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Project management office a knowledge broker in project-based organisations

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Abstract

Current research into project management offices (PMOs) has stressed the PMOs' potential to act as knowledge brokers between projects, and between project and top management. Nonetheless, the literature does not provide sufficient evidence of the brokering role of PMOs. The research reported here aims to examine PMO's functions from a knowledge sharing perspective and explore whether or not these functions reflect the knowledge sharing needs of project managers (PMs). These issues are investigated through a cross-case analysis of seven organisations. The main contribution is insight into how PMs share knowledge and awareness of the need to structure PMOs to align with PMs' nature, needs and expectations in order to improve knowledge sharing in PBOs. Finally, some practical steps for helping PMOs to better adapt their functions to the needs of PMs and their learning and knowledge sharing style are proposed.

Keywords: Knowledge management; Knowledge sharing; Project management office; Project manager; Project-based organisation

1. Introduction

Projects are temporary organisations, with an intentional death, purposefully designed to provide benefits for a permanent organisation or certain stakeholders through complex problem-solving processes (Söderlund, 2011). Projects are often regarded as an efficient means for combining knowledge and thereby optimising value from investments. Although projects are considered temporary organisations, they exist within the boundary of a project-based organisation (PBO). PBOs have no standard form and previous researchers have discussed project-based firms (Lindkvist, 2004; Whitley, 2006), other project-based organisations (Turner and Keegan, 2000) or project-based companies (Huemann et al., 2007). PBOs are here defined as organisations in which the majority of products or services are produced through projects for either internal or external customers. The PBO may be a standalone organisation or a subsidiary of a larger organisation (Turner and Keegan, 2000), but characteristically for both types, it's an organisation that is capable of handling many projects (Artto et al., 2011).

The expected benefits of establishing a PBO are that the temporary project organisation and the PBO should work jointly. Moreover, new ideas, challenges and learning gained in projects should be transferred to the PBO (Söderlund and Tell, 2011). Therefore, PBO has to ensure effective knowledge sharing (KS) and integration within and between projects to avoid the risk of reinventing the wheel and so repeating the same mistakes (Schindler and Eppler, 2003). Nevertheless, although PBOs have knowledge transfer processes in place, these are often ineffective (Swan et al., 2010). This is mostly because PBOs are fragmented and have a high degree of autonomy between PBO's sub-units, as suggested by Lindkvist (2004) and Orton and Weick (1990).

A project management office (PMO) is a formal layer of control between top management and project management within a PBO (Kerzner, 2003; Liu and Yetton, 2007) that is, an institutionalisation of governance strategies (Müller, 2009). The shapes and roles of PMO's functions vary according to the context within which they are incorporated (Aubry et al., 2010; Hobbs and Aubry, 2007, 2008) and although many PBOs do not have an explicit PMOs, the PMO functions are often

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incorporated within the parent organisation (Dietrich et al., 2010). The complexity and variety of PMOs have evidently resulted in a number of interpretations of what a PMO actually is and should do, both in practice and in research terms. For instance, Aubry et al. (2010) found that many organisations implement PMOs without a clear direction and vision of what role they want the PMO to play; they simply adopt existing PMO archetypes without considering organisational needs. From a knowledge perspective, the PMO can be regarded as an organisational unit facilitating coordination of knowledge and other resources between the PBO and its projects, and can therefore act as a bridge over organisational and knowledge boundaries. This perspective of a PMO as a knowledge broker was investigated in two studies (Desouza and Evaristo, 2006; Julian, 2008). These studies provided an insight into PMO's knowledge brokering role from the perspective of a PMO's personnel, but lacked insights into PMs' knowledge needs and expectations. Accordingly, the research conducted so far on PMOs as knowledge brokers is limited and requires further investigation. There are areas in need for further investigation, which brings the nature and knowledge needs of PMs into the picture. From the above, we have identified the following research question: *what capabilities do the PMO have to possess to become a knowledge-broker and meet PMs' knowledge sharing needs?* More specifically, the research reported here aims to examine PMO's functions from a knowledge sharing perspective and to explore whether or not these functions reflect the knowledge sharing needs of PMs.

Scarbrough et al. (2004) noted that in existing studies on organisational learning and knowledge sharing in the project environment, the level of analysis tends to be the project itself (e.g. Lindkvist et al., 1998; Prencipe and Tell, 2001). Relatively less attention is paid to project-to-organisation or inter-project KS behaviours. In this research, the unit of analysis is the relationship between PMO's knowledge brokering activities and PMs' knowledge sharing behaviours. The research is set in Sweden and Australia and includes subsidiary PBOs. The paper begins with a discussion on knowledge sharing in PBOs, which includes PMs' knowledge sharing and integrating behaviours, and the role of a PMO as a knowledge broker. It then continues with a description of the methods used in the study. A cross-case analysis is then presented followed by a discussion on the results and their implications.

2. Literature review

The main focus of this section is on knowledge sharing practices between projects and from projects to parent organisation; in particular, this review of the literature focuses on: knowledge sharing challenges in PBOs, the role of PMO as a potential knowledge boundary spanner between projects and PBO, and PMs' knowledge sharing behaviours.

2.1. Knowledge sharing challenges in PBOs

The PBO mainly learns from the projects through an accumulation of experiences among the project participants and project members (Swan et al., 2010). Nevertheless, the project nature tends to hamper knowledge sharing as PMs' primary focus is on time and product, or service, delivery, rather than on knowledge sharing activities. Time pressure and temporary nature of the project mean that the end of the project is often the end of collective learning. Furthermore, it is a common practice that project lessons are evaluated at the end of the project and regarded superfluous. This results in low quality of best practices and lessons learned, causing a lack of cross-project learning and communication such that project experiences are captured and shared infrequently (Ajmal and Koskinen, 2008; Eskerod and Skriver, 2007; Keegan and Turner, 2001; Newell et al., 2006; Schindler and Eppler, 2003; Turner et al., 2000). Crucially, problems of cross-project learning have wider implications for processes of organisational learning and the development of organisational and project management capabilities (Scarbrough et al., 2004).

