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Corlane Barclay  
University of Technology, CBarclay@utech.edu.jm

Kweku-Muata Osei-Bryson  
Virginia Commonwealth University, KMOsei@vcu.edu

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An Exploration of Knowledge Management Practices in IT Projects: A Case Study Approach

Corlane Barclay  
University of Technology, Jamaica  
CBarclay@utech.edu.jm

Kweku-Muata Osei-Bryson  
Virginia Commonwealth University  
KMOsei@vcu.edu

ABSTRACT
The effective application of knowledge management (KM) practices is important for the successful delivery of projects especially as the demands of these projects grow. Studies have continued to show that KM enhances organizational processes; therefore there is little doubt that effective application of KM can improve project competencies and engender project maturity. However, studies have also revealed that KM is not being applied effectively in IT projects. This claim is further supported by the continued reports of high failure rates which may be attributed at least in part, to ineffective KM. In an effort to better understand this phenomenon, a case study of a project management office (PMO) is applied to explore their experiences and challenges in applying KM. The findings underlined that there are challenges in formally applying KM consistently, however there also some positives in terms of tacit components that are sometimes taken for granted in a team collaborative environment that enhances knowledge processing, incidences of contribution to knowledge repositories and the use and application of knowledge that directly impact the management and execution of their projects.

Keywords
Knowledge management, IT project, project maturity, project management office (PMO), case study

INTRODUCTION
Information technology (IT) projects continued to have strategic significance in organizations. This is evident in the business sphere as organizations continue to use projects to help create value and improve competitiveness. However, in many cases these projects have been consistently mired by challenges and high occurrence of failures. A recent report suggested that failure rates among projects are increasing, especially as the projects get larger (Standish Group, 2007). If we are to take these reports at face value, projects are in urgent need of solutions that involve sustained success combined with strategies to provide continued value to its stakeholders. The knowledge based approach to managing projects is one such method that project professionals can exploit to help achieve success on a consistent basis. Drucker (1993) noted that knowledge is a strategic resource and vital to success, and is an essential business activity as organizations realize that competitiveness pivots around effective management of knowledge (Grover & Davenport, 2001). Similarly, Alavi & Leidner (2001) opined that the management of knowledge is a key strategic asset as it has been shown to influence value creation and as such is a key strategic asset. Therefore, new and improved ways to think about projects and their management should include new strategies to transfer knowledge and develop competencies that are aligned to current realities and contexts (Crawford, Thomas & Winter, 2006). This implies that new and improved methods and techniques of knowledge management (KM) in project management (PM) are essential. However, before we can get there, strategies to obtain an informed understanding of the current concerns, experiences and practices of projects in different contexts are necessary. Such an approach will help assure that the relevant solutions designed are well suited to the varied project contexts.

Despite the benefits of the application of knowledge management in organizations and projects, research suggests that projects are not effectively harnessing these benefits because of various factors. Kasvi, Vartiainen & Hailikari (2003) observed that the management of knowledge in project organizations is underdeveloped. Similarly, Love (2005) noted that the suboptimal KM activities within projects can be a consequence of knowledge being created in one project and are later misplaced. This may be explained at least in part by the temporary nature of projects which are later disbanded upon the completion of their work, thus project teams often start solving problems anew rather than learning from the experiences of previous projects within the same organization (Disterer, 2002; Scarbrough, Bresnen, Edelman, & Laurent, 2004). Furthermore, project information is rarely captured, retained, or indexed (Weiser & Morrison, 1998) and project techniques for learning from experience are not effectively utilized (Atkinson et al., 2006) leading to knowledge fragmentation (Disterer, 2002). Thus, the capture and re-use of knowledge from projects is likely to go no further than capture despite the fact that it is
generally accepted that these are sound practices (Atkinson, Crawford & Ward, 2006). From the evidence it is reasonable to deduce that there may be an apparent “knowledge crisis” in projects. As a consequence, empirical investigations to uncover additional insights into the challenges faced by practitioners and other contributory factors that impact KM in projects are well placed. A review of the academic literature revealed that there is currently a paucity of discourse surrounding results from the IT project contexts. An example includes a conceptual framework of knowledge management and learning in IT projects from the results of a field study of 15 project managers (Reich, 2007). A few notable empirical examinations in other contexts include the examination of social practices in managing knowledge in construction projects (Bresnen, Edelman, Newell, Scarbrough & Swan, 2003), and the assessment of process knowledge and project in a hospital (Newell, Scarbrough, Swan, Robertson & Galliers, 2002). However, despite these and other important works, continued research efforts in different business and project settings are necessary if we are to continue build relevant solutions for practice.

