The Impact of Unique Characteristics of Projects and Project-Based Organisations on Knowledge Transfer

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Abstract: Knowledge has been recognised as an important organisational asset that increases in value when shared; the opposite to other organisational assets which decrease in value during their exploitation. Effective knowledge transfer in organisations helps to achieve and maintain competitive advantage and ultimately organisational success. So far, the research on knowledge transfer has focused on traditional (functional) organisations. Only recently has attention been directed towards knowledge transfer in projects. Existing research on project learning has recognised the need for knowledge transfer within and across projects in project-based organisations (PBOs). Most projects can provide valuable new knowledge from unexpected actions, approaches or problems experienced during the project phases. The aim of this paper is to demonstrate the impact of unique projects characteristics on knowledge transfer in PBO. This is accomplished through review of the literature and a series of interviews with senior project practitioners. The interviews complement the findings from the literature. Knowledge transfer in projects occurs by social communication and transfer of lessons learned where project management offices (PMOs) and project managers play significant roles in enhancing knowledge transfer and communication within the PBO and across projects. They act as connectors between projects and the PBO ‘hub’. Moreover, some project management processes naturally facilitate knowledge transfer across projects. On the other hand, PBOs face communication challenges due to unique and temporary characteristics of projects. The distance between projects and the lack or weakness of formal links across projects, create communication problems that impede knowledge transfer across projects. The main contribution of this paper is to demonstrate that both social communication and explicit informational channels play important role in inter-project knowledge transfer. Interviews also revealed the important role organisational culture play in knowledge transfer in PBOs.

Keywords: knowledge transfer, lessons learned, organisational culture, project management office (PMO), project-based organisation (PBO), social communication

1. Importance of knowledge transfer in organisations

The debate on the meaning of knowledge has been ongoing among philosophers for thousands of years. However, only recently has knowledge been recognised as a powerful organisational asset (Alavi and Leidner 2001; Liebowitz 2005, Liebowitz 2008; Love, Fong 2005, Irani 2005; Nonaka and Takeuchi 1995). In the 1940s, organisations began to appreciate the value of knowledge. During the second half of the 20th century information technology (IT) become an important tool for knowledge management, but only during the late 1980s did roles begin to change and employees begin to be viewed as a source of knowledge and the drivers of organisational performance (Wiig 1997). While views on knowledge have been evolving, the nature of organisations has also been changing. During the second half of the 20th century, there has been an evolution in the organisational structure. Many organisations have moved from the functional structure to the project-based organisation (PBO). A driver for this was the changing nature of work from mass production, with stable customer requirements and slowly changing technology, to the current situation, where markets are increasingly competitive and technology changes rapidly according to growing customer demands. Thus many organisations have switched to PBOs. Projects can be used to concentrate resources, compress development time and implement new business processes much more rapidly than routine
operations. They are capable to create products and services discontinuity that is preferable in the present fast changing environment. On the other hand, PBOs simultaneously face serious knowledge needs in their projects. They tend to repeat the same mistakes too often because of the lack of effective knowledge transfer (Desouza and Evaristo 2006). This knowledge could be potentially found in other projects within the same organisation (Kotnour 1999; Landaeta 2008). It is therefore important for projects to go beyond the specific deliverables and become sites for acquisition and the integration of knowledge. Existing research on project learning has recognised the need for knowledge transfer within and from projects in PBO (Baccarini 1999; Bower and Walker 2007; Kotnour 1999; Schindler and Eppler 2003; Walker 2004). Although knowledge management in projects has been broadly researched, the problem of inter-project knowledge transfer is still current.

This paper discusses findings from review of the literature and fieldwork on knowledge transfer practices in PBOs, focusing on key elements influencing the effectiveness of inter-project knowledge transfer. The first section of the paper outlines the importance of knowledge transfer in organisations, and compares relevant characteristics of PBOs and functional organisations. Further, the paper discusses findings from the literature on how knowledge transfer occurs in PBOs. In the empirical study section, the interviews with practitioners anchor the practices in knowledge transfer in project environment. The main argument presented in this paper is that both social communication and explicit informational channels, such as electronic or documented lessons learned play important role in inter-project knowledge transfer. Interviews also revealed the role of organisational culture in knowledge transfer in PBOs as crucial.

