Barriers to Knowledge Sharing in ICT Project Environments

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Abstract

Project management supports much of the economic activity in various industries. Across the public sector, effective management of projects transforms taxpayer funds into new schools, hospitals, roads, construction and technology. However, numerous ICT-enabled, public sector projects fail to succeed as is reflected by ongoing public discourse and negative perceptions. The aim of this research-in-progress paper is to increase our understanding of what constitutes success in these environments and how it can be facilitated. To this end, a review of literature is conducted to survey traditional and modern views of critical success factors. Secondly, the role of knowledge management in project management is analysed with an emphasis on knowledge sharing. Based on the findings, we hypothesise that barriers to knowledge sharing contribute to poor performance of some public sector ICT projects and develop a conceptual framework for a proposed research study to address this problem.

Keywords

Project management, knowledge management, information systems, critical success factors, literature review.

INTRODUCTION

Project management (PM) is most commonly understood amongst the academic community and management practitioners alike to be a specialised branch of management that has evolved to coordinate some of the most complex activities of modern-day business practices. PM "…is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (Rose 2013, p. 6). In other words, a project could be thought of as a unique idea to introduce change whilst PM is the consulting aid to realise its purpose. According to (Cooke-Davies 2002), PM literature is dominated by research that sets out to describe techniques designed to aid the management of projects for project managers (Atkinson 1999; Cleland 1983; Pinto and Slevin 1987). In more recent times, the emphasis has shifted towards 'soft skills', focusing on stakeholders, leadership (Muller and Turner 2010), strategic management (Brook and Pagnanelli 2014) and organisational theory (Crawford 2006).

Turner (2009) refers to projects as temporary organisations. When a business endeavours to accomplish a vision of its future state, it creates a new organisation with a temporary existence, disbanded once the objectives are achieved. In many instances, IT initiatives are implemented via projects (Cadle and Yeates 2004) and effective management of such projects is imperative in today's turbulent and competitive climate. However, Rosacker and Rosacker (2010) postulate that "…IT projects are far too often…wasteful, inefficient, mismanaged, expensive and behind schedule" (p. 578). Current projects across the public sector in Australia and in particular, the Victorian Public Service (VPS), have resulted in similar outcomes (Brouwer 2011).

Responses and perceptions towards project success differ and are dependent upon many shifting variables (Papke-Shields et al. 2010). 'Success' is a multifaceted phenomenon encompassing project success, PM success and organisational success. Project success is concerned with the effects of the project's end product (Cooke-Davis 2002) while PM success focuses on the PM process (McLeod et al. 2012) with regards to cost, time and quality (De Wit 1988). Organisational success focuses on the impact of the project's output on the organisation's business and strategic objectives (McLeod et al. 2012). Karlsen and Gottschalk (2004b) modelled a framework that entailed project success, PM success and organisational success. Their framework consisted of project performance, project outcomes, system implementation, benefits for client organisations and benefits for stakeholders. On the other hand, Jiang et al. (2002) propose the perception of project failure is associated with the inability of managerial application to govern the well-known triple constraints - scope, time and cost (Atkinson 1999) and the required/desired functionality and quality of the final output (Whittaker 1999).

Given that PM is a knowledge-intensive activity, it is beneficial to include another management sub-discipline, namely knowledge management (KM), in the analysis. The study of KM in project environments is not as widely discussed as PM itself (Brookes et al. 2006). KM is commonly referred to as a systematic process of capturing, structuring, managing and distributing knowledge throughout an organisation and its members (Nonaka and

Takeuchi 1995). According to Reich (2007), "knowledge management in the context of a project is the application of principles and processes designed to make relevant knowledge available to the project team. Effective KM facilitates the creation and integration of knowledge, minimizes knowledge losses, and fills knowledge gaps throughout the duration of the project" (p.8).

Although several studies assert KM practices can yield organisational competitiveness and success in projects (Love and Irani 2003; Schindler and Eppler 2003), the temporary nature of projects leads to difficulty in the management of knowledge (Grillitsch et al. 2007). In permanent organisations, principles, processes, routines and culture are established and embedded in the organisation's structure (Lindner and Wald 2011; Prencipe and Tell 2001). It is only in recent times that researchers have begun to study the integration of PM and KM (Abdul Rasid et al. 2014; Pemsel and Wiewiora 2013).