Against this background, the research seeks to determine the state of affairs in managing knowledge in projects, within a defined context. This is to enable improved understanding of project experiences in managing knowledge and to uncover insights that may assist other organizations and projects to better manage their knowledge resource. The research applies the case study methodology to achieve this mission. A project management office (PMO) in the financial services sector is examined to gain an in-depth understanding of their experiences and attitudes towards knowledge management in the management of their projects and department. PMO is an organized body assigned various responsibilities related to centralized and coordinated management of projects within its span of control (PMI, 2008). One of their key roles is to improve project management performance and to reduce the number of failed initiatives (Stanleigh, 2006). Hence, the choice of a PMO is deliberate as their contexts and functions are prime candidate for knowledge transfer and learning.

Our research offers both academic and practical significance. Empirical investigations into KM in IT projects are emerging and there are current opportunities to carefully analyze these projects in different settings to gather additional clues and insights about the phenomenon and extend the knowledge base. The practitioner community can use the findings to form a basis for comparative analysis, assist in their KM activities in current and future projects and aid in improving their competency in project delivery and the management of project knowledge. The remaining sections of the paper are organized as follows: the research background provides a discourse on the relevant literature including projects, some challenges, knowledge management framework and potential benefits; the case for the case study methodology is also presented disclosing the rationale, context and validity of our research; the research findings are communicated with experiences and perceptions of the challenges being encountered in the PMO; and finally concluding remarks and future directions of research are disclosed.

**RESEARCH BACKGROUND**

Projects are typically seen as temporary organizations used to deliver value to its client within a specified context, budget and timeline (PMI, 2008), and involve substantial knowledge processing (Reich, 2005). These projects are being delivered on a daily basis to meet the strategic and tactical needs of businesses. In almost all the instances projects are initiated to create change - to develop new products, establish new processes or create a new organization (Shenhar, Dvir, Levy and Maltz, 2002). Within this dynamic environment a complex set of skills and resources are being coordinated to help deliver business value. Thus, project organizations are privileged place of learning as there is a need for combining creative and exploitive learning to manage projects efficiently and effectively (Bredillet, 2007).

The success of project depends on the right mix of knowledge experiences and thus dissemination and usage of knowledge is vital (Disterer, 2002). However, there are many reasons that may prevent organizations and projects from effectively applying KM. Knowledge is difficult to manage because it originates and applied in the mind of humans (Grover & Davenport, 2001), and can even be more difficult with the transient nature of the project teams. Additionally, Reich (2007) found that there was a lack of common understanding on the meaning of knowledge management within the context of projects as some focused solely on explicit knowledge, lessons learned while others incorporated more complex tacit considerations and the need to actively plan the knowledge needs of the project teams. This may pose a challenge for the effective formal applications of KM as team members having different views of knowledge may have different views of what is important to manage.
Knowledge Perspective

Knowledge is new or modified insight or predictive understanding (Kock & McQueen, 1998). Within the project context, this may be new or modified approaches to performing specific project tasks, management of the project or evaluation methods. Therefore with learning from the past, challenges in the execution of a project can be foreseen and overcome or a particular methodology may be adopted by organization to manage its projects based on experiences. Knowledge can also be seen as relevant information for certain jobs such as business information about customers, products, processes, and competitors (Alavi & Leidner, 2001), or organizational projects. A more encompassing view of knowledge is described as “an emerging set of organizational design and operational principles, processes, organizational structures, applications and technologies that helps knowledge workers dramatically leverage their creativity and ability to deliver business value” (Gurteen, 1998). This is even more apt in projects as different individuals work together over the course of different processes utilizing various applications and technologies to produce a unique product or service for the organization. Knowledge can be categorized into explicit and tacit knowledge (Nonaka, 1994). Explicit knowledge can be easily articulated, shared, generalized knowledge while tacit knowledge in contrast is more difficult to articulate and shared and encompasses experience and actions presents through metaphors, drawings, and various forms of expression that do not involve the formal use of language.

