

INFORMATION TECHNOLOGY-ENABLED KNOWLEDGE SHARING IN MULTINATIONAL STRATEGIC ALLIANCES: MEDIA RICHNESS – TASK RELEVANCE FIT

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SUMMARY

Sharing knowledge in a strategic alliance is far from being a smooth and self-propelled process. An important determinant of successful knowledge sharing is the level of fit between the tasks being undertaken by alliance partners and the IT-enabled knowledge sharing mechanism being employed to carry out these tasks.

This paper reports on ongoing research investigating IT-enabled knowledge sharing mechanisms in multinational strategic alliances within construction. First, the concept of media richness is introduced, which argues that the characteristic of a communication medium significantly determines how successfully that medium can share knowledge between participants. Second, the importance of task relevance is identified, emphasising that the success of a knowledge sharing mechanism is determined by how relevant the content of the message is to the receiver's work. These two themes are integrated to offer a media richness – task relevance fit model.

This model is used as a framework to structure and evaluate interim research findings from a multinational alliance case study. The findings indicate that successful IT-enabled knowledge sharing mechanisms are closely linked to both media richness and the business logic and the social processes captured in the task relevance and task environment aspects of a virtual organisation. The results reinforce the need to adopt a social constructivist approach to IT-enabled knowledge sharing mechanisms, which challenges researchers and practitioners to understand different alliance stakeholder groups' interpretations of, and interactions with, the information technology.

INTRODUCTION

The global economy is characterised by an ongoing process of integration and networking of countries, markets, technologies and firms. This globalisation is being "... driven on the one hand by the spread of economic logics centered on freeing, opening, deregulating, and privatizing economies to make them more attractive to investment, and, on the other hand, by the digitization of technologies that is revolutionizing communication" (Barkema *et al.*, 2002: 916). To meet the diverse challenge of globalisation, many firms rely increasingly on international alliances to enter new regions and markets; to share competencies thereby enabling the partners to benefit from each others proprietary assets; to leverage capabilities; and to be flexible whilst focusing internal resources on core competencies.

International alliances, however, are notoriously difficult to implement successfully (for example, Doz, 1996). A key challenge to the creation and maintenance of successful international alliances is the effective management of the conceptual, perceptual, organisational, temporal and physical distances between the alliance partners to enable appropriate shared sensemaking and collective action to take place. Dispersed or virtual ways of working and knowledge sharing, supported primarily by advanced communication and collaborative technologies, have been offered as a way to respond to bridging these distances (for example, see Boutellier, *et al.*, 1998; Townsend, *et al.*, 1998).

Sharing knowledge in a strategic alliance is far from being a smooth and self-propelled process. A growing body of evidence concludes that diverse knowledge derived from specific social or physical contexts hinders knowledge sharing across localities (for example, see Zander & Kogut, 1995). An important issue in this literature is the level of fit between the task and the information technology (IT) medium employed, and the impact of the closeness of this fit with knowledge sharing performance



across the virtual organisation (for example, see Daft & Lengel, 1984 / 1986; Trevino, *et al.*, 1987; Fulk & Boyd, 1991). The focus of this paper is to report on ongoing research investigating knowledge sharing mechanisms in multinational strategic alliances within construction, with a particular emphasis on the task-medium fit. First, the growth and nature of multinational strategic alliances and their virtual structures and ways of working will be identified. Second, the principal knowledge sharing challenges facing these alliances will be discussed. Third, the notion of appropriate medium richness – task relevance fit will be presented and a conceptual framework offered. Fourth, case study material will be presented to illustrate and test this framework. Finally, conclusions will be drawn.

STRATEGIC ALLIANCES AND VIRTUAL ORGANISATION

Strategic alliances are increasingly becoming a dominant organisational arrangement, with alliance partners motivated by better exploitation of individual and collective resources and capabilities, and/or the exploration of new opportunities (March, 1991; Koza & Lewin, 1998), in multiple project environments (for example, see van der Merwe, 1997). This shift towards international strategic alliances to support multiple project delivery is evident in the construction industry (for example, see Holt *et al.*, 2000; Kwok & Hampson, 1996; Bonke, *et al.*, 1996).

