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BARRIERS TO EFFECTIVE KNOWLEDGE TRANSFER IN PROJECT-BASED ORGANISATIONS

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Effective knowledge transfer can prevent the reinvention of systems and ideas as well as the repetition of errors. Doing so will save substantial time, as well as contribute to better performance of projects and project-based organisations (PBOs). Despite the importance of knowledge, PBOs face serious barriers to the effective transfer of knowledge, while their characteristics, such as unique and innovative approaches taken during every project, mean they have much to gain from knowledge transfer. As each new project starts, there is the strong potential to reinvent the process, rather than utilise learning from previous projects. In fact, rework is one of the primary factors contributing to construction industry's poor performance and productivity. Current literature has identified several barriers to knowledge transfer in organisational settings in general, and not specifically PBOs. However, PBOs significantly differ from other types of organisations. PBOs operate mainly on temporary projects, where time is a crucial factor and people are more mobile than in other organisational settings. The aim of this research is to identify the key barriers that prevent effective knowledge transfer for PBOs, exclusively. Interviews with project managers and senior managers of PBOs complement the analysis of the literature and provide professional expertise. This research is crucial to gaining a better understanding of obstacles that hinder knowledge transfer in projects. The main contribution of this research is exclusive for PBO, list of key barriers that organisation and project managers need to consider to ensure effective knowledge transfer and better project management.

Keywords: barriers, inter-project knowledge transfer, lessons learned, project-based organisation, social communication.

INTRODUCTION

Knowledge management enables the organisation of knowledge within a company. According to Alavi and Leidner (2001) knowledge management is a complete and organisationally specified process for acquiring, organising, and communicating both tacit and explicit knowledge so that others can use that knowledge to become more effective and productive. Knowledge transfer is a part of the knowledge management process that enables transfer of knowledge to locations where it is needed and can be used (Bhatt 2001). However, scholars recently refer to knowledge transfer in a broader context as the process through which one unit (e.g., group, department, or division) is affected by the experience of another (Argote and Ingram 2000: 151), focusing not only on knowledge communication per se, but also the application of knowledge (see also: Levin and Cross 2004; Szulanski 2001).

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Research on project learning, and practitioners have both indicated the need for knowledge transfer within and between projects (Baccarini 1999; Bower and Walker 2007; Kotnour 1999; Schindler and Eppler 2003; Walker 2004). Despite a project's uniqueness, project experiences can be reused in other projects, providing valuable lessons. For this reason, it is important to share knowledge across projects in order to avoid unnecessary reinventions of what has been already done (Carrillo 2005). Project-based organisations (PBOs) face serious knowledge needs in their projects. They tend to repeat the same mistakes too often because of the lack of effective knowledge transfer which could potentially be found in other projects within the same organisation (Desouza and Evaristo 2006; Landaeta 2008). Poor performance of knowledge transfer results in knowledge being wasted and unsuitable for reuse in other related projects. Lack of efficient knowledge transfer causes, in effect, unnecessary reinventions, errors, and time wastage. For example, the cost of rework in Australian construction projects has been reported as being up to 35% of total project costs and contributes as much as 50% of a project's total overrun costs. In fact, rework is one of the primary factors contributing to the Australian construction industry's poor performance and productivity (Love, Irani, and Edwards 2003).

This research investigates the literature and fieldwork on the barriers relating to inter-project knowledge transfer in PBOs, focusing on the characteristics of PBOs which influence that transfer, including social communication, transfer of documented lessons learned, and the role of the project manager in inter-project knowledge transfer.

The proposed research is significant in that it provides a list of barriers specific to PBOs that hinder knowledge transfer across projects, and offer recommendations on how to overcome some of these barriers, and ensure effective knowledge transfer and better project management.