Knowledge within projects has several classifications. Conroy and Soltan (1998) described knowledge in projects as technical knowledge, project management knowledge and project-related knowledge. Technical knowledge relates to the techniques, technologies, work processes that are involved in specific disciplines within the project. Project management knowledge encompasses the methods and procedures required for managing the implementation of projects while project-related knowledge considers knowledge about the customer and other people or entities that are of significance for the future business of the company. Riech (2007) reported on four types of knowledge that are important to the success of IT projects: process, domain, institutional and cultural. Process knowledge is akin to know-about knowledge and refers to knowledge that the project team and sponsors have about the project structure, methodology, tasks and timeframes (Chan & Roseman, 2001; Meehan & Richardson, 2002). Domain knowledge is knowledge about the environment or context within which the project operates. It includes the knowledge of the industry, firm, current situation, risks and potential solutions (Chan & Roseman, 2001; Reich, 2007). Institutional knowledge is a mix of history, power structure and values of the organization. Cultural knowledge ties in with institutional knowledge and considers the cultural dimensions of the team (Reich, 2007).

Effective knowledge management is therefore necessary and includes the creation and integration of knowledge, minimizes knowledge losses and fills knowledge gaps throughout the life of the project (Reich, 2007). Knowledge management can also be viewed within the traditional process of KM which entails knowledge creation, storage and retrieval, transfer and application (Alavi & Leidner, 2001).

METHODOLOGY

To ascertain the knowledge management occurrences in a single organization a case study approach was adopted. A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident (Yin, 1994, 2003). This approach embodies an account of past or current phenomenon drawn from multiple sources of evidence (Leonard-Barton, 1990), in this instance multiple project team members within the PMO. The use of the case study approach was also influenced by its suitability in providing enhanced understanding to organizational contexts and IT-related innovations (Darke, Shanks, Broadbent, 1998). Several researchers advocate this methodology for investigating real-life events, including organizational and managerial processes (Darke et al., 1998; Yin, 2003), because it allows the researcher to retain the meaningful and holistic characteristics of real-life events (Yin, 2003). Additionally, academic research has provided instances of the value of single case study illustrations (Barclay, 2008; Benbasat, Goldstein & Mead, 1987) to present findings and facilitate the collective process of knowledge accumulation in the given environment (Flyvbjerg, 2006). Some of the benefits of a single case study approach are that it enables detailed explanation and corroboration of phenomena, uncovers novel areas for research and discourse and provide key findings in defined contexts.

Project Case Selection and Background

According to Yin (2003), case selection should not rest entirely on convenience or ease of accessibility to the site but instead should incorporate specific rationale. Thus, our single PMO case was chosen primarily because based on the nature of PMOs. PMOs can provide a rich analysis of knowledge processes within projects as they are the “project hub” where multiple
projects with different range of complexities are managed and coordinated. In short, a PMO environment facilitated our research goal, i.e. to better understand KM practices across IT projects.

The case study is applied to a financial services organization based in the English-speaking Caribbean. As one of the leading financial services organizations in the region they created an enterprise project management office (PMO) to help improve project efficiencies, particularly those with technology components. Thus, the core function of the PMO is to provide support to the numerous set of projects being introduced by the business areas and to effectively manage the business critical projects of the company such as core business system implementation related projects. Initially project delivery was decentralized as each business area was responsible for providing the requisite project management skills needed to deliver their business initiatives. Over time, the business moved towards a more centralized area responsible for the delivery and support of technology based projects.

Data Collection

A combination of interviews and observations was used to gather data from the PMO. The interviews consisted of structured and unstructured questions and lasted between 40 and 60 minutes. Several rounds of interviews were conducted at different intervals with four (4) members of the PMO. The participants included the PMO director, a member of the project team and two project leads and reflected the levels of hierarchy within the area. We were also able to observe the day-to-day activities of the PMO over several days. The observations were used to gain an appreciation of how they operated and interacted with each other and other members of the organizations. The preliminary set of interviews and observations were used to gather preliminary information about the organization and PMO and help us to set the framework for the remaining investigations. Company and projects records were also examined at the initial stage of the research investigation, including the organization’s website, brochures, project documentation including meeting notes, project planning documents. Structured record keeping was maintained through-out the collection process and meeting notes were taken during all of the interviews discussions and observations.