2. Functional organisations versus PBO

PBOs differ significantly from functional organisations in terms of their structure, viewpoint on time, processes, and people.

- **Organisational structure**

  The classic functional organisation is hierarchical, where each employee normally has one superior. Functional organisations can also have projects, but the scope of the project is usually limited to the boundaries of the function. In PBOs, the main organisational unit is a project. Most of the organisation’s resources are involved in the project activities, and project managers have authority and independence. An extreme form of PBO is a pure PBO structure (Hobday 2000), which is organised solely around projects (Prencipe and Tell 2001). There is no formal functional coordination across project lines. The entire organisation is dedicated to one or more projects and business processes are coordinated within the projects. This type of PBO has no functional division of labour or task coordination across project lines. The lack or weakness of formal link across project lines impedes knowledge transfer and the learning process causing ‘learning closure’ and lack of cross-project learning and communication (Hobday 2000).

  Project managers within a PBO typically have high status and direct control over business functions, personnel, and other resources (Hobday 2000). They play a role as a connector between projects and organisation and across projects (Eskerod and Skriver 2007; Loo 2002). The role of the project manager does not exist in functional organisations, and the responsibility of a functional manager differs significantly from that of the project manager. A functional organisation is more hierarchical, where the manager of the function reports to a senior manager who further reports to an executive manager in a chain of command (Bartol, Tein, Matthews, and Sharma 2008).

- **Viewpoint on time**

  Due to the fact that projects are time orientated, people tend to focusing on project activities rather than knowledge transfer activities (Davenport and Prusak 1998; Kotnour 1999; Loo 2002). The temporary character of projects defines the end date from the very beginning of its existence (Lundin and Söderholm 1995; Ngoasong and Manfredi 2007). For functional organisations, time is generally regarded as a limited resource and is often alluded to in terms such as "time is money" (Lundin and Söderholm, 1995). However, in the project environment, the handling of time is more complicated since their time is literally limited. Therefore, the time is always running out since it is finite from the start and known from the beginning. Functional organisations are survival rather than time orientated as they perceive their future as eternal (Lundin and Söderholm 1995).

- **Processes and people**
Processes in PBOs are flexible and staged; whereas in functional organisations, processes are continuous and stable. Stable functions can be well defined because both the work of the functions, and the intermediate products which pass between them are well defined and unchanging, leading to the functional approach to work (Mintzberg 1979). In functional organisations, people remain in their positions, which encourage the development of expertise, as members specialise in a function (Bartol et al. 2008). Whereas, a PBO is weak in coordinating processes, resources and capabilities across projects, because projects act almost like separate organisations (Hobday 2000). Moreover, in PBOs when a project finishes, people reassigned to their previous functions or start working on new projects. Members of the disbanded team often have little time and motivation to reflect on their experience and document transferable knowledge for recycling in future (Brady and Davies 2004). As each new project starts, there is a tendency to reinvent the process, rather than learn from the experiences of previous projects (Prusak 1997).

- Geographical location
In functional organisations, functions or departments are usually co-located. In PBOs geographical dispersion of projects reduce the amount of social communication occurring during projects. As projects become more highly distributed along the dimensions of space, time and organisations, the problems associated with knowledge boundaries between the practices of the different projects involved also increase (Newell et al. 2008). Depending on the projects’ geographical location there is a change of communication means used to transfer the knowledge as well as the party involved in the inter-project knowledge communication.

Table 1 compares the characteristics of PBO and functional organisations that have been discussed above.