KS on the project level takes place as social communication between project stakeholders and through different explicit information channels such as project documents (Arenius et al., 2003). Accumulated knowledge throughout the project, if not effectively shared with other projects and the parent organisation, can be irretrievably lost. Thus, the risk of a knowledge loss at the project's end is a serious problem for PBOs. It is therefore apparent that the transfer of knowledge and learning generated within projects, either to other projects or to the parent organisation, does not happen without difficulty (Scarbrough et al., 2004).

The main reason why the PBO is weak in coordinating processes, resources and capabilities across projects is because of the specific characteristics of projects. Even though projects have been found to be impacted by its history and context (Engwall, 2003), projects act almost like separate organisations. This means that project work is highly independent, hence there is limited coordination across project lines and, in effect, the learning process is interrupted causing 'learning closure' (Hobday, 2000). The result of this project autonomy makes learning and KS across projects difficult. As suggested by Scarbrough et al. (2004), project autonomy can be advantageous for learning by allowing the development of practices which are distinctively different to mainstream organisational practices. However, the integration of learning or sharing capabilities is the main challenge for PBOs. Moreover, another challenge for effective inter-project KS and KS from project to parent organisation is the finite character of projects, wherein project members, ever mindful of time pressures, become focused primarily on product or service delivery rather than on KS activities. This hinders the transfer of best practices, causing a lack of cross-project learning and communication (Davenport et al., 1998; Kotnour, 1999; Loo, 2002). Additionally, when a project finishes, people are reassigned to work on another project. Members of the disbanded team often have little time and motivation to reflect on their experience and document transferable knowledge for recycling in the future (Brady and Davies, 2004). Thus, the tendency to reinvent the process rather than learn from the experiences of previous projects is common in PBOs (Prusak, 1997). Not surprisingly then, studies that

investigated inter-project KS practices (Eskerod and Skriver, 2007; Newell et al., 2006) found that KS between projects and from projects to the rest of their respective organisations was generally poor. For instance Newell et al. (2006) found that transfer of project lessons is fragmented and lessons are focused on what was achieved by a project team (product knowledge) rather than how this had been achieved or why it worked or did not work (process knowledge). Other reasons, including a weak communication links between geographically dispersed projects hinders KS (Hobday, 2000) and lack of integration of KM strategies into the company goals (Riege, 2005) were also highlighted in the literature.

Evident boundaries between projects and between projects and the parent organisation mean that KS and, consequently, the development of PBO's capabilities remain a challenge. The following section discusses the potential of PMO to act as a boundary spanner between projects and the parent organisation in relation to KS endeavours.

2.2. PMO as a knowledge broker

The PBO needs coordination mechanisms to facilitate the integration and management of knowledge across project groups and business units (Gann and Salter, 2000). The PMO has potential to act as a bridge over organisational and knowledge boundaries in the PBO as it spans at least three organisational levels: upper management, PMO personnel and project teams (Julian, 2008). PMOs can thereby promote individual and group learning by providing a knowledge network structure that enhances KS through sharing expertise knowledge and insights on individual, group and organisational levels (Walker and Christenson, 2005).

Previous research has found that effective knowledge brokers have to be capable of translating, coordinating and aligning different perspectives (Pawlowski and Robey, 2004; Wenger, 2008). Brokering activities are social processes with the broker participating in the interactions (Brown and Duguid, 1998). Knowledge brokers therefore contribute to KS between organisations by providing and integrating different perspectives, as a means to, for example, increase the understanding of other parties' needs. Boundary objects, that is, sketches and guidelines, and boundary endeavours, such as workshops, meetings and study tours, are often used as tools to bridge boundaries between, for example, the project and the end-user organisation. Additionally, capabilities for adapting the use of boundary roles, for example, interpreter, negotiator, ambassador, educator and translator, have be found to be essential for efficient bridging (Pemsel and Widén, 2011).

Desouza and Evaristo (2006) categorised PMOs in IT projects along two dimensions: administrative and knowledge-intensive. Unsurprisingly, administrative PMOs provide PMs with administrative support. Knowledge-intensive PMOs, on the other hand, take an active role in managing the best practices of project management, learning from projects (both failures and successes) and improving the maturity of project management in the organisation. Desouza and Evaristo (2006) distinguished between four PMO knowledge archetypes: *the supporter*, *the information manager*, *the knowledge manager* and *the coach*. The supporter is purely administrative. The information manager's function is to track and report the progress of projects, and to serve as a source of information about projects and consolidated status updates. This is a knowledge-intensive PMO with a partial administrative function. However, this PMO rarely takes the initiative and has no enforcement authority. The knowledge intensive PMO is a repository of best practices, but has no administrative responsibility. It is a knowledge-base that provides project expertise, mentoring and training, and is recognised as the organisation's authority on all knowledge related to project management. The coach is the most knowledge-intensive archetype, its role involves both enforcement and control of KS as well as acting as a house of best practices and knowledge (Desouza and Evaristo, 2006). The coach archetype provides a proactive and active approach to KS and learning, and focuses on strategic and corporate activities to coordinate and improve project management within the organisation. It moves towards the concept of a centre of excellence in project management by creating an environment to deliver a continuous stream of successfully managed projects (Kerzner, 2003; Walker and Christenson, 2005).