KNOWLEDGE TRANSFER IN PROJECT-BASED ORGANISATIONS

In PBOs, the main organisational units are projects that often cooperate as separate endeavours and are often geographically dispersed. This causes a lack of communication links between projects and in effect hinders the knowledge transfer and learning process causing 'learning closure' and lack of cross-project learning and communication (Hobday 2000). Knowledge acquired during one project is not effectively transferred and utilised by other projects. When a new project starts, there is a tendency to reinvent the process, rather than learn from the experiences of previous projects (Prusak 1997). Companies could save considerable costs caused by redundant work and the repetition of mistakes, if they master the project learning cycle (Schindler and Eppler 2003).

Knowledge transfer at the project level takes place as social communication between project stakeholders and through different explicit information channels such as project documents (Arenius, Artto, Lahti, and Meklin 2003). According to this definition, knowledge in projects is transferred by social communication, and explicit information channels. Explicit information channels are the lessons learned that are documented from past project experiences.

This research outlines the roles of social communication and transfer of documented lessons learned in inter-project knowledge transfer, as well as the role of project manager as an important player in inter-project knowledge transfer process.

The role of social communication in inter-project knowledge transfer

In a project environment, communication provides critical links between the people, ideas and information necessary for project success (Project Management Institute 2004).

Mintzberg (1973) indicated that people prefer to turn to other people rather than documents for information. More recently, the same tendency has been found even for people with ready access to the internet and their firm's IT-based knowledge repository (Cross, Parker and Borgatti 2000). Newell et at. (2008) conducted empirical research using data from 13 projects in six organisations. They identified that social networks and informal dialogue are more efficient than IT techniques and that IT should only complement social networks in knowledge transfer. It is then apparent that social networks play an important role in knowledge transfer (Cook and Brown 1999; Foos, Schum and Rothenberg 2006; Liebowitz 2005; Newell, Bresnen, Edelman, Scarbrough and Swan 2006).

Existing research found that social networks such as informal meetings, coffee breaks, and workshops are excellent means to share knowledge (Cook and Brown 1999; Foos et al. 2006; Liebowitz 2005; Newell et al. 2006). However, even if there is an opportunity for direct interaction in PBOs, people work under pressure, and often have no time for social communication. Moreover, specific characteristics of projects such as tight schedules and geographical dispersion of projects reduce the amount of social communication, which can take place during projects. When this social communication is missing, the project must develop specific means to increase it (Arenius et al. 2003).

The role of documented lessons learned in inter-project knowledge transfer

Another way to ensure effective knowledge transfer across projects is to capture and transfer lessons learned beyond the project. Projects are often geographically dispersed and sometimes the use of a lessons learned repository is the only way to get knowledge from other projects. Therefore, it is important to ensure complete lessons learned approach that not only ensures documentation of lessons learned, but also regulate the aspect of transfer of lessons learned beyond the project, to other projects and organisation. Lessons learned are defined as key project experiences, which have certain general business relevance for future projects. They have been validated by a project team and represent a consensus on key issues that should be considered in future projects (Project Management Institute 2004). Lessons learned are part of the knowledge transferred that can be regulated, including transfer of mainly explicit knowledge.

According to project management methodologies, lessons learned should constitute valuable knowledge for current and future projects and should be comprehensively transferred (Office of Government Commerce UK 2005; Project Management Institute 2004). The aim for lessons learned is to capture the positive and negative aspects of projects in order to learn from the experiences (Kotnour 1999), therefore avoiding unnecessary reinventions that are time consuming and costly (Carrillo 2005). The lessons learned can become a valuable knowledge source during the planning phases for other projects (Kotnour 1999). The risk of knowledge loss at a project's end is a serious problem for organisations.

Leading project management methodologies like PMBOK and PRINCE2 (Office of Government Commerce UK 2005; Project Management Institute 2004) have already acknowledged the importance of the transfer of lessons learned by identifying project management processes during which the transfer of lessons learned should occur. Moreover, practitioners constantly talk about the importance of lessons learned. Nevertheless the process of documenting and transferring lessons learned does not occur effectively, as there is still a lack of effective approaches on producing and transferring lessons learned beyond the project.