**Table 1: PBO and functional organisation comparison**

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>PBO</th>
<th>FUNCTIONAL ORGANISATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organisational Structure</strong></td>
<td>Main Unit – Project</td>
<td>Main Unit – Function, Department, Division</td>
</tr>
<tr>
<td></td>
<td>Project: unique, novel and transient</td>
<td>Activity: repetitive, routine and ongoing</td>
</tr>
<tr>
<td></td>
<td>Project manager is a chief executive of a temporary organisation.</td>
<td>Manager of the function reports to senior manager who further reports to executive manager in a chain of command.</td>
</tr>
<tr>
<td></td>
<td>Lack or weakness of formal links across projects</td>
<td>Easy co-ordination between departments as activities are related.</td>
</tr>
<tr>
<td><strong>Viewpoint on TIME</strong></td>
<td>Time is existence</td>
<td>Time is money</td>
</tr>
<tr>
<td></td>
<td>Time orientated</td>
<td>Survival (continue existence) orientated</td>
</tr>
<tr>
<td></td>
<td>Finite character - the end date of the project is known from the outset</td>
<td>Future is perceived as eternal with no end time identified a priori</td>
</tr>
<tr>
<td><strong>Processes and People</strong></td>
<td>Flexible, staged</td>
<td>Stable, continuous</td>
</tr>
<tr>
<td></td>
<td>People come from several areas of organisation; are formed around the project</td>
<td>People remain on their positions and stay within the function,</td>
</tr>
<tr>
<td><strong>Geographical Location</strong></td>
<td>Co-located and geographically dispersed projects</td>
<td>Co-located functions</td>
</tr>
</tbody>
</table>
There are significant dissimilarities in both organisational settings. The unique characteristics of PBOs (novel and temporary character of project, the role of project manager, time focus, geographical dispersion of projects) play an important role in knowledge transfer. These features are not relevant to knowledge transfer approaches in functional organisations, however, should be carefully considered for knowledge transfer approaches in PBOs.

3. Knowledge transfer in PBO

Knowledge transfer at the project level takes place as a social communication between project stakeholders and through different explicit information channels such as project documents (Arenius, Artto, Lahti, and Meklin 2003). In a project environment, communication provides critical links among people, ideas and information that are necessary for project success (Project Management Institute 2004). Tight schedules and geographical dispersion of projects reduce the amount of social communication taking place during projects. When this social communication is missing, the project must develop specific means to increase the communication (Arenius et al. 2003). One way to ensure effective knowledge transfer across projects is to document and transfer lessons learned beyond the project. Lessons learned are the key project experiences, which have 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). The lessons learned can become a valuable knowledge source during the planning phases for other projects (Kotnour 1999). A project manager is not only involved in producing and transferring lessons learned, but also plays an important role in inter-project knowledge transfer.

Matured PBOs embody project management offices (PMOs), known also as a centres of excellence, which is an organisational entity established to manage a specific project or a related series of projects (Ward in Dai and Wells 2004). The PMO can play an important role as a link between projects. However, PMOs have only recently begun to appear, and few PBOs have established such a mechanism.

PMOs can vary widely in terms of size, structure, and accountability. One PMO role is to manage project knowledge by leveraging knowledge across projects in the organisations; whereby the PMO serves as a knowledge repository. This accumulated knowledge is made available to other projects or areas of the organisation, such as engineering, research and development, and product development, so as to improve the products and services of the organisation (Desouza and Evaristo 2006). PMO’s serves as a support to other projects in providing knowledge of project tasks (Liu and Yetton 2007).

4. Organisational culture and trust

Organisational culture provides norms on what is right and what is wrong, stabilises organisational methods of operation (Ajmal and Koskinen 2008) and in this way enable knowledge transfer. Goh (2002) argues that cooperation, as one of the dimensions of organisational culture, has enormous impact on knowledge transfer in organisation. Without appropriate mechanisms to encourage cooperation, knowledge transfer may not work. A fundamental variable of co-operation is trust. A high level of trust is therefore an essential condition for a willingness to co-operate. Right organisational culture will enhance mutual trust in organisation, and help to enable more effective knowledge transfer (Issa and Haddad 2008). Civi (in Issa and Haddad 2008) suggested that training is the best way to start to introduce culture within organisations seeking to achieve more collaborative environment. Building common purpose and shared meanings help in building trust to share knowledge. Trust encourages network relations (Levin and Cross 2004) and improves working environment (Issa and Haddad 2008).

5. Empirical study

The empirical 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 capture practices in knowledge transfer in the project environment, considering specific characteristics of projects and PBOs.

The rationale for choosing interviews as the evidence collection approach was to provide 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 allowing 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 average time of the interviews was one hour. All interviews were recorded and later transcribed. Data from the interviews was analysed using NVivo 7 software that allowed for arranging and analysing data in an efficient manner.