According to Ajmal et al. (2010) and Barclay and Osei-Bryson (2010), effective KM practices can be used to reduce project time and improve customer satisfaction and the general management of projects (Cope III et al. 2006; Davidson and Rowe 2009; Koskinen et al. 2003). The success of KM initiatives depends on several factors including effective knowledge sharing and there appears to be demonstrable evidence linking effective knowledge sharing and success in project delivery (Davidson and Jillian 2009). According to Davidson and Voss (2002), it contributes towards creative concepts and ideas, coping with changes, and efficiency in decision-making. While barriers to knowledge sharing have been studied by researchers across multiple disciplines (Fullwood et al. 2013; Paroutis and Al Saleh 2009; Ranjbarfard et al. 2014), there is relatively little empirical research examining the barriers to knowledge sharing across ICT project environments (Ismail et al. 2009) with a focus on public sector institutions (Ismail et al. 2009; Seba et al. 2012) and their relative implications for project success. This leads to the research questions that motivated this study:

- *What set of critical factors influence project success across ICT project environments?*
- *What is the role of knowledge management in project environments?*
- *How do barriers to knowledge sharing impact project success?*

The remainder of the paper is structured as follows. The next section introduces the approach taken towards the review of literature. This is followed by a thematic analysis of the findings to present a background summary of the topic. Finally, a conceptual framework for the proposed research study and a brief conclusion are provided.

RESEARCH METHOD

This section provides background information about the review of existing PM literature from multiple perspectives that was conducted to derive a solid foundation for the proposed research study. The review was guided by Webster and Watson (2002) literature review framework. According to Webster and Watson (2002), developing a solid foundation for a research study requires a methodical analysis and synthesis of literature. Using relevant electronic databases, this method involved deriving a broad overview of the PM literature, particularly over the past few decades where studies on PM become more prevalent in business and management research. Part of this investigation also included an analysis of existing peer-reviewed journals across the Information Systems (IS) field. According to Levy and Ellis (2006) "…an effective literature search in the IS-related literature must exhaust all sources that contain IS research publications (i.e. journals, quality conference proceedings, etc.) that are valid to the proposed study" (p. 183). The large volume of journals, books and conference papers meant a strict identification process needed to take place.

In conducting the literature search, several academic databases and search engines were used including Ebscohost, Sciencedirect, Jstor, Google Scholar, Sage Journals and IEEE Xplore, focusing on the last 30 years for general PM-related searches and on the last 10-15 years for more specific PM and KM related searches. This broad approach was used to initially scan the vast volume of information. At this point, key words such as ICT/IS project success, critical success factors and knowledge management were used within the scope and context of PM (Table 1).

Table 1: Initial database screening

Database	Key words	Results	Narrow down strategies	Applicable results
Sciencedirect	ICT project success	6,318	• Key words added: Public sector • Domain shortlisted: Business, management & accounting domain • Year: 1980 - present	• Government information Quarterly: 158 • International Journal of Information Management: 83 • International Journal of Project Management: 53 • The Journal of Strategic Information Systems: 32
Ebscohost	ICT project success	301	• Key words added: knowledge sharing	• Information Technology for Development: 12 • Government Information Quarterly: 6

			• Content type: Academic journals	• Information Polity: The International Journal Of Government & Democracy in the Information Age: 6 • Behaviour & Information Technology: 4 • Information, Communication & Society: 4 • Information Society: 3
IEEE Xplore	Project success	3,736	• Content type: Journals and conference papers • Year: 1980 - present	• Engineering Management, IEEE Transactions on: 76 • Computer: 21 • Engineering Management Journal: 18 • IT Professional: 15 • IBM Systems Journal: 7 • System Science HICSS, 2012 45th Hawaii International Conference: 13
Google Scholar	ICT project success & knowledge sharing barriers	13,400	• Key words added: Project success and knowledge (*occurring in the title of the article*) • Year 1980	• Total of 64 references (i.e. journal articles, books, etc.)
Jstor	ICT project success	7,695	• Key words added: Project and knowledge sharing (*occurring in the title of the article*) • Domain shortlisted: Technology	• Total of 47 journal articles