Research Validity

The principles of case study research were closely followed to enhance the rigor and validity of our study. Creswell & Miller (2000) proposed several useful aids including member checking, triangulation, thick description, peer reviews and external audits, depending on the research lens being used. Gibbert, Guigrok & Wicki (2008) shared similar views and emphasized that case studies need to reveal internal validity, external validity, construct validity and reliability to help strengthen the knowledge claims and relevance of the research. Yin (1994: 2003) also offered principles relating to proper procedures such as the maintenance of clear chain of evidence, database and the use of multiple sources. Table 1 presents the summary of the principles adopted and applied in the research.

<table>
<thead>
<tr>
<th>Internal Validity</th>
<th>Construct Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Findings from academic literature on the discourse on knowledge management in projects, particularly IT projects were used as a basis to identify gaps in empirical investigations and motivate our research</td>
<td>• Secondary and primary sources of evidence used</td>
</tr>
<tr>
<td>• The research literature in project management, knowledge management were used to help frame the study and explain some of the occurrences within the PMO</td>
<td>• Review of interview transcripts to assess completeness and accuracy</td>
</tr>
<tr>
<td></td>
<td>• Maintenance and preservation of the chain of evidence during our research</td>
</tr>
<tr>
<td></td>
<td>• Iterative process of collection and analysis applied</td>
</tr>
<tr>
<td></td>
<td>• Structured, unstructured interviews and observations were used to collect data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External Validity</th>
<th>Reliability</th>
</tr>
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</table>

Based on our research mission to gather empirical data on events in project settings a single case study was used to form part of this exploratory research. The case was selected based on criteria including suitability and relevance to research goal to enhance the knowledge accumulation in management of knowledge in IT projects.

The choice of organization was based on convenience, availability and convergence with our research goal. Multiple sources of evidence used, i.e. members of the project organization. Maintenance of a case study database. Clear chain of evidence developed and maintained. Anonymity of the participants preserved as per request.

Table 1. Summary of the case study principles applied

RESEARCH FINDINGS

The participants were initially asked to assess their current project KM practices and activities. They shared that their objective is to develop the competency levels of the teams so that they can be effective in any type of initiatives demanded by the organization. The Director reiterated that it is important to “…build competency levels for people to become more than subject matter experts”. The research participants recognized the importance of harnessing knowledge but cited challenges in effectively managing knowledge across their set of enterprise projects. A participant appraised that “we have recognized the importance [of KM] and have started to build our databank however there are still some gaps”. Some of the gaps highlighted related to issues of finding appropriate strategies to effectively and efficiently store and retrieve project data and consistent use of project knowledge by the team. Table 2 provides a summary of the research findings.

<table>
<thead>
<tr>
<th>KM Processes</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General perception of KM</strong></td>
<td>It is important for the successful delivery of projects, and necessary for the continuity or sustainability of the PMO</td>
</tr>
<tr>
<td><strong>KM strategies</strong></td>
<td>- Predominantly informal approach</td>
</tr>
<tr>
<td></td>
<td>- Utilized a combination of personalization and codification strategies. Examples:</td>
</tr>
<tr>
<td></td>
<td>- Codification of project documents e.g. plans, charters, schedules and status reports</td>
</tr>
<tr>
<td></td>
<td>- Personalization among teams during projects, meetings and daily interactions</td>
</tr>
<tr>
<td><strong>Knowledge storage and retrieval</strong></td>
<td>Manual and electronic storage options are utilized</td>
</tr>
<tr>
<td></td>
<td>- Shared (networked) electronic document repository, email and intranet</td>
</tr>
<tr>
<td></td>
<td>- Manual records of projects e.g. project charters, completion reports</td>
</tr>
<tr>
<td><strong>Patterns of reuse</strong></td>
<td>- Patterns of reuse are mixed based on the team’s perception of relevance of information to their work</td>
</tr>
<tr>
<td></td>
<td>- Low reuse: lessons learned</td>
</tr>
<tr>
<td></td>
<td>- High reuse: templates, PM standards</td>
</tr>
<tr>
<td><strong>Knowledge sharing</strong></td>
<td>- Person to person e.g. meetings, training sessions</td>
</tr>
<tr>
<td></td>
<td>- Person to computer e.g. storage of documents for reuse</td>
</tr>
<tr>
<td></td>
<td>- Computer to person e.g. retrieval and use of documents</td>
</tr>
</tbody>
</table>
Knowledge application  
- PM standards  
- Internally developed methodologies