The geographically dispersed nature of strategic alliances is ushering in the virtual organisation, which is "composed of several business partners sharing costs and resources for the purpose of producing a product or service ... [which] can be temporary ... or it can be permanent. Each partner contributes complementary resources that reflect its strengths, and determines its role in the virtual corporation" (Turban *et al.*, 1999: 142.) These virtual alliances are exhibiting new managerial and organisational drivers and characteristics that are rendering traditional business models and modes of operation obsolete (for example, see Henning, 1998). Virtual alliances are working towards (to varying degrees depending on the nature of the alliance), shared goals, knowledge, results and culture at a strategic level; and the adoption of standard platforms and by information systems integration at an operation level (for example, see Coyne & Dye, 1998).

Firms now routinely create and attempt to coordinate, across time zones, languages and cultures, virtual teams whose members have never had an opportunity to meet face-to-face (for example, see Montoya-Weiss, *et al.*, 2001). A core capability which underpins this way of working is the capability to share knowledge across the alliance; indeed, this imperative has been captured in the observation that, "... to work in concordance (joint ventures of alliances) there needs to be mechanisms to transfer, share and use knowledge in a consistent, coherent ... manner" (Pawar, *et al.*, 1999: 433).

It is recognised, however, that there are significant psychological, social and organisational difficulties in cooperative work and knowledge sharing supported by technology (for example, Condon, 1993). The challenges of knowledge transfer are magnified when crossing organisational boundaries (for example, see Williams & Gibson, 1990). Sung and Gibson (2000: 2) summarises the potential problem with inter-organisation situations, when they note that "... the transfer of knowledge and technology is a particularly difficult type of communication in that it often requires collaborative activity between two or more individuals or functional units who are separated by structural, cultural, and organizational boundaries." The next section will briefly discuss a number of key issues pertaining to knowledge transfer and sharing mechanisms.

IT AND KNOWLEDGE SHARING

The use of IT is argued to enable firms to broaden the possibilities for the way in which activities are organised over time, geographic space and organisational boundaries. Some commentators have indicated that developments in ITs, and their appropriated use, can reduce the effects of distance and time, and can facilitate communication, coordination, collaboration and knowledge sharing between partners (for example, see Davenport *et al.*, 1998).

Drawing upon the inter-organisational knowledge and technology transfer literature, successful knowledge sharing is primarily a matter of the existence and richness of transmission channels (Bartlett & Ghoshal, 1989), and the characteristics of the transferred knowledge in terms of such dimensions as tacitness and ambiguity (Zander & Kogut, 1995; Szulanski, 1996). An influential

theory, which fruitfully integrates these two dimensions in a communications context, is the media richness theory (Daft & Lengel, 1984 / 86). This work proposes that communication and knowledge sharing is at its most effective between people when the richness of the medium matches the task relevance of the information being conveyed. The concept of media richness consists of four attributes (Daft & Lengel, 1984; Daft and Lengel, 1986; Trevino, *et al.*, 1987; Fulk & Boyd, 1991):

- Feedback capability – refers to how quickly can the communication medium enable participants to ask for, and receive, information.
- Availability of multiple cues – refers to the number of the various channels of communication available to the participants; e.g. physical presence, body language, words, numbers and graphics.
- Language variety – refers to the use of different types of language. For example, written media supports more precise, textual language; whilst oral media imparts understanding of a broader range of concepts and ideas
- Personal focus – refers to the degree of individual attention and socio-emotional content a message contains.

The media richness theory postulates that the more of the above attributes an IT media possesses the richer the medium, and the greater the potential for effective knowledge sharing between the participants. The telephone, for example, has fast feedback capability but lacks visual cues; “individuals have to rely on language content and audio cues to reach understanding” (Daft & Lengel, 1984: 198); whilst, formal written communications is considered even less rich because of slow feedback, limited visual cues and lack of audio cues.