The role of project manager in inter-project knowledge transfer

Project managers typically have a high status and direct control over business functions, personnel, and other resources (Hobday 2000) and so play an important role as connectors between projects and organisation and across projects (Eskerod and Skriver 2007; Loo 2002) facilitating inter-project knowledge transfer.

A project manager is engaged into the project processes and tasks, dealing with project team members as well as coping with a variety of stakeholders within and outside the organisation (Turner and Muller 2003). A project manager's knowledge transfer responsibilities, according to PMBOK and PRINCE2, are to produce lessons learned and to manage project communication. A project manager's communication chain is broad, communicating with senior management to keep their continuing commitment, clients, senior members of the project team to coordinate their activities, all team members, heads of functional departments, suppliers, and subcontractors (Parker and Craig 2008). This communication needs to be constantly maintained as it plays a critical role in knowledge acquisition and transfer.

A project manager is in the centre of a project network. Blackburn (2002) empirical studies on project managers showed that project managers place themselves at the centre of their project stories: "they are the heroes with the knowledge and experience you can trust". A project network needs constant maintenance, in which the project manager and the project management methodology help to keep the project manager at the centre of the project. Blackburn (2002) used the term ´obligatory passage point´ to describe a location in a network through which other actors are obliged to pass, the centre of the network. Project managers are in the centre of executive project network; and as such have knowledge about the project issues. However, project managers often hoard knowledge and/or do not attempt to search for knowledge outside the project.

EMPIRICAL STUDY

This research conducted an empirical study to look into mechanisms of inter-project knowledge transfer, and uncover barriers that hinder that transfer. The study was a qualitative investigation involving five interviews, with four executive managers that have been involved in providing project management consultancy to PBOs across a range of industries, and one senior structural engineer who works for a multinational organisation providing leadership in management, engineering, environment, planning and architecture. Each respondent had at least 5 years of experience in providing project management across different industry sectors, such as construction, health, government, and IT. The reason for choosing practitioners from companies providing consultancy for PBOs is that they have broad expertise in working for different types of PBOs and can provide an overview of knowledge transfer issues related to many industries. The aim of the interviews was to identify the key barriers that prevent effective inter-project knowledge transfer in PBOs.

Description of method

The rationale for choosing interviews as the evidence collection approach was to provide a rich insight into the complex problem of knowledge transfer in projects. Focused interviews were conducted in which respondents were interviewed for a short period of time, and the interview was followed by a set of questions prepared earlier, as suggested by Merton, Fiske and Kendall (in Yin 2003). This type of interview can remain open-ended, while ensuring relevant ideas are addressed and allow for focused, conversational, two-way communication (Yin 2003). The possibility of asking open-ended questions in focused interviews is useful where there is a need to clarify some responses as well as to facilitate respondents in providing valuable comments and feedback. The alternative closed and remote survey

approach provides little information on the underlying meaning of data (Gable 1994). The average time for each interview was one hour. All interviews were recorded and later transcribed. Data from the interviews was analysed using NVivo 7 software, which facilitated the arranging and analysing of data in an efficient manner.

Findings

Interviews findings focused on barriers specific to inter-project knowledge transfer, and were classified into three main categories: barriers related to a lack of social communication, barriers related to transfer of documented lessons learned, and barriers related to the project manager.

Knowledge transfer in a project environment occurs via social communication between project stakeholders and through different explicit information channels such as project documents (Arenius et al. 2003). Interviews revealed that depending on the projects' geographical dispersion, and the size of the PBO, there is a change of communication means used to transfer knowledge. Small PBOs with co-located projects facilitate social communication, including face to face, formal and informal meetings. However, in large PBOs with geographically dispersed projects knowledge transfer occurs better through documented lessons learned because the chances for direct interactions are limited.

