several authors (for instance Shariqe, 1999; Dixon, 2000) indicated that knowledge transforms while it is being transferred. This displays how a proper knowledge-sharing atmosphere could create new knowledge for the benefit of the alliance partners. Dixon (2000) provides an example to describe this in the form of a case study (British Petroleum's peer assist program).

“Those who offer their knowledge feel honoured to be asked. Being selected to assist is an acknowledgement of their expertise. Those who receive the assistance also share what they know. They feel respected for the knowledge they have drawn together and for their analysis and interpretation. They recognise that the people who have come to assist leave even more knowledgeable than when they came because of the exchange” (Dixon, 2000: 81)

The peer assist program (Dixon, 2000) demonstrates how knowledge sharing, contributes significantly to create new knowledge. The program creates the environment conducive for knowledge sharing and brings the two groups of people together. A win-win situation is created in order to facilitate knowledge exchanges. As demonstrated by the “peer assist” program we argue that creation of new knowledge and better use of existing knowledge is a direct result of knowledge sharing. Proper use of IT for KT in an

appropriate context could make this process of knowledge sharing more productive in terms of new knowledge created and how it impacts on overall performance improvement. When investigating different KT mechanisms it is important that they are used in the appropriate context. This is a major factor, which determines the level of IT use on KT. The next section addresses this problem.

Use of Appropriate Knowledge Transfer Mechanisms

The use of KT mechanisms could be depicted in fig. 1 based on a two dimensional matrix of place (same place, different place) against time (same time / different time) (Skyrme ,1999). The suitability of these tools is based on the context in which each technique is used.

	Same Place	Different Place
Same Time	<p>1.</p> <p>Workshops Face-to-face meetings Intranets</p>	<p>2.</p> <p>Video conferencing Web conferencing</p>
Different Time	<p>3.</p> <p>Document Management</p>	<p>4.</p> <p>Emails Discussion Forums</p>

Fig 1 - Knowledge Transfer Mechanisms

The KT mechanisms as shown above in fig. 1 could be classified (Hills, 2000) based on:

1. Whether the usage is in real time (Synchronous groupware) or different times (Asynchronous)
2. Whether the users are localised (collocated) or distributed (distanced)

Apart from the conventional face-to-face types of KT mechanisms, organisational intranets also play a major role in collaborative work. Organisational intranets although listed in the first quadrant could also be listed under the fourth quadrant to indicate that it can be used as a “different time” “different place” collaborating mechanism. The conventional face-to-face types involve people to gather at a certain location periodically for collaboration. The travel costs and time can limit the number of face-to-face meetings for multinational alliances. To overcome this problem a significant number of multinational alliances use other KT mechanisms, which are IT based to complement the conventional ones. For example a few participants getting connected online via the Internet often complement a face-to-face meeting. A web conference with a video content will therefore enable them to collaborate in an efficient manner without having the other party to frequently attend physically to the meeting.

The web conferencing tools available in the market provide a lot of features such as:

- Ability to run different applications such as presentations, document transfers and other information transfer over the Internet.

- Ability to split the screen into different windows and run different applications on the screen simultaneously together with a video content so that it will enable those who are collaborating to see one another although they are several miles apart thus establishing eye contact as in a face to face meeting.
- Electronic whiteboard facility, which enables the multinational participants to trigger their thinking out of brainstorming sessions.
- Ability to arrive at decisions using the voting facility, which enables quick actions to be taken.

Bickson (1996) conducted a case study of the World Bank on use of an IT collaborating tool (group systems technology). He found that participants believed that complementing their periodic meetings with the electronic collaborating tool had an impact on their outcomes significantly. Although they report learning more about the meeting’s subject matter than in traditional meetings participants gave highest marks – both relatively and absolutely – to knowledge exchange in IT supported meetings. (That is they believe that they were able to share more of what they knew and that they got more from their peers). Table 1 displays the results of the study.