In the role of knowledge broker, the PMO develops and maintains a set of standards and methods (Dai and Wells, 2004) by providing centralised archives of systematically collected and stored project knowledge in a form of lessons learned and project templates. In addition, the PMO also provides project administrative support, project management consulting and mentoring, as well as arranging project management training (Julian, 2008). Julian found that, in order to bridge boundaries, the PMO needs to support networks (i.e. be a relationship promoter), encourage learning from both successful and less successful projects, emphasising both product and process, and using a facilitator to support reflection during lessons learned assignments. To achieve more effective knowledge sharing and integration, the PMO has to be capable of managing retrospective learning, which refers to generating knowledge from past projects, as well as prospective learning that refers to transferring knowledge from past experience to future projects. In other words, the aim is to provide both feedback and feed-forward across projects to ensure KS (Liu and Yetton, 2007). Thus, the PMO has to manage continual change and reinvent itself in terms of goals, objectives and processes, whilst maintaining focus on improving project management in the PBO in order to remain effective (Hurt and Thomas, 2009). Additionally, the PMO requires capabilities to manage different kinds of knowledge areas and knowledge types (Julian, 2008), as in the case of the five knowledge types presented earlier (Blacker, 1995; Collins, 1993) and with respect to project specific knowledge such as, technical, procedural, and organisational. Technical knowledge is about the product, its parts, and technologies. Procedural knowledge concerns production, the utilisation of a product and action in a project. Organisational knowledge concentrates on communication and collaboration (Kasvi et al., 2003). Accordingly, it is critical for the PMO to possess competence in brokering and managing

project knowledge to be able to facilitate coordination and, by implication, has to take an active role in promoting learning and KS activities.

2.3. PMs' knowledge sharing and integrating behaviour

PMs have been found to emphasis their individual project, neglecting the broader and longer term perspective of the PBO and resulting in tight couplings within projects and loose couplings in the PBO (Dubois and Gadde, 2002). Furthermore, Bresnen (2007) found that project teams have a few incentives to collect and reflect upon their experiences, particularly as they often have new projects before them. This situation is unfortunate as an organisational competence develops through learning and, in a project context, the PBO requires competence to support and contribute to project goals (Sense and Antoni, 2003). It therefore becomes hard to develop appropriate competences if the PMs do not share their experiences and insights with the PBO.

Previous research found that PMs have distinct learning and sharing behaviours; for example, Eskerod and Skriver (2007) and Newell (2004) investigated PMs' inherent attitudes affecting KS activities and how they preferred to learn. Newell (2004) found that PMs prefer learning by doing rather than learning from others. Eskerod and Skriver (2007) uncovered six assumptions that influence KS between PMs related to: (1) masculine values that PMs commonly possess; (2) perception of time as scarce; (3) lack of concern about the past; (4) limited concern about the future; (5) relationships based on respect and no unrequested interference; and (6) PMs' independence and private ownership of projects. These culture-related assumptions were found to hamper PMs' willingness to become involved in KS and lessons learned (LL) activities (Eskerod and Skriver, 2007).

In summary, from a knowledge creation and sharing perspective, there has been limited research concerning the implications of PMs' learning behaviours and their preferences to learn, share and integrate knowledge in relation to the PMOs' functions and activities. This research attempts to investigate PMOs' abilities to act as a knowledge broker, that is, if the PBO understands and supports PMs' learning and knowledge sharing processes (Fig. 1).

3. Research method

A qualitative multi-case study approach was adopted from a realism perspective. Adoption of this approach supported the investigation of a complex and contemporary phenomenon of PMs' KS behaviours and PMO's knowledge brokering role, over which the investigator had little or no control (Eisenhardt, 1989; Yin, 2009).

3.1. Data collection instrument and process

As outlined in the literature review section, existing research on PMO's knowledge brokering functions does not provide sufficient evidence to support the formulation of testable hypotheses. Instead, the review discovered the need to extend existing theory and further query the phenomenon under study to improve understanding of the PMO knowledge brokering role. The data collection process started with the design of a case study protocol, which was developed to increase the consistency of the research (Yin, 2009). Accordingly, every interview in each case followed similar case study questions and data collection procedures. The protocol focused on areas of PMs' knowledge sharing behaviours and PMOs' knowledge brokering functions. The use of the case study protocol enhanced the reliability of the research by providing clear guidance for the data collection process ensuring the consistency of the study (Yin, 2009).

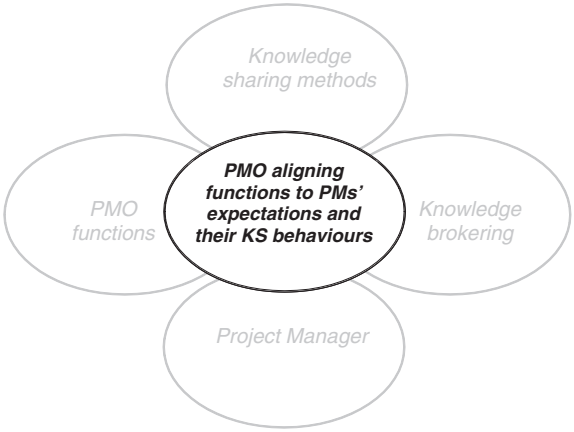

Fig. 1. Research focus.

Overall, 64 semi-structured interviews were conducted, each of which lasted approximately 1 h: all interviews were recorded and transcribed. The majority of respondents were PMs. PMO personnel provided data about PMO functions and their experience of interacting with PMs. This use of data triangulation achieved by collecting information from multiple sources, with the aim of corroborating the same fact or phenomenon (Yin, 2009), ensured validity of the findings.

3.2. Data analysis

The analysis adopted a case-oriented approach (opposite to variable-oriented) due to the limited number of cases (Miles and Huberman, 1994). The data analysis process followed Miles and Huberman's suggestion of data collection, data display, data reduction and data verification. The analysis began with several rounds of coding of the transcribed interviews, case-by-case, to abstract and transform the data into emerging pattern codes and then into categories. At this stage, no comparison between cases was made. The comparison started during a selective coding process, where core categories from each case were compared and further abstracted into a higher level of categories that incorporated instances from each case. The analysis resulted in three main categories, namely: PMs' attitudes that impacted KS, actual PMO functions and PMs' expectations of the PMO. These categories and their respective themes are illustrated in Table 1 and further

Table 1
Categories that emerged through the cross-case analysis.