Regardless of the richness of the media, however, there will not be effective knowledge sharing if the content of the message being communicated is not relevant to the task(s) being undertaken by the receiver. Allwood (1998), when discussing the performance criteria of information systems, identifies that any given system should be suitable for the users’ needs, goals and tasks. Hollingshead & McGrath (1993), for example, studied the impact of task type on the effectiveness of knowledge sharing. They concluded that the quality of decisions decreased in a virtual team environment when the tasks became more difficult and ambiguous. This research theme produced a task typology, with each type having implications for the IT approach employed (McGrath & Hollingshead, 1994):

- Generating tasks – planning and creativity tasks which involve inception and acceptance of a shared activity and determination of strategic goals.
- Choosing tasks – decision-making tasks which involve the solution of operational issues and planning.
- Negotiating tasks – conflict resolution tasks which involves negotiation between group members
- Execution tasks – coordination tasks which involves implementation of the performance requirements.

Gutwin & Greenberg (1995) provide a complementary dimension by locating such task typologies within task environments, and argue that for effective task-orientated knowledge sharing, the task environment needs to be explicit and transparent about what types of activity the other participants are engaged in, and what are their task-specific intentions.

The two dimensions of media richness and task relevance can be brought together, as shown in Figure 1. The horizontal axis presents a media richness continuum ranging from low potential richness on the left hand side, to high potential media richness on the right hand side. The vertical axis shows a specific task relevance continuum, going from potentially task relevant at the top of the diagram (i.e. the information is of no use to the specific task being undertaken, but might be of use for another task at some stage in the future), to specific task relevance at the bottom. The curved lines in the middle of the diagram denote that for a given media richness – task relevance combination, any IT approach can be located by its degree of fit or alignment – i.e. an appropriate IT approach to the media richness – task relevance combination would be a ‘good fit’, whilst an inappropriate IT approach would be a ‘poor fit.’

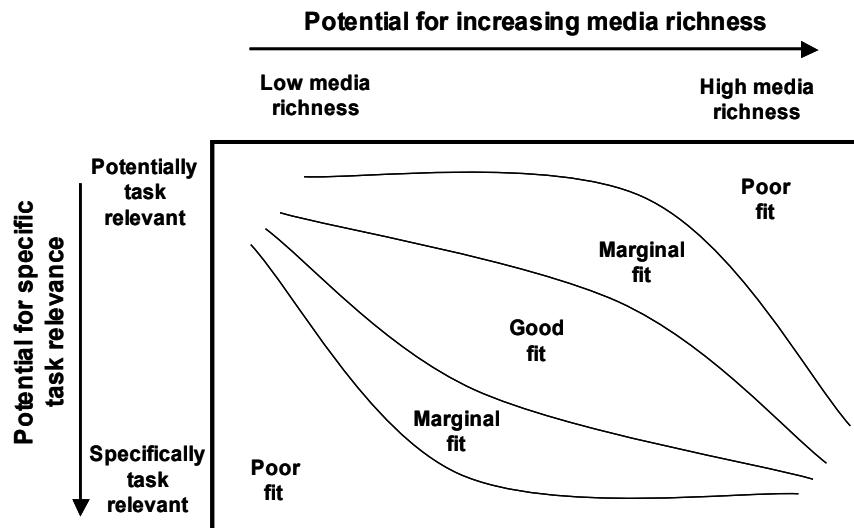


Figure 1 Media richness – task relevance fit model

The next section will present ongoing case study work to examine the utility of the IT, task relevance and media richness model offered above.

CASE STUDY

Background

The XYZ Alliance is an international alliance between a petroleum retail company and a project management company. (XYZ Alliance is a fabricated name to ensure anonymity for the alliance partners.) The alliance was formed in 1996 in United Kingdom, and currently operates in twelve countries. The main purpose of the XYZ Alliance is to deliver an effective and an efficient project management service, and to reduce the cost and maintenance of the petroleum retail company's petrol stations.

Purpose of the case study

The main purpose of the case study is to focus on how people in the XYZ Alliance share their knowledge (through IT-enabled mechanisms) in order to achieve the alliance objectives of reducing costs year on year and improving client satisfaction, quality and the health and safety record during construction and maintenance operations.