Table 1 - Results of Group Systems Technology (Bickson, 1996)

5 – point rating scales	Groupware Mean	Traditional Mean
Degree to which you learned about meeting subject	3.8	3.2
Degree to which you participated in the meeting	4.2	3.1
Degree to which you learned about views of other participants	4.1	3.0
Degree to which you affected the meeting outcome	3.4	2.8

The KT mechanisms mentioned in the fourth quadrant in fig 1 consist of discussion forums and emails, which may also facilitate the collaboration exercise in the alliance. The forums allow a greater flow of information within the group, they make it possible to share data and documents, they provide the opportunity for all the group members to stay in touch with the decision-making process. The document management systems given in the third quadrant also helps in the collaboration process. Although different KT mechanisms are used in the industry to perform collaborative tasks, it is important that these systems integrate with the culture, people and processes of the alliance. The usage of IT tools needs to make the process of knowledge sharing more efficient. This is reflected in the framework of the study.

The Framework Of The Study

Although past studies have focused on effectiveness and efficiency of KT mechanisms, they haven’t substantially dealt with assessing of the new knowledge that is created as a result of specific KT mechanisms used in multinational strategic alliances.

KT mechanisms listed earlier and others practically used in the industry will be evaluated and the potential impact of IT on these mechanisms will be investigated. Finally the effectiveness and efficiency of the KT mechanisms will be linked to project outcomes gained in terms of the project adhering to cost, time and quality limits at each stage considered in projects.

The research framework of the study is represented in fig. 2.