Findings from the interviews focused on four key issues that appeared to be important in understanding the impact of unique characteristics of projects and PBOs on inter-project knowledge transfer, such as: social communication, transfer of lessons learned, and the role of the project manager and PMO.

5.1. Social communication
All respondents acknowledged the importance of social communication for inter-project knowledge transfer. Two respondents recognised that social communication occurs differently in different PBOs. They distinguished three types of PBOs - contractors, public, and private sector PBOs. 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, if any, between project teams. 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. Because people remain in their positions, there is 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, therefore threatening or bad news is not welcomed. 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”.

It was also suggested that social communication in a project environment is influenced by size of PBOs and projects. For example, in small organisations, projects may prefer face-to-face communication during informal meetings, but for large and/or dispersed projects this may not be possible and other approaches may be more useful, i.e. lessons learned repository, e-mail, on-line forums, etc. One interviewee said:

“...When it [knowledge] is buried in the documentation of the project, you have to go and read every project completion report that doesn't have really any value, because no one is going to do that. Something has to be readily available, maintained and managed”.

“Face to face communication is more important, but recognising the staff changes you still have to document.”

One interviewee noticed that whether people are willing to communicate knowledge depends on the type of knowledge they communicate. If the knowledge relates to improvement of process or procedure, people are more likely to communicate because the fault relates to the system they have, not the people. If the fault relates to individual performance e.g. “what we did wrong in the project”, people tend to hoard the information as it relates to themselves and/or their group performance. However, if the organisation views bad news as a way of learning and encouraging sharing of project
experiences, people are more likely to share. The impact of organisational culture on the willingness to transfer the knowledge was more or less directly acknowledged by all interviewees.

5.2. Transfer of lessons learned
Interviewees confirmed findings from the literature that transfer of lessons learned across projects saves time and prevent valuable knowledge being lost. However, this process of documenting and transferring lessons learned does not occur effectively. Interviewees recognised that although people constantly talk about the importance of lessons learned, there is still a lack of effective approaches producing and transferring lessons learned. They recognised several barriers, the main being work pressure caused by time constraints, where people are mainly focused on the delivery of a project rather than on lessons learned activities. It was also observed that in some cases the transfer of lessons learned is fragmented. One interviewee said that people see what went well, what has to be improved, but there is lack of ability to capture and share that information for future.

One exception to this practice was outlined. The requirements to document and transfer lessons learned were well defined in some organisations that conduct critical projects where high technology and risk is involved; in these organisations, knowledge is a main asset that gives competitive advantage and therefore needs to be managed with caution.

Organisations struggle with how to create a lessons learned database. One respondent suggested that the ideal situation is to have a database of lessons learned and when people join the organisation, it is a part of their induction to review such a database; this way they become familiar with what is there and how to use it. However, it was suggested that to prepare such a database is not an easy task. When there is no proper repository of lessons learned within the organisation, searching for them can be time consuming. There are very few cases of PBOs that have central repositories of lessons learned, and those who have these are mainly in the private sector. This is because organisations do not have clear procedures on how to produce and store lessons learned. Furthermore, often the collection of lessons is done periodically rather than continuously as a by-product of project activity, which often results in the loss of important information (is missed or forgotten). Mostly what currently happens is that people tend to keep lessons learned in their minds. There was one organisation that introduced technical and management open forums where lessons learned could be exchanged informally. People can register for such a forum and participate in a discussion about aspects of their interest.

5.3. Project manager’s role in knowledge transfer
Three respondents agreed that the project manager, who is responsible for producing lessons learned, is not interested in doing so. Due to the lack of time, their focus is on delivery of the project, rather than on lessons learned. Project managers produce lessons learned only if the organisation requires this, as specified in the scope of the project and in the project budget.

One respondent suggested that experienced project managers who have a high level of self-awareness and confidence, are usually willing to share their knowledge and experiences. Unexperienced project managers usually prefer to control the information they possess because they fear that if they share their knowledge it may become a threat for them in the future.