Furthermore, additional academic journals were also used including JBR, JIM, ISJ, JKM, PMJ, KMRP and IJPM (see Appendix 1). A similar endeavour was undertaken to narrow down the information to quarantine and direct the findings (Table 2). Sources were selected based on their relevance to the actual subject in question, themes that relate to project performance and references mentioned/listed and/or recommended by authors. Redundancies were based on the authors' research objectives and matters that do not relate to the research field. This resulted in the identification of key articles relevant to the research focus and the scope was further refined to legitimise existing gaps in literature, progressing towards a development of a theoretical model. In addition, selected works from conference proceedings were also identified and shortlisted. These included the ACIS, ICIS, HICSS, PMI and AMCIS conferences (see Appendix 1). The sources identified during this process provided a sufficient theoretical background and initiated leads for additional references to substantiate the subject in question.

Table 2: Initial academic journal screening

Journal	Key words	Results
Journal of Business Research	Project success	838
Information Systems Journal	Project success	334
Journal of International Management	Project success	190
Journal of Knowledge Management	Project success	516
Project Management Journal	Knowledge sharing barriers	67
Knowledge Management Research & Practice	Project success	17
International Journal of Project Management	Knowledge sharing barriers	152

During the analysis phase, a detailed summary of the material was carried out for the key concepts and issues emerging. This allowed the study to present theoretical constructs and models and evidence-based arguments for the proposed research area, in addition to demonstrating how the proposed research will contribute to the body of knowledge. The majority of articles shortlisted unveiled thematic concepts with an understanding of the relationship between KM and success in ICT projects. As pointed out by Webster and Watson (2002) "you can gauge that your review is nearing completion when you are not finding new concepts in your article set" (p. 16). The analysis of the most recent articles introduced similar themes and concluding arguments and the pace of further examination in this domain gradually reduced, mirroring the advice of Webster and Watson (2002).

The evaluation of literature consisted of categorising existing theories, distinguishing and establishing tested facts and identifying potential gaps in current research. As at this stage, it is acknowledged that additional sources exist beyond the IS literature. However, the research method applied in this investigation yielded sufficient results for detailed examination of the research topic.

CRITICAL SUCCESS FACTORS AND PROJECT SUCCESS

Researchers have laboured for decades to capture and understand the variables that are critical to project success (Pinto and Slevin 1988). Jugdev and Müller (2005) argue that to define what project success looks like is almost

like gaining some agreement to the definition of good art; it's relative and subjective. Shenhar et al. (2002) argue that project success can vary according to the person evaluating the particular subject. Jugdev and Müller (2005) concluded that four conditions are required for success "1- Success criteria should be agreed with stakeholders before and during the project. 2 - A collaborative working relationship should be maintained between project owner/sponsor and manager. 3 - A project manager should be empowered to deal flexibly with unforeseen circumstances. 4 - The project owner/sponsors should take an interest in the performance of the project" (p. 28).

It is worthwhile pointing out that the mechanism for success in any given project is truly dependent upon the very nature of its endeavour, complexity, associated risks, political environment, culture, technological circumstances and other conditions in which the project operates (Papke-Shields et al. 2010; Shenhar et al. 2002). For example, the set of factors, influences or drivers that contribute towards the success of Project (A) may not be applicable/relevant to Project (B). Therefore, an 'agreed' unified set of success criteria is not a one-size-fits-all phenomenon.

According to Rafia (2009), a major motive for the deployment of ICT across public institutions is to respond to legislative processes with the aim of improving the delivery of services. Yet, and not surprisingly, there are several concerns about the ways in which government ICT projects are governed (Leydesdorff 2007). Therefore, scholars have pursued the topic of critical success factors (CSFs) to improve implementation process and ICT project outcomes (Antlova 2010). According to Bullen and Rockart (1981), CSFs are "…the limited number of areas in which satisfactory results will ensure successful competitive performance…" and "…are the few key areas where 'things must go right' for the business to flourish and for the manager's goals to be attained" (p. 7). Since the topic of CSFs began to dominate the PM literature, several scholars have pursued the subject and examined the type of factors that facilitate the achievement of success in projects (Ward and Daniel 2013). Table 3 draws on the major themes and concepts emerging in CSF research.