PMs' attitudes impacting KS	PMO functions and PM expectations
People oriented	Repository for LL
Free-thinkers	Active KS
Passionate	Training, workshops, seminars
Autocratic	Formal and informal social interactions
Conservative	Control and quality assurance
Pragmatic	Project standard and procedures

explained and analysed in the cross-case analysis section below. Furthermore, pattern-matching, data displays and explanation-building analytical techniques (Yin, 2009) were used primarily in cross-case analysis. Using pattern-matching allowed comparison of cases and a means for determining similarities and differences between them (Eisenhardt, 1989) (i.e. compare PMO functions and PMs expectations across cases), whereas explanation-building analysis, predominantly used in the discussion section, assisted in the explanatory stage of the research. This approach helped in drawing conclusions by searching for patterns, themes, making contrasts and comparisons and verifying them against the literature (Miles and Huberman, 1994; Yin, 2009). Careful use of these analytical techniques and a rigorous coding process helped to achieve internal validity of the research (Yin, 2009).

4. Description of cases

The primary criterion for choosing a case for inclusion in this research was that it had to be a PBO deploying any form of PMO. Seven cases were selected for the study: four from Australia and three from Sweden. An overview of them is given in Table 1. Each case was a PBO, as per the definition provided by PMBoK (2008) and each delivered projects to large clients. The sizes of their projects varied from small to medium and large. The cases came from a range of industries including engineering, telecommunication, communication services, mining technology and property. The selection of specific sectors allowed to control environmental variations (Eisenhardt and Graebner, 2007).

According to the typology presented by Cleland and Ireland (1994), the PBOs in all cases except one (mining), delivered projects of a kind that, to some extent, had been done before. This meant that the projects had a majority of tasks that were repetitive, and so a prior knowledge base existed. The mining case covered mostly innovative projects that, by definition, were of a kind that had not been attempted before. All Swedish cases were from the property sector and were designated *Education*, *Health care* and *Residential* in accordance with the products they delivered. The cases from Australia varied across a range of different industries and were designated accordingly: the *Engineering* case was from the heavy engineering sector, *Telecom* case represented telecommunication, *Support Services* provided communication services and the *Mining* case was from the mining sector. Cases ranged from public to private. The Health Care, Education, Residential, Mining and Support Services cases were set in the public sector; whereas the Engineering and Telecom cases were set in the private sector. The PMOs of each organisation appeared to have different functions and status. At the time of data collection, the *Engineering* case had a newly established PMO providing mostly administrative support. The PMO in *Telecom* had gone through the transition from a purely administrative operating function to more of controlling and monitoring unit. Support Services had a well-established PMO, which was recently transformed into a project programme office (PPO) to provide wider support for projects. The *Mining* case did not have an explicitly dedicated PMO. However, the PMO functions were present in administration, commercial and legal support functions as well as support for the PMs in their operations. Similarly, the *Education* case did not have an explicitly established PMO, but it had technical experts and PM directors who performed duties assigned to PMO functions, for example, supporting processes and managerial support. The PBO in *Health Care* had an explicitly stated PMO with four PMO directors and a number of administrative personnel. The *Residential* case had a small project department with six PMs and one PM director. Although the company did not have an explicitly designated PMO, the PM director had administrative PMO functions that supported the PMs. Furthermore, due to the relatively few numbers of PMs in the organisation, much KS and integration occurred during meetings.

5. Cross-case analysis

A detailed analytical process, outlined in the previous section, resulted in a selection of three main categories, namely: (1) PMOs' KS functions, (2) PMs' KS expectations of the PMO, and (3) PMs' attitudes that impacted KS, the discussion of which is provided below.

5.1. PMOs' KS functions versus PMs' expectations of the PMO

Pattern-matching analysis revealed that *PMOs' KS functions* and *PM's KS expectations of the PMO* were highly overlapping and related to six areas: (1) a repository for LL; (2) active KS; (3) training, workshops and seminars; (4) formal and informal social interactions; (5) control and quality assurance; and (6) project standard and procedures (see Table 2). Nevertheless, the cross-case analysis revealed that not every PMO satisfied the expectations of PMs, which can be seen in Table 3. The respective PMO's KS functions and the PM's expectations towards the PMO are further explained in the following subsections.

5.1.1. Repository for lessons learned

Data across all seven cases revealed that PMs expect the PMO to manage and provide a repository for lessons learned. In a majority of these cases the PMO was not fully involved in the process of storing and maintaining lessons learned. These duties were primarily assigned to PMs, who often did not have the time or motivation to produce and store lessons learned for future projects. PMs reported that lessons learned databases contained large information that is not systematically organised. As a consequence, PMs commented that those lessons learned

Table 2
Summary of case organisations.

Categories/case	Engineering	Telecom	Support service	Mining	Education	Health care	Residential
# of interviews	9	7	14	9	15	5	5
Industry area	Engineering	Telecommunication	Communication services	Mining technology	Property	Property	Property
Size of company	Large	Large	Large	Large	Large	Large	Medium
(approx # of employees)	>1000	>1000	>300	>1000	>300	>300	<200
Country	Australia	Australia	Australia	Australia	Sweden	Sweden	Sweden
Types of projects	Majority of tasks are repetitive.	Majority of tasks are repetitive.	Majority of tasks are repetitive.	Majority of tasks are novel.	Majority of tasks are repetitive, but for large projects novel tasks.	Majority of tasks are repetitive but for large projects novel tasks.	Majority of tasks are repetitive.
Project size [a]	Large	Med–large	Small–med	Med–large	Small - large	Small–large	Small–large
Client size	Large	Large	Large	Large	Large	Large	Large
PMO type	PMO	PMO	PMO	NED	NED	PMO	NED
PMO knowledge archetypes [b]	In transition from supporter to information manager	In transition from supporter to information manager	Information manager	Supporter	Between information and knowledge manager	Supporter	In transition from supporter to information manager

PMO — Explicitly dedicated PMO.
NED — Not explicitly dedicated PMO.
[a] In line with Turner, R., Ledwith, A. and Kelly, J. (2010) Project management in small to medium-sized enterprises: matching processes to the nature of the firm. *International Journal of Project Management*, 28(8), 744–755.
[b] In line with Desouza, K.C. and Evaristo, J.R. (2006) Project management offices: a case of knowledge-based archetypes. *International Journal of Information Management*, 26(5), 414–423.

databases were underutilised and most PMs did not make use of them as a source of knowledge in future projects. PMOs thus struggled to make the PMs utilise these lessons learned repositories.