Methodology

To obtain primary data for the case study, the interview technique was used. First, four interviews over one hour were held with senior executives based on an open-ended type of interview guideline and by adopting a more structured approach six other interviews with project managers were conducted. Responses received were used to build up cognitive maps (causal maps) using a software tool (Decision Explorer[®] version 3.1.2). In building up the cognitive map the features available in the software was also used to get a better understanding of the relationship between IT approach, media richness and task relevance.

Results

The XYZ Alliance uses three principal IT-enabled knowledge sharing mechanisms: email, web conferencing and an alliance portal. Key issues from the qualitative data which are relevant to the media richness – task relevance fit of these mechanisms are summarised in Table 1 below. The ideas and concepts presented in the literature review sections of this paper will be used in the discussion.

Table 1 Summary of key media richness and task relevance issues from the case study

IT knowledge sharing mechanism	Description / Task relevance / Media richness					
Email	<p>Description Unsynchronised communication medium which allows the transmission of electronic messages over the alliance network. Email is perceived by alliance staff as being the most common form of communication, both by senior alliance managers and project managers.</p> <table border="1" data-bbox="371 496 1406 1266"> <thead> <tr> <th data-bbox="371 496 584 530"><u>Task relevance</u></th><th data-bbox="584 496 1406 530"><u>Media richness</u></th></tr> </thead> <tbody> <tr> <td data-bbox="371 530 584 1266"> Senior alliance managers and project managers commonly use email, and felt that the information communicated between participants varied in its relevance to specific tasks (see media richness section to the right). </td><td data-bbox="584 530 1406 1266"> Senior managers and project managers viewed email as being rich in 'feedback capability', but more limited in its 'availability of multiple cues', 'language variety' and 'personal focus.' Senior managers stressed the 'personal focus' attribute, stating that email encouraged, to varying degrees, inappropriate delegation of responsibility and lack of participation in evolving dialogue; as one senior manager lamented: "our main source of collaboration is email. However emails get abused. People think that when they press "send" it is no longer their problem" and that staff "do not fully participate in the discussion." Project managers, in contrast, identified the 'availability of multiple cues' and 'language variety' limitations, commenting that the email medium was useful to a certain level to discuss and share 'explicit knowledge' project issues. Above that level, however, it was noted that email could not adequately capture and share tacit, fine-grained knowledge. Project managers thus supplemented email to discuss such operational issues with face-to-face meetings and the frequent use of the telephone. These media were felt by the project managers to offer the required multiple cues and language variety to facilitate successful knowledge sharing. </td></tr> </tbody> </table>		<u>Task relevance</u>	<u>Media richness</u>	Senior alliance managers and project managers commonly use email, and felt that the information communicated between participants varied in its relevance to specific tasks (see media richness section to the right).	Senior managers and project managers viewed email as being rich in 'feedback capability', but more limited in its 'availability of multiple cues', 'language variety' and 'personal focus.' Senior managers stressed the 'personal focus' attribute, stating that email encouraged, to varying degrees, inappropriate delegation of responsibility and lack of participation in evolving dialogue; as one senior manager lamented: "our main source of collaboration is email. However emails get abused. People think that when they press "send" it is no longer their problem" and that staff "do not fully participate in the discussion." Project managers, in contrast, identified the 'availability of multiple cues' and 'language variety' limitations, commenting that the email medium was useful to a certain level to discuss and share 'explicit knowledge' project issues. Above that level, however, it was noted that email could not adequately capture and share tacit, fine-grained knowledge. Project managers thus supplemented email to discuss such operational issues with face-to-face meetings and the frequent use of the telephone. These media were felt by the project managers to offer the required multiple cues and language variety to facilitate successful knowledge sharing.