Beyond IT project research, countless authors have studied factors critical across other industries. Nguyen and Ogunlana (2004) investigated success factors across large construction projects in Vietnam revealing that certain conditions were required for project success such as: comfort, competence, commitment and communication. Chan et al. (2002) identified a set of project success factors for a design/build project. Project team commitment, contractors' competencies, risk and liability assessment, clients' competencies, end-users' needs and constraints imposed by end users were identified as critical to delivering successful project results. While Wan Abdullah (2010) reasoned that stakeholders' appreciation, quality, time and cost were the key influences impacting performance in the Malaysian construction industry.

Pinto and Slevin (1987) developed the project implementation profile (PIP) instrument identifying 10 CSFs: "communication, project mission, top management support, project schedule/plan, client consultation, personnel recruitment, selection and training, technical tasks, client acceptance, monitoring and feedback and troubleshooting"(p.26). They note that "the factors appear to be…time sequenced and interdependent" and "they were found conceptually to be essentially temporal" (p. 26). In many cases, they were "sequenced to occur in a certain order instead of randomly or concurrently" (p. 26). For example, setting the project goals/defining the project mission should be considered first before seeking top management support.

Table 3: CSFs in PM Research

Authors	**Concept**								
	Project Planning	Management Support	Project Management	Communication	User Involvement	Availability of Resources	Project Manager Competence	Risk Management	Stakeholder Management
Baker et al. (1983); Pinto and Slevin (1988); May and Zimmer (1996); Murray (2001); Baccarini and Collins (2003); Frese and Sauter (2003); Dong et al. (2004); Antlova (2010)	X								
Jiang et al. (1996); Murray (2001); Poon and Wagner (2001); Somers and Nelson (2001); Baccarini and Collins (2003)		X				X	X		
Standish Group (1994); Jiang et al. (1996); Wixom (2001); Baccarini and Collins (2003); Dong et al. (2004); Wong and Tein (2004); Kamal (2006); Antlova (2010)					X				
Nah et al. (2001); Kamal (2006)		X	X	X					
Cleland and King (1983); Pinto and Slevin (1988, 1989), Verma (1995); Jiang et al. (1996); Baccarini and Collins (2003); Dong et al. (2004); Wong and Tein (2004); Remus				X					

and Wiener (2009)									
Bailey and Pearson (1983); Cleland and King (1983); Pinto and Slevin (1988, 1989); Standish Group (1994); Verma (1995); Jiang et al. (1996); Summer (1999); Murray (2001); Milis and Mercken (2002); Baccarini and Collins (2003); Dong et al. (2004); Turner and Muller (2004, 2005); Wong and Tein (2004); Salmeron and Herrero (2005); Kamal (2006); Biehl (2007); Freedman and Katz (2007); Lee and Kim (2007); Young and Jordan (2008); Al-Mudimigh et al. (2011); Dezdar and Ainin (2012); Sudhakar (2012)		X							
Sayles and Chandler (1971); Pinto and Slevin (1989); Jiang et al. (1996); Dong et al. (2004); Turner and Muller (2004, 2005); Amberg and Wiener (2006)		X					X		
Holland and Light (1999); Sumner (1999); Rosario (2000); Murray and Coffin (2001); Baccarini and Collins (2003); PMI (2004); Nah et al. (2007); Dezdar and Ainin (2012)								X	
Fortune and White (2006); Melin and Axelsson (2009)							X		
Munns and Bjerimi (1996); Holland and Light (1999); Ross (1999); Sumner (1999); Rosario (2000); Murray and Coffin (2001); Ross (1999)			X						
Shenhar and Dvir (1996); PMI (2004); Crawford (2005); Morris et al. (2006); Bourne and Walker (2008); Abouzahra (2011)									X

KNOWLEDGE MANAGEMENT IN PROJECT ENVIRONMENTS

KM and PM are two very distinct areas of study and a vast volume of publications exists across each domain. Figure 2 depicts the major milestones and contributions in KM and PM research. In more recent times however, scholars have moved towards bridging the gap between KM and PM, examining areas such as situated learning (Sense 2007), post project reviews (Rezania and Lingham 2009) and issues in managing knowledge across project based organisations (d'Armagnac 2014). Newell and Edelman (2008) posit that organisational learning practices of project related activities are restricted due to the project's temporary nature. In addition, there appears to be lack of robust instruments in KM strategies across projects to capture and disseminate knowledge for organisational learning (Sydow et al. 2004) . Knowledge workers (i.e. project teams) are disbanded during the final stages of project closure and knowledge such as that of a tacit nature is no longer present. Nonetheless, studies have acknowledged that effective KM activities yield positive project performance (Davidson and Rowe 2009).