5.1.2. Active KS

The findings from the within-case analysis showed that PMs from all seven cases expected the PMO to provide active support related to the best practices for work procedures through improved integration and collaboration among PMs. Yet, in most cases, such active support did not occur. The exception was two cases: Education and Support Services. The Education case employed experts to provide knowledge for PMs as a way of actively sharing lessons learned. Knowledge provided by those experts related primarily to technical expertise and, to some degree, financial expertise. However, they did not provide knowledge about how to deal with customers or how to solve leadership and group dynamic issues. Furthermore, at Support Services, the PMO was a source of information about risks and lessons from past projects and the PMs often approached PMO personnel for knowledge and expertise.

5.1.3. Training, workshops and seminars

Pattern-matching analysis helped to reveal that PMs from at least four cases (Telecom, Support Services, Education and Health Care) reported the need for more training and certification. Cross-case analysis also revealed that PMOs from Education, Engineering and Support Services provided such support for PMs. Common to all organisations was the reactive approach the PMO had when organising training and workshops that is, each was set up on a needs-only basis. Training and workshops were conducted mostly around basic project management skills such as scheduling and scoping, and did not cover softer issues including stakeholder management, human resources or leadership even though PMs expressed a need for improvement in these areas. This was especially apparent in the PBOs with personnel from non-Engineering backgrounds (i.e. Support Services and Telecom), who provided services and frequently dealt with customers. Since the PMOs did not provide training on stakeholder management, PMs from non-Engineering companies often discussed with colleague matters of how to deal with a certain stakeholder.

Additionally, training and workshops organised by the PMOs were, in some cases, a formality and did not lead to the achievement of continual improvement. For example, in the Education case, it was reported that PMOs provided one-off training on leadership and it was later assumed that PMs had that skill. In addition, the PMs reported that the PBOs do not see the value of having more training sessions around those softer aspects.

5.1.4. Formal and informal social interactions

Respondents from the cases recognised the need for more active KS between projects, as well as between projects and the organisation. Feedback from them revealed that the PMO could play such an active role in facilitating KS. Furthermore, it was reported that PMOs should provide more effective collaboration

Table 3
Example of PMO functions and PMs' expectations and of PMOs.

Evidential examples from the cases
Repository for lessons learned
"Every lessons learned document we've ever produced is different. It's a different format, it focuses on different questions, there's no set structure, so you read one and it's completely different to the next one so it's really hard to find the common theme" (PM, Engineering case).
"PPO owns Lessons learned they review them and make sure everyone is aware of who has them" (PM from Service Support case).
"I hope in our future mode PMO will be our avenue for lessons learnt and there will be a lot clearer avenue to report on that and to be able to I guess, get the knowledge of other people's lessons learnt from their projects. We don't do that well at the moment" (PM, Telecom case).
"The intranet is quite messy and it is considered hard to use and find what you are looking for. There however exist a project report from each and every project" (PMO personnel, Education case).
Active KS
"We have too much to do to be able to have proper discussions that lead to development and integration of knowledge from different disciplines" (PM, Health Care case).
"[The PMO] has knowledge, experience and well trained staff in that area so I do go there and ask them similar questions to what I'd ask a project manager" (Support Services case).
"I feel comfortable with them [PMO personnel] but I think they're really busy. But they do a lot of quality assignments so I feel comfortable in whatever knowledge they're giving me is accurate" (PM, Support Services Case).
"The PMO hopefully will provide more informal social interaction between project managers and lessons learned" (PM Engineering case).
Training, workshops and seminars
"[If training was provided once] it was believed that you were an expert in it and PBOs do not see the value of having more training sessions around those softer aspects" (Education case).
"PMO offers resources for education, e.g. take external courses, and some internally held courses and seminars, breakfast meetings, half day seminar, lunch meetings with a specific topic. Workshops on emergent/upcoming topics like for example communication in projects which lead to new directions and guidelines" (PMO Personnel, Education Case).
"[Newly establish PMO is now] Organising internal and external project methodology trainings for both, project managers and other areas who work on projects" (PMO Personnel, Support service Case).
"Sometimes they'd [PMs] ask me questions that I didn't really know the answer to. Because they might ask something really intense about Microsoft project and I didn't know enough about it" (PMO personnel, Support Service Case).
"PMO also do a one day SSQ project methodology course and I guess that's good because not everyone's come from one Prince Two background. It gives you some visibility of project management" (PM, Support Service Case).
Formal and informal social interactions
"There is a need for an improved knowledge transfer of knowledge of softer kind, such as for example knowledge of the end/users. PMO needs to support this better. There is a need for an improved support of the knowledge transfer between PMs and property managers. More forums are needed for more structured knowledge sharing; the sharing today is done on an 'ad hoc'-basis. More time for spontaneous meetings" (PM, Education Case).
"I try to encourage people to talk to each other and share their experiences and build relationships" (PMO personnel, Education case).
"I use meetings and face-to-face interactions with the PMs as my main source for understanding their needs and try to give them feedback as often I can. I also support the PMs by solving emergent conflicts as between PMs and other project stakeholders" (PMO Personnel, Education case).
"We need to facilitate more informal social interaction between project managers" (PMO personnel, Engineering Case).
Control and quality assurance
"We have follow up meetings were everybody in the organisation from the project department and some from the property department is involved, totally 25 persons that meets 4 times every year" (PMO personnel, Property Case).
"We review and control the project quality concerning fulfilment of promises (through interviews and document reviews) and the outcome but also for example the quality of the procurement and safety. We are also responsible for ensuring that the projects follow the law and that it collects relevant data for the PBO" (PMO Personnel, Education).
"PMO will dictate to us how we do things… and guides project managers in how we report, how…what numbers we use so that it's just…at the moment we can pick and choose what we want to report on and I don't think that's right in terms of the Company and for our customers it's not right.... if you don't have that consistency in that process and that big brother watching you and making sure you're abiding by those things you can do whatever you want" (PM, Engineering Case).
"They [old PMO] were merely and administrational, these are our initiatives and these are our risks and that was it. They didn't do anything with the risks so the PPO is more like a governing organization for our programs, which is what we really need" (PM, Telecom Case).
Project standard and procedures
"The PMO support with guidelines and checklists and manuals – many of those needs to be aligned and updated in order to find the best practice since the organisation struggles with too many 'practices.' And the manuals do not say how you should work, which makes it a bit difficult for new persons to enter the organisation. And there is a fussiness of how to conduct projects here" (PMO personnel, Education case).
"The PMO provides guidelines of how to conduct projects in our organisation" (PM, Property Case).
"I want PMO to provide a scheduling and value management support to the projects, be responsible for project standards and processes, responsible for the certification and training of project managers and become the repository for lessons learned and knowledge management and that across the projects" (PM, Engineering case).