Opportunities for knowledge safeguards  
- Human resource related e.g. develop a culture of trust, profile potential employees  
- Legal e.g. confidentiality and non-disclosure agreements  
- Technological e.g. access control levels to sensitive data

Some of the key challenges  
- Knowledge loss of knowledge through attrition and lack of defined approach to store explicit knowledge  
- Difficulty in retrieval of past project data  
- Lack of defined strategies and/or methodologies

Table 2. Summary of Key Findings

Project Knowledge Management Strategies

Hansen, Nohria & Tierney (1999) described personalization and codification as methods to effectively manage knowledge. Personalization refers to person-to-person knowledge transfer or sharing. Codification refers to writing or transferring knowledge into documents or electronic repositories. This can applied in several ways such as an 80/20 mix (Hansen et al., 1999) or a flexible strategy mix that evolves over time (Sheepers, Venkitachalam & Gibbs, 2004). While the PMO does not have a formal strategy they tend to utilize a mixed strategy to manage knowledge across their projects and teams.

Our study found that learning from experience, learning from others and learning by doing are the main personalization strategies used by the organization to harness knowledge in, about and from the projects. For example, the PMO primarily utilized informal coaching sessions due to time constraints, as “time does not permit otherwise”, to facilitate sharing on the projects and the organizational dynamics. They also established and maintained a collaborative environment where team members can ask for each other for guidance whenever faced with an obstacle. Several instances of interactive sessions were observed among the team as they discussed issues arising in current projects and strategies to help overcome them.

Formal meetings were common in the PMO. They had periodic meetings at different intervals to discuss status of activities or exceptions at different levels: sessions within the PMO, sessions with external team members and meetings with executives. Meetings notes were normally created and disseminated to the project team later and serves as a communication, reference and control tool.

The creation and maintenance of standardized documents and methodologies to aid project teams in the management of their projects are approaches used in codification of their project knowledge. This can range from the development of working templates and checklists to the creation of standard procedures and methodologies that become repeatable processes, i.e. project and knowledge management competency and maturity levels. An examination of the PMO shows templates that illustrate the know what of certain project activities such as project plans, work plans, schedules and specialized activity templates (e.g. checklists and logs). A project manager further explained their intention to incorporate more learning tools to help during the management of project activities, particularly among less experienced team members: “we hope to develop a checklist of things to be done throughout the full project cycle, anything else [the] team members can ask”.

Use of PM Standards

There have been recent criticisms about practitioners tending to merely follow explicit knowledge guides instead of emphasizing the development of competence (Morris, Crawford, Hodgson, Shepherd, and Thomas, 2006). Our study confirms the high reliance of the PMBOK®, for example as one participants described it as the “project management bible”. The PMI standards are used as a basis to design the strategies and methods for delivery and management of projects. Thus, there is a high volume of codification particularly in the project planning and control processes. Additionally, the PMO has also begun to add to this body of knowledge by the application of its unique cultural and project dynamics in how their projects are managed. For example, they recently refined the organizational project delivery standards that are used to support the full-cycle management of their projects across the organizations. These were later documented and communicated to the other business areas in the organization for adoption.
Patterns of Reuse