Moreover, interviewees distinguished three types of PBOs - contractors, public, and private sector PBOs, stressing that knowledge transfer occurs differently in each type. Contractors fall under the first category of PBOs explained by PMBOK, organisations that derive their revenue primarily from performing projects for others under contract. The further two types fall within the second category explained by PMBOK, organisations that have management systems structured to facilitate project management (Project Management Institute 2004). It was suggested that in a construction company, where a team is established for an individual project, there is very little communication between project teams. On the other hand, in public sector there is an opportunity for more frequent interaction and knowledge exchange between team members from different projects, because people remain in their positions. However, in public sector environment "bad news" is not welcomed and people tend to hoard information that relates to their faults. In the private sector, communication across projects can happen similarly to public sector, though the culture in such organisations is not as resistant to "bad news".

Barriers related to inter-project transfer of lessons learned
Interviewees confirmed findings from the literature that transfer of lessons learned across projects saves time and prevents the loss of valuable knowledge that could be used for future projects. However, this process does not occur effectively. Interviewees recognised that although people constantly talk about the importance of lessons learned, there is still lack of effective approach to produce and transfer lessons learned. Very few organisations that actually have regulated the processes of lessons learned. Interviewees noted that often this process is done in a rush, and it is hard to involve the right people to properly analyse and incorporate lessons learned into the organisation. Moreover, interviewees addressed that most organisations do not regulate the process of transfer and use of lessons learned by other projects and organisation.
Interviewees addressed that work pressure and consequently a lack of time to produce lessons learned is one of the main causes for lessons learned not being transferred. Projects have to be delivered within the desired timescale. In the project environment, time is literally limited and is always running out. People are focused mainly on delivery rather than on knowledge transfer activities.

Respondents also highlighted the lack of the recognition of lessons learned in the project budget as a factor causing poor performance of lessons learned. Often lessons learned are not produced because they are not recognised in the project budget. One interviewee noted: *"the reality is that nothing happens unless there are some money and resources allocated."* It was also said that the project manager produces lessons learned only if an organisation requires it, if it is in the project scope, because the main responsibility of a project manager is to deliver the project and achieve the objectives. Therefore, unless it is regarded in scope by the organisations and include in the budget there is no interest for a project manager to produce lessons learned.

"Very rarely people produce and transfer lessons learned because they feel it could be valuable for other projects. Project members firstly focus on the things under budget [focus on delivery, where the profit comes from], dropping of lessons learned."

Moreover, one interviewee with the experience across different industry sectors noted that in most cases the transfer of lessons learned is fragmented. He said that people see what went well, what has to be improved, but there is a lack of ability to capture and share that information for the future. Often producing lessons learned is simply ticking the box, without paying special attention to the potential value for future projects and the organisation.

Organisations struggle with the idea of how to create a lessons learned data base. When there is no proper repository of lessons learned within the organisation, searching for them can be time consuming. There are very few cases where PBOs have central repositories of lessons learned and those who have are mainly in the private sector. Most organisations do not have clear procedures on how to produce and store lessons learned. Furthermore, the collection of lessons is conducted periodically rather than throughout the performance, which causes important information to be missed or forgotten. People mostly tend to keep lessons learned in their minds. One interviewee proposed a solution. Organisations should create a repository of lessons learned data base that is easy to access, and when new employees come to the organisation, forms a part of their induction so they become familiar with the data base, what is there, and how to use it. When there is no proper repository of lessons learned within the organisation, searching for them can be time consuming.

Barriers related to social communication
Another factor that prevents a transfer of valuable knowledge across projects is a lack of social communication between projects. This occurs especially in construction companies where there is very little communication, if any, between projects teams. A lack of links between projects, often due to their geographical dispersion, results in coordination and communication happening at a higher level of the organisation and occurring only during scheduled meetings and training. In a public sector environment, projects are normally organised around functions, in which case people tend to work on several projects at a time and there is a greater possibility for ongoing communication between project teams, creating potential for informal sharing of knowledge. However, one interviewee observed that in the public sector there is often a culture in which bad news is unwelcome. Moreover, one interviewee pointed out that people tend to hoard information as it relates to themselves and/or their group performance. If something in the project went wrong and the fault relates to individual performance "what did we do wrong in the project", people are not willing to share that information.

Transfer of knowledge by social communication is hard to achieve in PBOs where projects are dispersed. However, most interviewees agreed that this is the most effective way to share valuable knowledge and information.