and integration between different subunits. Such active support was provided by Education and Support Services and to some extent by Engineering, whose PMO personnel were actively involved in facilitating both formal and informal face-to-face interactions between PMs. In the Education case, the PMO was also engaged in building relationships between PMs and providing support to handle emergent conflicts between PMs and other project stakeholders. In Support Services, the PMO organised monthly project management forums during which PMs prepared short presentations on challenges they had encountered in their projects and how they resolved them. Moreover, PMs could approach a PMO officer at any time to discuss the issues they encountered in their projects.

5.1.5. Control and quality assurance

PMs from at least three cases (Education, Engineering and Telecom) reported that they expected the PMO to provide a certain level of control and quality assurance in order to obtain consistency in reporting and project management processes. One PM in the Education case reported that the role of PMO personnel as quality assurance provider makes him feel more secure about the project outcome. Respondents in the Engineering case expected the PMO to be responsible for project standards and processes, and provide scheduling and

value management support to the projects. Similarly, PMs from Telecom expected the PMO to have certain level of control over projects and authority to identify, register and prioritise projects, and to ensure that projects had a proper allocation of resources. Analyses revealed that in at least four cases (Education, Engineering, Health Care and Support Services), the PMO provided a certain level of project control, which included quality control of project management reports, value management support, budget control and gate reviews.

5.1.6. Project standards and procedures

The PMs expected the PMO to provide some form of organisational coordination support and procedural knowledge concerning reporting, how to act in a project and how to follow project management processes. Cross-case analysis revealed that PMOs in each participating organisation did, to some extent, provide PMs with the necessary tools to carry projects, including project management standards, templates and guidelines on how to conduct projects, prepare technical guidelines, checklists and manuals. For example, 28 guides were found in the Education case covering cost management, energy goals, education management and procurement together with brief descriptions of projects that were regarded as successful and recommended references for future projects. There was limited evidence of the PMO providing organisational knowledge. The PMs across all seven cases reported that they often do not search through these guidelines because it is time-consuming and tiresome. They prefer to refer to their colleagues or ask experts for advice.

5.2. PMs' KS behaviours

Although every individual is different and unique, the cross-case analysis revealed that PMs have certain common behaviour-related KS practices. Selective coding, followed by the comparison of cross-case data for pattern-matching allowed grouping of PMs' behaviours according to six qualities: people-oriented, passionate, free-thinkers, autocratic, pragmatic, competent and conservative (see Table 4). These qualities helped in understanding the challenges of managing projects. These, together with findings presented in the previous section, revealed that PMOs have the capabilities to meet PMs needs and are able to manage project knowledge to achieve inter-project learning.

Each case confirmed that PMs are *people-oriented.* The importance of the human aspect in projects was primarily advocated by PMs in the Health Care, Telecom and Support Services cases, each of whom provided services or products that were highly customised. The PMs in those cases appeared to be extraverts, chatty, oriented towards relationship-building and manipulative; for example, they tried to understand the needs of end-users and their daily activities, but they also studiously manipulated and encouraged people to act in a manner that ensured the accomplishment of project goals. The PMs in the other cases also revealed that the management of people is vital for project success and most of the PMs argued that relationship-building and face-to-face interactions with

Table 4
Example of PMs' KS behaviour.

Evidential examples from the cases
People oriented
"You need knowledge of the human nature… personal chemistry matters" (PM from Health Care case).
"I am sort of…a people manager" (PM, Engineering case).
"I'm a verbal communicator, I like to be able to talk it through" (PM, Support Service case).
"I just stick up my head up over the barrier and have a bit of a chat or if she's looking a bit glum I'll say 'oh what's going on'" (PM, Support Services case).
"We've actually just got to talking about the stuff we're both doing and come to some idea of how we can help each other" (PM, Mining case).
Free-thinkers
"Lonely rangers" (PM, Mining case).
"It is a lonely job… it is ok not to be able to collaborate with others, you can manage your project anyway" (PMO personnel, Health Care case).
"Some talk, some do not, I do not know how to make the non-talkers to talk" (PMO personnel, Health Care case).
"They believe that some things are better taken care of if they do it themselves" (PMO personnel from the Education case).
"PMs do not want to be steered" (PMO personnel, Education case).
"Before we built more on a feeling but now, with the new policy, we try to communicate more with the property developers"(PM, Residential case).
Passionate
"It is fun to be a project manager as you are a project manager… you can always improve the projects through more work therefore you always experience that there is a lack of time" (PM, Residential case).
"They have a huge interest for technical aspects of buildings" (PMO personnel, Education case).
"They're always thinking about better ways to improve, so I think it's a healthy thing that they are continuing to learn" (PMO personnel, Support Services case).
Autocratic
"PMs are thrilled by the power situation and the management situation and they become small 'CEOs' for big and complex projects" (PMO, Education case).
"I'm a gatekeeper almost so I have to constantly tell people no… I explain to them, but this is what we need and this is why we need it so when you come with this and I say no, you know, this is why" (PM, Telecom case).
"PM trust their feelings and experiences and do not hesitate to 'drive over' people if needed. They want and require control and are one of a kind, very special" (PMO personnel, Education case).
Conservative
"They follow their own templates and checklists, I have to force them to change their behaviour and actively add new things they have to do, otherwise they use the template they have" (PMO personnel/director, Education case).
"PMs are stuck to old habits and methods, it is hard to teach old dogs new tricks" (PMO personnel, Education case).
"We have an older man that prefers to manage projects after his own 'best practices' so to say" (PM, Health Care case).
"To change their behaviour you have to talk, talk, and talk" (PMO personnel, Education case).
Pragmatic
"We have guidelines but are not very good at using them. Many do not see the value of using them as they do not see their projects from the PBO perspective" (PM, Health Care case).
"One of the main tasks for the PM is to ask questions and they tend to do that in every situation: question it! They ask until they have got an answer they are happy" (PMO personnel/director, Education case).
"I say 'go and talk to this person' so I would direct them to learn from that person" (PM, Support Services).
"If I had a person to talk to I'd go to them before having search for something" (PM, Support Services).