Studies have indicated that there is a low incidence of reuse among projects (e.g. Atkinson et al., 2006; Kasvi et al., 2003). Our investigations revealed that this is a complex phenomenon and reuse may depend on several variables including perception of ease of use or relevance of knowledge artifact, type of knowledge and so on. Additionally, it is worth underscoring that tacit reuse is difficult to measure as this may only be evident when it is externalized and actualized. Easily measured, for example is the use of knowledge embedded in project deliverables templates and documents which is relatively high. These are used to help in the preparation and execution of current projects, including assisting in estimation of project work, comprehending the scope or boundaries of particular activity or more specifically enabling the project member to understand the know what of the particular task. Common deliverables templates include project plans, schedules, issue logs and work plans. We also found that there are project items reused based on their indirect or longer term impact. That is, those documents not required to execute or manage the project processes based on the practices of the PMO are not reused or referred to consistently. For example, referring to lessons learned items is not deemed necessary when compared to referring to the standard templates to prepare an implementation project plan. Also another explanation for low reuse is the internalization of the knowledge embedded in these documents, so while the members may not reuse the actual documents they have gained project learning and this is transferred or used in their other projects. A participant explained that they do not need to always reference documents such as lessons learned because the same set of persons have been involved in the project and have “lived the experience”.

Attitudes towards Projects’ Lessons Learned

Studies have suggested that techniques for learning from experience, including lessons-learned are not effectively utilized by project team (e.g. Atkinson et al., 2006). In examining the PMO’s current practices the general consensus was that there are opportunities to better leverage the creation and use of project learning events such as lessons-learned. A project manager recounted a recent symposium that highlighted that their current practices in managing lessons learned may be insufficient: “We do develop lessons learned and we try to draw from it for other projects. We make a note of what went wrong in the project and how we can correct it. However we now realize that we have not been putting any plans in place to correct these errors.” This scenario emphasizes two critical areas for attention: (1) the inconsistent creation/use of lessons-learned and the (2) lack of adequate planning to not only correct the errors from the projects, but to prevent recurrence of these events in other projects. The project manager explained further that they relied on lessons learned more for their standard “run of mill” projects as they are better able to plan these projects and manage risks. It was explained that they rely more on expertise and less on documentation in managing their non-standard projects because they have less history to rely on. We also found that the lessons learned are normally documented at the end of the project. There is an inherent risk in this practice as some of lessons may have been forgotten and thus the learning opportunities are diminished.

Application of Knowledge Processes

Our examination identified many examples of the knowledge spiral (Nonaka & Takeuchi, 1995) that considers socialization, externalization, combination and internalization, see Table 4. The PMO had a highly collaborative environment as we saw many instances of experiences and ideas being shared among team members in a typical informal mode. Members of the PMO shared incidents or events of particular projects and shared anecdotes with each other. Additionally, their shared document repository had materials that can provide aid in future projects.

<table>
<thead>
<tr>
<th>Knowledge Processes</th>
<th>Examples of Application in the PMO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socialization:</strong></td>
<td></td>
</tr>
<tr>
<td>tacit (\rightarrow) tacit</td>
<td>- project meetings</td>
</tr>
<tr>
<td></td>
<td>- training sessions</td>
</tr>
<tr>
<td></td>
<td>- narratives and stories on current or past project experiences</td>
</tr>
<tr>
<td><strong>Externalization:</strong></td>
<td></td>
</tr>
<tr>
<td>tacit (\rightarrow) explicit</td>
<td>- project methodologies and procedures</td>
</tr>
<tr>
<td></td>
<td>- project checklist</td>
</tr>
<tr>
<td></td>
<td>- project templates</td>
</tr>
<tr>
<td></td>
<td>- previous project documents</td>
</tr>
</tbody>
</table>
Knowledge Processes

<table>
<thead>
<tr>
<th>Combination: explicit → explicit</th>
<th>Examples of Application in the PMO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• use and update of central electronic document storage</td>
</tr>
<tr>
<td></td>
<td>• intranet</td>
</tr>
<tr>
<td></td>
<td>• project methodologies and procedures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internalization: explicit → tacit</th>
<th>Examples of Application in the PMO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• research and analysis from past project documents, internet</td>
</tr>
<tr>
<td></td>
<td>• application of methodologies</td>
</tr>
</tbody>
</table>

Table 3. Application of Knowledge Processes

Knowledge Risks

Safeguarding knowledge is an important process that can help prevent knowledge leakage or loss. Understandably, securing explicit knowledge was comparatively easier for the organization as electronic and manual repositories were used for the project documentations. We found that there may be active and passive methods to safeguarding tacit and explicit knowledge through people management, legal methods and storage and transfer methods (i.e. physical storage). One of the primary ways of losing tacit knowledge is through employee movement or departure from the organization. These changes can negatively impact the projects as there gaps left and remaining team members are left with significant learning curve. The PMO director recounted that they have loss employees causing them to “start over” with others, “we have lost a lot of our resources over the last couple years. Life does go on but generally not as smoothly or as effective”. This also can impact the loss of intellectual property or other types of innovations that leave with employees.