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Web conferencing	<p>Description Standard software product used to facilitate web conferencing (an internet-based remote conference) which can transfer applications (presentations, spreadsheets, etc.) to participants. The web conference is controlled by one person who runs the applications, with other participants being able to view only.</p> <table border="1" data-bbox="371 1417 1406 1938"> <thead> <tr> <th data-bbox="371 1417 885 1450"><u>Task relevance</u></th><th data-bbox="885 1417 1406 1450"><u>Media richness</u></th></tr> </thead> <tbody> <tr> <td data-bbox="371 1450 885 1938"> Senior managers commonly use web conferencing. The knowledge created and shared is seen as being specifically task relevant; particularly for 'generating tasks' to identify strategic issues. Project managers do not commonly use web conferencing, and is not perceived as being specifically task relevant. Project managers view the use of web conferencing as being used for identifying strategic issues and that, from their perspective "the need doesn't arise to use web conferencing as [our] superiors clarify all the problems for [us]." </td><td data-bbox="885 1450 1406 1938"> Senior managers viewed web conferencing as being media rich, with rapid 'feedback capability', words, graphics, numbers and audio capability offering 'multiple cues' and 'language variety.' This richness was seen as being sufficient for 'generating tasks' (see 'task relevance' section to the left). However, once key issues were identified, more rich media was used for undertaking 'choosing', 'executing' and 'negotiating' tasks. As one senior manager commented; "at this stage [once the key issues have been identified] the senior managers 'get people round the table discussing face-to-face.'" </td></tr> </tbody> </table>		<u>Task relevance</u>	<u>Media richness</u>	Senior managers commonly use web conferencing. The knowledge created and shared is seen as being specifically task relevant; particularly for 'generating tasks' to identify strategic issues. Project managers do not commonly use web conferencing, and is not perceived as being specifically task relevant. Project managers view the use of web conferencing as being used for identifying strategic issues and that, from their perspective "the need doesn't arise to use web conferencing as [our] superiors clarify all the problems for [us]."	Senior managers viewed web conferencing as being media rich, with rapid 'feedback capability', words, graphics, numbers and audio capability offering 'multiple cues' and 'language variety.' This richness was seen as being sufficient for 'generating tasks' (see 'task relevance' section to the left). However, once key issues were identified, more rich media was used for undertaking 'choosing', 'executing' and 'negotiating' tasks. As one senior manager commented; "at this stage [once the key issues have been identified] the senior managers 'get people round the table discussing face-to-face.'"
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Alliance portal	<p><u>Description</u></p> <p>The alliance intranet was launched in September 2002 and is still being developed. The intranet can be accessed from all alliance offices. The intranet is being used as a knowledge repository that is categorised for knowledge search and retrieval functionality.</p>	
	<p><u>Task relevance</u></p> <p>Senior managers and project managers view the alliance portal as providing knowledge which was potentially task relevant, but not specifically task relevant. As one senior manager commented; "we don't get the specific information through intranets. Therefore people don't use them much." Similarly, a project manager noted that; "if someone wants to know about tank lining in a fuel storage tank, that person has to read a full paper on tank lining available in the Intranet. Therefore people don't have time to use the intranet."</p>	<p><u>Media richness</u></p> <p>Senior managers and project managers view the alliance portal as being very low in its media richness.</p>