both project participants and colleagues are needed in order to build trust, understand whether people are honest or not and to share knowledge. A majority of the PMs stated that fellow PMs in the PBOs helped each other and preferred face-to-face interactions instead of writing and reviewing LL. Their preferred choice was to phone or talk to an individual instead of searching in databases or documents for information. The advantage of information gained through a discussion was richer and provided a better understanding of the context and more examples than available in the databases.

The data from each case provided strong evidence that PMs were also *passionate* about their job. PMO personnel found that PMs in general were more interested in getting more complex and interesting projects over time than being faithful to the PBO as their passion was ultimately their project. The PMs from at least three organisations revealed they like to have everything under control; they were confident, unafraid of conflicts and willing to argue. They treated projects very seriously, felt responsible for them and cared about their project's performance. This *autocratic* and *passionate* behaviour resulted in the PMs giving lower priority to everything that did not directly contribute to their project. For example, the interviews revealed that if PMs did not see the direct value of KS or LL documentation for their project, they would simply ignore it or produce LL merely to 'tick the box'.

In at least three cases (Mining, Education and Residential), it was stated explicitly that PMs are *free-thinkers* who rely on their personal experience gained during past projects, and prefer to do the job on their own. This characteristic was also implicitly apparent in two more cases (Engineering and Heath Care) which demonstrated the significance of this PM trait. Some admitted they were not willing to share their failings/shortcomings and preferred to keep them to themselves, because they did not want to lose prestige. PMs prefer to share knowledge with a small circle of people whom they trust. There was evidence that PMs in at least three cases (Education, Health Care and Engineering) were conservative and unwilling to change their old routines or listen to advice from others. Although they claimed to be people-oriented and willing to help each other, it is valid to question how willing they really were to take others' opinions on board and change or improve habits and methods of working. The PMs also appeared to be *pragmatic* when it came to learning, often preferring learning by doing, and relied on their own experience instead of searching through databases for information. Project goal-oriented PMs were willing to learn only if they saw the value of learning for their project's benefit. For example, PMs from the Education and the Mining cases disclosed great interest in technological developments in their area. The Education case had a long history of encouraging the use of new technical solutions in their buildings, which might explain why the organisation attracted PMs with a passion for technical solutions. The pragmatic view to learning was also apparent when PMs described how newcomers learned to become skilful PMs: "*let them go beside a more knowledgeable person to see how things really worked*". When PMs had reached some degree of experience they seemed to prefer to rely on their own experience without asking others for help. They showed signs of being confident about their knowledge, as in the case of free-thinkers, and they preferred to do things on their own.

6. Discussion and implications

This research has examined PMOs' ability to act as knowledge brokers within PBOs, adopting PMs' perspectives and their knowledge sharing behaviours. Although this research was set in two distinct countries, Sweden and Australia, it is notable that similar patterns were observed in almost every case, which helped strengthen the emerging findings.

Data from the cases revealed that PMs are passionate about their projects; however, they often rely on their expertise and are unwilling to share and seek knowledge from other colleagues. This behaviour represents a barrier to inter-project knowledge sharing, and calls for the introduction of a KS broker to facilitate KS between projects. This research extends early work on the brokering role of PMO (Desouza and Evaristo, 2006; Julian, 2008) by taking into account PMs' knowledge sharing behaviours. This enabled a mismatch between PMs' expectations towards PMO and actual PMO functions to be identified.

Findings from this research indicated that in all participating cases, PMOs had developed processes for managing explicit knowledge especially related to technical and procedural knowledge; but the management of tacit knowledge was limited. To facilitate explicit knowledge transfer, PMOs often used boundary objects, for instance standardized forms, repositories and ideal type boundary objects (Star and Griesemer, 1989). However, coincident boundary objects, such as analytical tools (Star and Griesemer, 1989) and boundary encounters, including meetings and workshops (Wenger, 2008) were rarely used.

Furthermore, based on the cross-case comparison of PMs' KS behaviours and expectations of the PMO, it appears that PMs promote more active sharing of knowledge based on social interaction. Moreover that they expect the PMO to provide active support in sharing and integration of knowledge, for example by offering expertise and advice through improved integration and collaboration among PMs. In particular, the analysis of PMs' expectations of the PMO provided strong evidence to show that PMs require support related to leadership and soft skill development, primarily with respect to the maintenance of positive relationships with customers and other stakeholders. Another PMO function that supports active KS engagements is fore example, facilitating cross-project workshops and discussions as well as assistance in managing and maintaining a lessons learned database, was required. In most cases PMOs did not meet these needs. In just two instances were PMs' expectations of the PMO met, and these related to *project standard and procedures* and *control and quality assurance* functions. In relation to the latter, the PMOs applied a boundary organisation function (O'Mahony and Bechky, 2008), that is, it governed, controlled and supported the quality of the project outcome, and this was positively regarded among the PMs. Based on this discussion, the overall finding from this research shows a clear misalignment between PMO knowledge sharing functions and PMs' KS behaviours and their

KS expectations of the PMO. The PMOs in each case did not entirely meet the requirement of a knowledge broker, which is to provide coordination between projects and between projects and the PBO (Pawlowski and Robey, 2004; Wenger, 2008). None of the PMOs provided an active role engaging in social processes (Brown and Duguid, 1998).