Knowledge Sharing and Project Success

The success of KM initiatives depends on knowledge sharing (Wang and Noe 2010). Knowledge sharing here specifically refers to the exchange of valuable and relevant information, through formal and informal means between people as they relate to project activities. One such strategy to transfer knowledge (and an approach that is well practiced) is for project teams to capture and re-use information from lessons learnt databases/documents. But how often this is practiced and used to enhance project delivery is not widely explored (Newell et al. 2006) and at times "…ineffective unless the outcome is enacted by people" (Von Zedtwitz 2002, p. 266). Von Zedtwitz (2002) also suggests that project managers appointed for new projects should be involved (as observers) across post project review processes. Further to this, Keegan and Turner (2001) study on 18 project based companies concluded that respondents did not express satisfaction with their post project review practices.

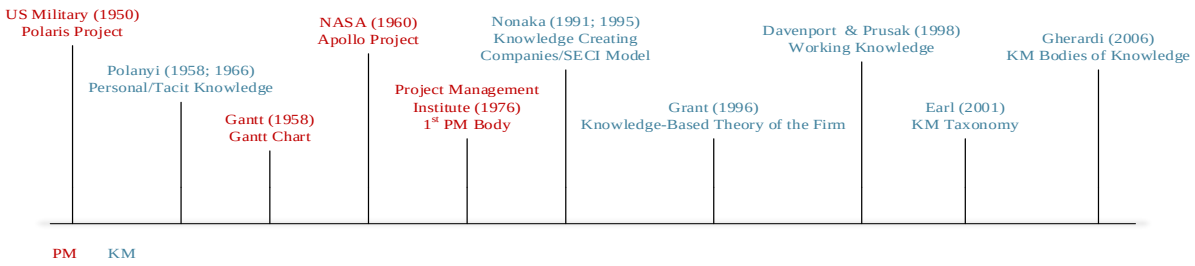

Figure 2: Major Milestones in KM and PM Research

Cross and Parker (2004) point out that people are the most critical conduits of information and typically, knowledge workers are five times more likely to engage with co-workers than acquiring information form KM databases/systems (Dalkir 2005). Yet, from this dynamic social event, only one in five knowledge workers actually find the required information to satisfactorily perform their tasks (Dalkir 2005). Since the study of KM

emerged as a discipline in its own right, countless scholars have deliberated on the knowledge sharing process. Table 4 catalogues coverage of KM and in particular, knowledge sharing across the PM field of research.

Table 4: KM in PM Research

Domain	Authors
Knowledge management in project environments	Ayas (1996); Keegan and Turner (2001); Prencipe and Tell (2001); Fong (2003); Huang and Newell (2003); Kasvi et al. (2003); Liebowitz and Megbolugbe (2003); Schindler and Eppler (2003); Newell et al. (2004); Hall and Sapsed (2005); Love et al. (2005); Sapsed et al. (2005); Walker and Christenson (2005); Brookes (2006); Desouza and Evaristo (2006); Boh (2007); Ajmal et al. (2010); Anand et al. (2010); Lindner and Wald (2011); Moslehi et al. (2011); Arumugam et al. (2012); Eriksson (2013); Pemsel and Wiewiora (2013); Gemino et al. (2014); Sokhanvar et al. (2014); Yang et al. (2014)
Knowledge sharing in project environments	Cameron (2002); Karlsen and Gottschalk (2004); Hall and Sapsed (2005); Ruuska and Vartiainen (2005); Adenfeld and Lagerström (2006); Jones et al. (2006); Reich et al. (2008); Ismail et al. (2009); Zhao et al. (2011); Wang and Ko (2012); Cooke (2013); Johansson et al. (2013); Kashif and Kelly (2013); Frank and Ribeiro (2014)

According to Cameron (2002), projects often fail because of a lack of incentives to promote knowledge sharing and inadequate time given to lessons learnt from previous (failed) projects. From this perspective, Snowden (1999) argues the importance of how storytelling (a knowledge sharing element) can be a powerful knowledge disclosure mechanism whereby the transfer of complex meanings could be created. He further postulates the absence of such a narrative signals a controlling environment.