> *"Meetings and discussions about the projects will be more valuable than necessarily documenting the lessons learned. People like to challenge things, drill down, and discuss why they happened."*

Another interviewee added:

> *"Face to face communication is more important, but recognising the staff changes you still have to document [knowledge in a form of lessons learned]."*

Barriers related to project manager

According to the empirical findings, the major reason why knowledge transfer did not reach the expected level, was because a project manager's first priority is to deliver the project. They are not focused on transfer of lessons learned unless it is mandated in the project scope and budget. Moreover, project managers often hoard their knowledge, as they view it as a potential threat for them in the future.

One interviewee addressed young project managers, from the generation Y as overconfident who do not want to take advice from others. At the same time project managers do not like passing on their expertise, as they like to control information (knowledge) they possess.

One interviewee proposed the solution that a properly deployed project management office (PMO) can assist project managers in the transfer of knowledge and lessons learned. PBOs must put a special notice to allow better connection between projects, which in effect will facilitate knowledge transfer. A PMO can play that role and serve as a link between projects in providing expertise and advice.

CONCLUSIONS AND PRACTICAL RECOMMENDATIONS

According to the findings of the empirical study, this research proposes the following classification of barriers that hinder inter-project knowledge transfer:

Barriers related to social communication:

- Lack of social communication between projects
- Sharing of "bad news" is not encouraged
- Lack of time for social communication
- Lack of willingness to share project faults caused by individual or group performance

Barriers related to inter-project transfer of documented lessons learned:

- Lack of comprehensive approach to lessons learned including processes of transfer of lessons learned beyond the project
- Transfer of lessons learned is fragmented
- Lessons learned are not included in the project scope and/or budget
- Lack of a lessons learned repository
- Lack of time to produce lessons learned

Barriers related to project manager:

- Lessons learned have a low priority for the project manager
- Young project managers, from generation Y are overconfident and are reluctant to take advice from others
- Project managers do not like passing on their expertise, and prefer to control the information (the knowledge) they possess
- Project managers do not want to criticise processes or people from the organisation

As time in projects is limited, project members are focused on delivery of the product or service rather than on knowledge transfer activities. A lack of time was the most frequently noted barrier to knowledge transfer. This problem cannot be simply fixed by allocating extra time for knowledge transfer activities, because time in projects is limited due to their temporary existence. PBOs must search for other solutions to empower knowledge transfer, perhaps by improving social communication, including requirements for documenting and transferring lessons learned in the project scope and budget, and by deploying PMOs formed of experienced practitioners who will provide expertise for projects, and link projects across an organisation.

The literature identified and findings from interviews confirmed that documented repository of lessons learned is an effective way to preserve knowledge from being lost. However, face-to-face communication still plays an important role in inter-project knowledge transfer. Therefore, PBOs should promote social communication whenever possible. Workshops, seminars, opportunities for informal meetings, coffee breaks, and other direct interactions are effective techniques to transfer knowledge. Nevertheless, the geographical dispersion of projects means direct interactions are not always achievable, and other communication means should be introduced, such as the transfer of documented lessons learned. To ensure an effective knowledge transfer through lessons learned, organisations should introduce a complete lessons learned approach that includes comprehensive regulations on how to document and transfer lessons learned throughout the project to ensure they are accessible beyond the project, and ensure who is responsible for transferring lessons learned, as well as how and to whom lessons learned have to be transferred. A project manager should review lessons learned at the beginning of the project and be responsible for producing them throughout the duration of the project with the assistance of a PMO or project officer if possible.

Organisations should create a repository of lessons learned, and a review of such repository should be part of a new employee's induction process. When there is no proper repository of lessons learned within the organisation, searching for them can be time consuming.

Learning from other's mistakes is the best way to avoid repeating the same again. Industry practitioners discuss the problem of a lack of effective inter-project knowledge transfer approach, but still not enough attention and importance is given to this vital process. Organisations need good governing structures and policies that regulate the process of lessons learned and facilitate social communication.

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