5.4. PMO’s role in knowledge transfer
Interviewees recognised the key function that the PMO can play in inter-project knowledge transfer, by providing mentoring and advice for projects, and being a central repository for lessons learned.

Effectiveness of the PMO depends on its position in the organisation’s hierarchy. Interestingly all respondents agreed that the PMO’s level of maturity should not always be the highest, stressing that the role of PMO should be in providing support, enhancing development of expertise, and monitoring rather than controlling and decision making. One interviewee suggested that the PMO should have stronger influence in those organisations that manage their projects in traditional way, strictly following project management processes and/or run by less experienced project managers. In organisations, which manage complex projects, run by experienced people, the PMO should provide guidelines and mentoring only. Two respondents stressed the importance of people who form the PMO. The PMO will not serve its purpose if it is populated with cliques or inexperienced members. It should rather be formed of experienced people, perhaps retired project managers who possess years of expertise. One interviewee said:
“If the PMO is populated with cliques or unexperienced people will not have creditability and it won’t be effective, as you are having people who knows what you are talking about.”

One organisation deployed a so-called ‘organisation business school’ as a form of PMO. This organisational body was formed of past engineers and past scientists; usually senior practitioners who provide their expertise in the form of advice, for projects run by less experienced managers. Their role was also to organise seminars and workshops, to gather people together and discuss issues of current interest. This type of project support was recognised to be very effective.

6. Discussion and conclusions
The empirical study confirmed the finding from the literature that the social communication and transfer of lessons learned play a pivotal role in knowledge transfer in projects.

It can be said that the social communication in PBOs depends on the projects geographical location, and the type of PBO (contractors, public, or private sector PBOs). It was also noted that organisational culture plays a pivotal role in social communication. When the organisation encourages communication and promotes knowledge transfer, people are prepared to share their information, ideas, problems and potential solutions. Moreover, the reason whether people are willing to communicate knowledge to other projects depends on the type of knowledge people communicate. People are not willing to transfer knowledge related to individual performance, especially faults caused by individual or group performance. We can further speculate that this willingness to transfer knowledge is influenced by organisational culture. Establishment of collaborative and trusting relationships can enhance the willingness to transfer different types of knowledge, even these related to bad news or faults. Right organisational culture will enhance mutual trust in organisation, and help to enable more effective knowledge transfer (Issa and Haddad 2008).

Although social communication has been acknowledged to be more effective for knowledge transfer, respondents also recognised the importance for explicit information channels, mostly due to the frequent staff changes, and geographical dispersion of projects where access to electronic documents or use of forums or databases is the only way to acquire knowledge from other projects.

Furthermore establishment of PMO that provides guidelines and mentoring for project managers and project members can facilitate inter-project knowledge transfer and lighten project manager’s workload.

The following are conclusions of this paper; first, despite the fact that respondents recognised the importance of face-to-face communication over documents and electronic media, however they also acknowledged the need for documenting knowledge due to staff changes, and geographical dispersion of projects. Consequently a statement can be drawn that both, social communication as well as explicit information channels, like electronic or documented lessons learned, on-line forums, are equally important in project environment, and PBOs should facilitate access to both.

Second, the major reason why knowledge transfer did not reach the expected level was that project manager’s first priority is to deliver the project. They are not focused on transfer of lessons learned unless it is mandated in project scope and budget. Moreover, often project managers hoard their knowledge, as they view it as a potential threat for them in the future. Properly deployed, the PMO can assist project managers in 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. PMO can play that role and serve as a link between projects in providing expertise and advice.

Third because time is perceived to be limited, project members are focused on delivery of the product or service rather than on knowledge transfer activities. This was often stressed by interviewees. This problem cannot simply be 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 deploying PMOs formed of experienced practitioners that provide expertise for projects by mentoring rather than directing.
The problem of knowledge transfer in project environment has not yet been solved. Perhaps due to the barriers that derive from specific project characteristics, such as geographical dispersion of projects, and time pressure. Future research should explore to a greater extent the key elements that have an impact on knowledge transfer in PBOs, and examine relationships between them. Another area that requires further investigation is the impact of specific project culture on inter-project knowledge transfer, as this element was often mention by the interviewees as an important factor.

7. Reference list


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