Summary

The senior manager and project manager perspectives on the task relevance and media richness fit drawn from the case study material are shown in Figure 2.

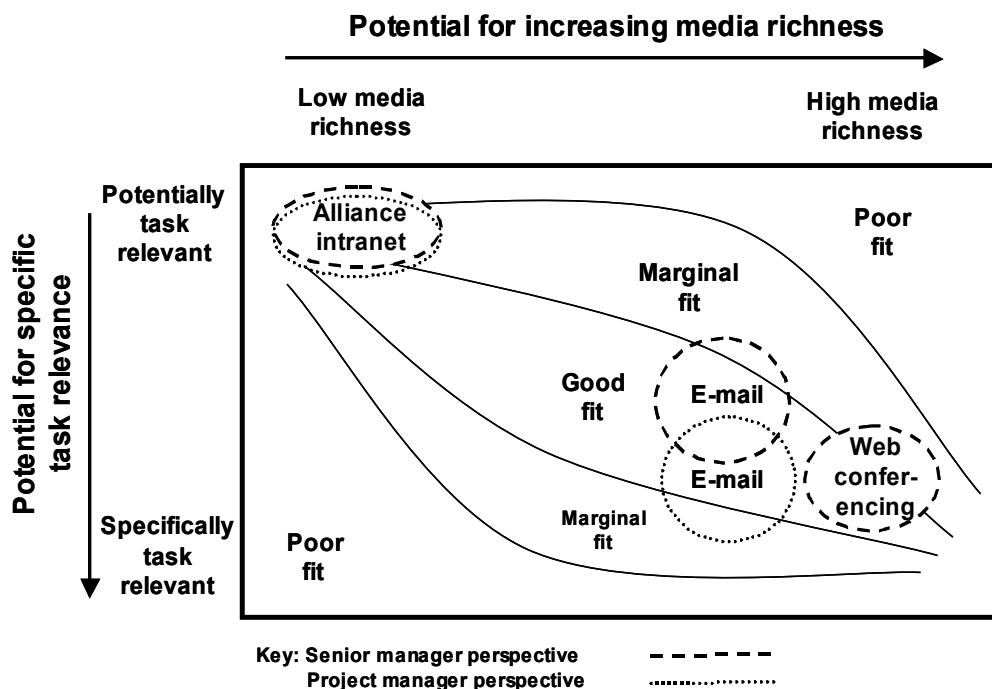


Figure 2 Summary of case study insights into task relevance and media richness alignment from senior manager and project manager perspectives

For both the senior managers and the project managers, the alliance intranet was seen as being not specifically task relevant and low in media richness. The web conferencing mechanism was used by senior managers only, and seen as being fairly specifically task relevant and high in media richness. Email was seen differently by senior managers and project managers, with project managers seeing the mechanism as more specifically task relevant and higher in media richness.

CONCLUSIONS

The aim of this paper has been to report on ongoing research investigating IT-enabled knowledge sharing mechanisms in multinational strategic alliances within construction. Two contextual lines of enquiry were set out to generate a model to locate and evaluate IT-enabled knowledge sharing

mechanisms. First, the concept of media richness was introduced, which posits that the feedback capability, availability of multiple cues, language variety and personal focus attributes of a medium significantly determine how successfully that medium can communicate knowledge between participants. Second, the importance of task relevance was identified, emphasising that success of a communication is determined by how relevant the content of the message is to the receiver's work. These two themes were integrated to offer the media richness – task relevance fit model set out in Figure 1.

This model was used as a framework to structure and evaluate interim findings from a multinational alliance case study. The results support the validity of the medium richness – task relevance fit model. The two key stakeholder groups interviewed in the case study – senior alliance managers and project managers – both associated successful knowledge sharing with task environments which encourage specific task relevance, and IT-enabled mechanisms characterised by high media richness. The significant difference between the stakeholder groups was the use of web based conferencing, with senior managers valuing the mechanism more than project managers. This difference appears to be because project managers do not see the mechanism has being used for task relevant communication.

In conclusion, the interim findings indicate that successful IT-enabled knowledge sharing mechanisms are closely linked to both media richness and the business logic and the social processes captured in the task relevance and task environment aspects of virtual organisation. Stakeholder groups within the alliance, with difference purposes, use media in different ways and the communication patterns are substantially the same within the stakeholder group but differ between stakeholder groups in the alliance. The results reinforce the need to adopt a social constructivist approach to IT-enabled knowledge sharing mechanisms, which challenges researchers and practitioners to understand different alliance stakeholder groups' interpretations of, and interactions with, the information technology within the broader business and social contexts of the alliance.

The implication for virtual alliance organisation design and operation flowing from this social constructivist perspective is that adequate organisational development and change management needs to take place for people to make appropriate sense of knowledge sharing mechanisms and, in this sense-making process, to develop desired and shared assumptions about their rationale and use, which then serve to shape subsequent actions towards it.

It is important that we recognise the need for appropriate debate between the ways in which the media richness characteristics of different IT-enabled knowledge sharing mechanisms affect business logic and social processes of virtual multinational alliances, and the ways in which these business logics and social processes affect the design and operation of IT-enabled knowledge sharing mechanisms.

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