Electronic and manual file storage repositories are common methods used to archive project knowledge however there is high incidence of non-use of insufficient use of knowledge. The PMO uses repositories to store copies of the project documents and provide access to information during and after a project. A team member explained that “sometimes we are turned off by the documentation [because it is] too much reading” as a result they rely on their embedded knowledge or those of others. To help resolve of these issues the PMO investigated an online PM systems but encountered difficulty as the found later it was not the right fit for them. It is now considering other online collaboration tools. However, a consequence of this is that a substantial portion of their project knowledge is not being captured.

<table>
<thead>
<tr>
<th>Challenges/Risks</th>
<th>Explanation/Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel attrition</td>
<td>“We have lost a lot of [people] over the last couple of years. Life goes on but it is not as smoothly or as effective [as before]”</td>
</tr>
<tr>
<td>Difficulty in storing information/data that can be retrieved easily</td>
<td>“Sometimes we are turned off the documentation [because it is] too much reading”</td>
</tr>
<tr>
<td>Lack of sufficient and up-to-date support systems</td>
<td>The PMO has experienced difficulty in finding KMS that is the “right fit” for them (i.e. current processes)</td>
</tr>
<tr>
<td>Lack of defined knowledge strategies</td>
<td>Coaching is not done formally but training sessions are conducted periodically: “[more experienced team members] provide guidance on what is needed”</td>
</tr>
<tr>
<td>Insufficient priority on person-to-person strategies</td>
<td>“[less experienced team members] ask for what they want” “time does not permit us to do formal training”</td>
</tr>
</tbody>
</table>
Table 4: Summary of Challenges

CONCLUSIONS

Effective KM practices are necessary for the successful delivery of projects. We conducted a single case study to examine the experiences of a PMO based in the English-speaking Caribbean. The study found that the project team experienced some challenges that corroborate research such as the inconsistent application of explicit knowledge and reuse of lessons-learned (e.g., Atkinson et al., 2006). However, there were also some positive signs from the PMO in their approach to knowledge creation, sharing and application that have provided additional insights. For example, the team environment provided a rich opportunity for tacit exchange especially in the daily (taken for granted) interactions, there are many instances of contribution to knowledge repositories (explicit knowledge) such as the use of a shared electronic repository, and the use and application of knowledge via project aids and tools that directly impact the management and execution of projects (e.g. working templates, project standards). In short, the team was willing to harness explicit knowledge if they could appreciate its immediate impact while tacit knowledge although taken for granted was applied particularly during the socialization process. Some of the key lessons taken from this study are that there is a need for a well-defined KM strategy that is well-suited for the specific environment to facilitate consistent application of knowledge across projects, tools and techniques are required to better harness and transfer the knowledge embedded in the large volume of data stored both manually and electronically, a collaborative environment enhances knowledge sharing and can offset some of the challenges and risks associated with KM, and knowledge reuse is strongly based on users’ perceptions on areas such as the accessibility of knowledge and its perceived ability to help them perform their current tasks better.

Our research is in its nascent stage and thus diligence must be taken in generalizing the results. Despite this the research offers significance in terms of contributing to the accumulation of knowledge within the domain and establishing a platform where further examination in this area in different settings can continue while offering project practitioners with some current insights on experiences and practices that may help their own KM efforts. Our future research directions include continued in-depth analysis and reporting of this case and the incorporation of other project contexts, including the utilization of complementary research methods; the continued search for additional explanations concerning for the current challenges in IT projects; further investigations into the set of antecedents to project success; closer examination of the categories of knowledge being applied in project environments and its rationale; and the development of solutions (techniques and methods) that systematically aid in managing different types of knowledge within projects.

REFERENCES