Based on these findings, it is suggested that to improve knowledge sharing capabilities, PMOs need to develop their facilitation (Brochner et al., 2004), process promotion (Hauschildt and Schewe, 2000) and relationship promotion (Walter and Gemunden, 2000) capabilities. These capabilities include ensuring efficient knowledge flows between departments through improved relationships at different levels in the organisational hierarchy. Additionally, PMOs have to improve their capabilities in terms of using boundary encounter activities (Wenger, 2008) and coincident boundary objects (Star and Griesemer, 1989). It is therefore recommended that the PMO takes into account the knowledge behaviours of PMs and is consultative and supporting. Furthermore, analysis also revealed that PMs were protective and preferred to rely on experiences instead of engaging in knowledge sharing activities. Accordingly, it is suggested that more commanding or law making knowledge governance strategies might be required and suitable to change current behaviours. PMOs therefore require capabilities of enabling and commanding governance strategies with knowledge of when to adopt them in order to become efficient knowledge brokers.

Most PMO functions appeared to be focused on retrospective learning that refers to generating knowledge from past projects through repositories and standardized forms as boundary objects (Star and Griesemer, 1989), including lessons learned, best practices and guidelines, rather than prospective learning. The latter refers to transferring knowledge from past experience to future projects, (Julian (2008) that is through coincident boundary objects that allow for more active interactions (Star and Griesemer, 1989), such as value management sessions, job rotation and mentorship — see Table 5. It was also notable that many of the retrospective learning activities were not performed enthusiastically by the PMs and the need for prospective learning was apparent. This is consistent with past research (Newell, 2004) suggesting that PMs are prospective in their learning as they prefer learning by doing and therefore stress the need for the PMO to provide prospective learning. Furthermore, PMs' urge to see immediate value from their projects confirms that their ties with projects are stronger than their ties with the PBO as suggested by Dubois and Gadde (2002), which further seems to support the notion of prospective learning. Accordingly, the PMO would benefit from possessing capabilities of a coach (Bredin and Söderlund, 2007; Desouza and Evaristo, 2006), a relationship promoter and facilitator to improve their brokering capacity.

This research has also revealed that to improve KS endeavours in PBOs, it is important to consider PMs' knowledge sharing behaviours. Previous research tends to offer a simplistic description of PMs' knowledge sharing behaviours, suggesting they mainly learn from their own experience (e.g. Ajmal and Koskinen, 2008). The novelty of this research is that it provides a more comprehensive view of PMs, implying that they appear to be people-oriented, free-thinkers, passionate, autocratic, conservative and pragmatic, and that these characteristics play an important role in knowledge sharing behaviours and shape a specific need for the PMO's brokering role. This extends previous studies conducted by Eskerod and Skriver (2007), which drew attention to how PMs' nature affects their KS behaviour (see Table 5).

Overall, this research suggests that in order to improve knowledge sharing and integration in PBOs, the PMO needs to possess capabilities for managing active KS and relationship-building activities. This involves strategically using various boundary objects, roles and encounters, promoting both prospective and retrospective learning and embracing both horizontal and vertical boundaries within PBOs. In doing so, they are likely to succeed as knowledge brokers.

7. Conclusions

The aim of this research was to examine PMO functions from a knowledge sharing perspective and to determine whether or not these functions reflect the knowledge sharing behaviours of PMs. This was investigated in a cross-case study of seven organisations. This research found that the PMO needs to possess multiple knowledge brokering capabilities in order to support and meet PMs' knowledge sharing behaviours. The suggested capabilities are: (a) facilitating and promoting the strategic development of PMs' relationships with diverse stakeholder groups, strategic use of boundary objects and endeavours when

Table 5
Mapping the results of this study against the findings of Desouza and Evaristo (2006), Julian (2008), and Eskerod and Skriver (2007).

PMs expectations towards PMO functions	PMO functions according to Desouza and Evaristo (2006) typology	PMO learning functions according to Julian (2008)	PMO brokering functions according to (ibid)	PMs attitudes impacting knowledge sharing	PMs characteristics according to Eskeröd and Skriver (2007)
Repository for LL	Administrative	Retrospective learning	Translation and alignment	People oriented	
Project standard and procedures	Administrative	Retrospective learning	Alignment	Free-thinkers	✓
Control and quality assurance	Administrative/knowledge intensive	Retrospective learning	Alignment	Passionate	
Training, workshops, and seminars	Knowledge intensive	Prospective learning	Reflection and coordination	Autocratic	✓
Formal and informal interactions	Knowledge intensive	Prospective learning	Coordination	Conservative	✓
Active KS	Knowledge intensive	Prospective learning	Translation and reflection	Pragmatic	✓

interacting with PMs. Moreover, the PMOs need capabilities in educating PMs to strategically use similar boundary objects and endeavours in their operations; (b) govern, control and support PMs in their operation to ensure efficient knowledge flows; (c) adopt coaching, negotiating and training roles to ensure competence development, which were found to require an interplay of commanding and enabling strategies. PMs were found to be people-oriented, free-thinkers, passionate, autocratic, conservative and pragmatic. Even so, in some cases, these traits hampered cross-project sharing of expertise and knowledge integration.

The findings from this research demonstrate that PMO functions are not fully aligned with the PMs' KS behaviour or the PMs' exceptions of the PMO. Accordingly, this research extends early studies on the brokering role of the PMO (Desouza and Evaristo, 2006; Julian, 2008) and PMO functions (Aubry et al., 2010) by focusing on relationships between PMs' knowledge sharing behaviour and PMOs' capabilities as knowledge brokers. The contribution of the research is an improved understanding of the connection between PMs' knowledge sharing behaviours and how these align with PMO functions. The overall conclusion is that PBOs and PMOs do not truly understand PMs' knowledge sharing needs and expectations and that might explain why KS endeavours are often ineffective in PBOs.

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