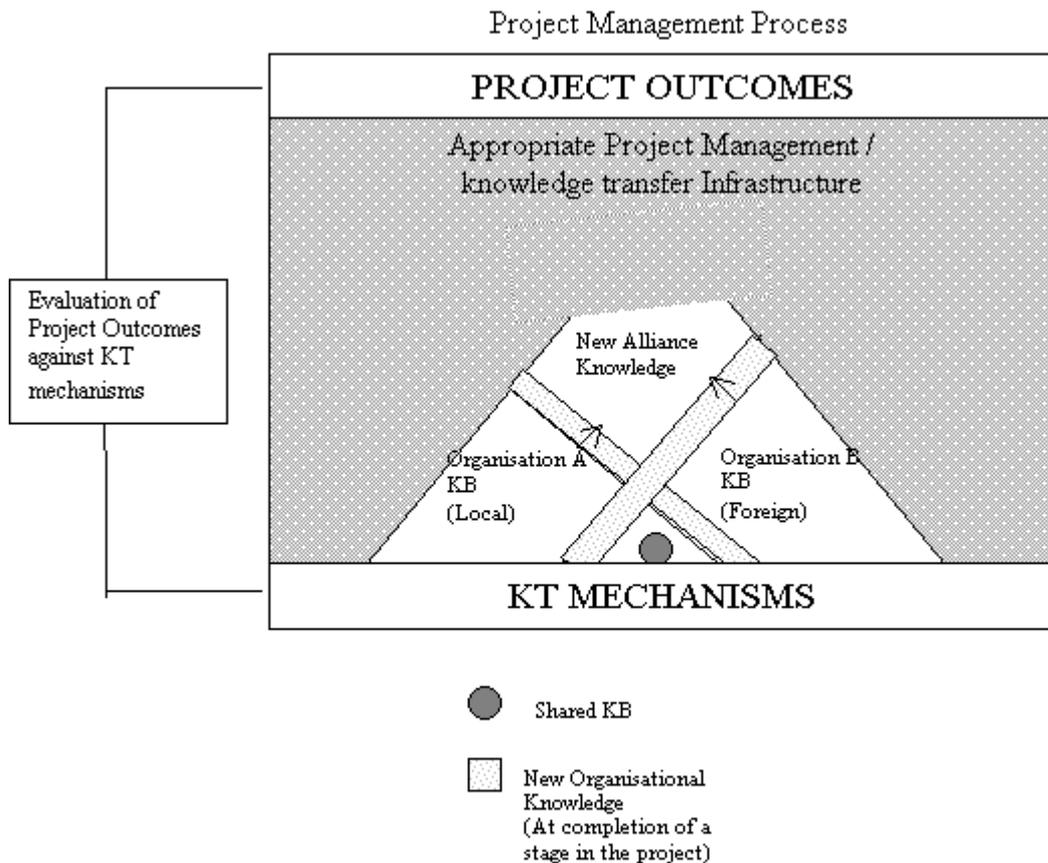


Fig. 2 – The Research Framework

Fig. 2 illustrates the flow of tacit / explicit project management knowledge within the strategic alliance and realising the outcomes as a result of the KT mechanisms. The KT system rests on an appropriate project management / KT infrastructure. It determines how the alliance organisations attain the necessary fit in the knowledge transfer process (Skyrme, 1999). One of the important features of this model is that knowledge from alliance knowledge base is linked to organisational knowledge base, so that organisations can realise short-term advantages due to alliance activities. The characteristic, which was pointed out earlier that KT, results in transformation of knowledge is highlighted as new knowledge created at organisational level. The effectiveness and efficiency of KT mechanisms are evaluated through the degree to which each mechanism is linked to the creation of new project management knowledge.

Methodology

The chosen research approach should provide the opportunity to investigate the research problem of how IT impacts the knowledge sharing process involving different types of knowledge. It also involves an analysis of how the project outcomes are linked to effective and efficient KT mechanisms, which will impact the development of organisational Knowledge Bases (KB).

Several research approaches were considered to deal with the above investigation. However in developing an appropriate research approach we adopt Yin's suggestion of adopting the case study approach because the question which we need to investigate raise "how", "why" and "what" type of inquiry (Yin, 1994). Johnston et al (1999) state that the strength of case research is its ability to utilise various sources of evidence and triangulation procedures to demonstrate convergence on one meaning. Data gathering case studies will be conducted covering a range of issues arising from the research framework without having to localise in project sites. The steps that are followed consist of:

Defining the unit of analysis

The unit of analysis for this study is taken as collaborative relationships between alliance organisations.

Case Study Design

Initially an exploratory case study will be conducted, which involves a strategic alliance between an international project management and property development company and a leading petroleum retail company having offices in many countries. This exploratory study will generate:

1. The types of project management knowledge that is shared between alliance firms.
2. The types of KT mechanisms used in sharing knowledge in the alliance.
3. The problems that they face in knowledge sharing.
4. The response from the people with regard to the effectiveness of different KT mechanisms.

The findings of the exploratory case study will provide the necessary support to the other industry case studies, particularly in the process of preparing guidelines for data collection.

Analysis

The case study results will be analysed following the approach suggested by Miles and Huberman (1984) with the use of re-arranging arrays, placing the data in a matrix of categories and creating flow charts or data displays. The preparation of a case description proposed by Yin (1994) also enables us to refine some of the data arrangement methods, which support the analysis of results. The analysis of case study data helps to reflect upon the research framework in fig. 2. The findings of the case studies will enable us to evaluate the KT mechanisms and how IT is used to make the process of knowledge sharing more effective and efficient.

Conclusion And The Way Forward

It would be clear by now that without moving in the right direction by addressing problems of culture, language and prior related knowledge and championing the process with the proper leadership, IT alone cannot deliver success. Further the biggest problem lies in bringing the people together and changing their attitudes before they can collaborate electronically. The earlier comment that we made about knowledge, that one of its major constituents being the tacit element, which is difficult to articulate, further complicates this process because the only way to transfer tacit knowledge is through proper socialisation (Nonaka and Takeuchi, 1995). However a significant number of IT tools that are found in the market, which promises KT, do mostly capture explicit form of information. These tools to a large extent result in failures if not used within the proper context. Hendricks (2001) adds further to this by saying that not giving proper attention to factors other than IT might impose political tensions within the organisation therefore the KT mechanisms will disconnect people rather than connect them and it will not enhance knowledge sharing but frustrate it. On the other hand IT tools can be used to facilitate KT by combining its features, so that they provide the appropriate atmosphere for knowledge sharing. But the perception of the people and how well the IT tools are received, contributes significantly to their success.

The paper addressed the issues related to improving effectiveness and efficiency of KT in the context of strategic alliances in the construction industry. This is an ongoing study, which investigates the use of IT on the process of knowledge sharing. The paper presented the conceptual framework and a brief description of the methodology by which it is expected to investigate the research questions and also points the reader at the next steps of this study, which is to investigate and measure creation of new knowledge and how it influences organisational outcomes in of construction companies.

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