Since it is well documented that knowledge sharing is the most critical process of the KM Cycle (Cross and Parker 2004; Love and Irani 2003; Poh and Erwee 2004), it is well understood that it plays an important role across projects (Karlsen and Gottschalk 2004a; Malhotra and Galleta 2003). Jewels (2006) and Santos et al. (2012) insinuate that there are solid reasons to believe that effective knowledge sharing behaviour contributes to project performance and success. This notion is also supported by Ramaprasad and Prakash (2009) who proposed an ontological analysis to address the complexity of knowledge sharing and the very factors that influence them.

Researchers such as Wang and Ko (2012) confirmed specific knowledge sharing practices had a positive influence on "…productivity of project staff, the on-time project completion, and the successful development of new products" (p. 428). Xu and Ma (2008) opine that a fundamental factor in fostering collaboration between project members and achieving the set goals in IS implementations is successful knowledge sharing approaches. Patnayakuni et al. (2007), Hsu et al. (2012) and Pee et al. (2010) agree that knowledge sharing has a crucial role in sustaining robust performance in IS related projects, increased innovation (Lind and Zmud 1991) and creativity levels (Tiwana and Mclean 2003). According to Park et al. (2014), the requirement for knowledge sharing has become an important endeavour to see ensure completion of IS related projects.

The majority of knowledge sharing studies are concerned with private enterprises and there is a lack of understanding of KM in the public sector (Amayah 2013). Despite this, sufficient studies exist to demonstrate a growing interest in knowledge sharing in public sector organisations, especially at an international level. These include studies across Dubai (Seba et al. 2012), Malaysia (Sandhu et al. 2011; Yusof et al. 2012), Korea (Park and Lee 2014), Jamaica (Mansingh et al. 2014) and Ghana (Boateng and Agyemang 2014).

FOCUS OF RESEARCH

The literature examined in this study indicates that there is little agreement on a definition of project success and there is no definitive set of critical success factors. Nor is there a significant body of work focusing on KM in the PM literature particularly as they relate to public sector driven projects. The barriers to knowledge sharing have been widely studied by researchers across multiple disciplines (Damodaran and Olphert 2000; Fullwood et al. 2013; Paroutis and Al Saleh 2009; Ranjbarfard et al. 2014). However, there is relatively little research examining the barriers to knowledge sharing across ICT project environments in general (Ismail et al. 2009) with a focus on public sector institutions (Ismail et al. 2009; Liebowitz and Megbolugbe 2003; Seba et al. 2012) and their relative impact on project success. It is this noticeable gap in existing research which the researchers aim to address by conducting an empirical study using organisations of the VPS as an example. The researchers hypothesise that ineffective KM processes and in particular, barriers to knowledge sharing, may be a contributing factor to the poor performance of managing projects and their subsequent outcomes. Therefore, this research aims to investigate the KM strategies and processes employed by the VPS to support project success outcomes and to identify existing barriers to knowledge sharing in ICT project environments. The research will use a deductive approach/reasoning (from a knowledge sharing barrier perspective) to determine what variables impact project success and highlight opportunities to create an environment that stimulates and enables effective knowledge sharing and in turn, improves project performance across the VPS. The contribution to knowledge will be strengthened by applying and testing the following theoretical models:

- Dalkir's (2005) KM lifecycle framework which consolidates well-established KM Cycle models (Wiig 1993; Meyer and Zack 1996; Bukowitz and Williams 2000; McElroy 2003).

- Kukko's (2013) knowledge sharing barrier framework which focuses on the individual, organisational and technological levels.
- Karlsen and Gottschalk's (2004) project success framework which encompasses project success, PM success and organisational success. It consists of project performance, project outcomes, system implementation, benefits for client organisations and benefits for stakeholders.

These models have seen little attention with regards to their application, particularly in the public sector. The study will aim to enrich these existing models and further our understanding of the role of KM in PM. A conceptual framework has been devised for the study (Figure 3) outlining the intended method of approach and how the theoretical models will apply across each phase.

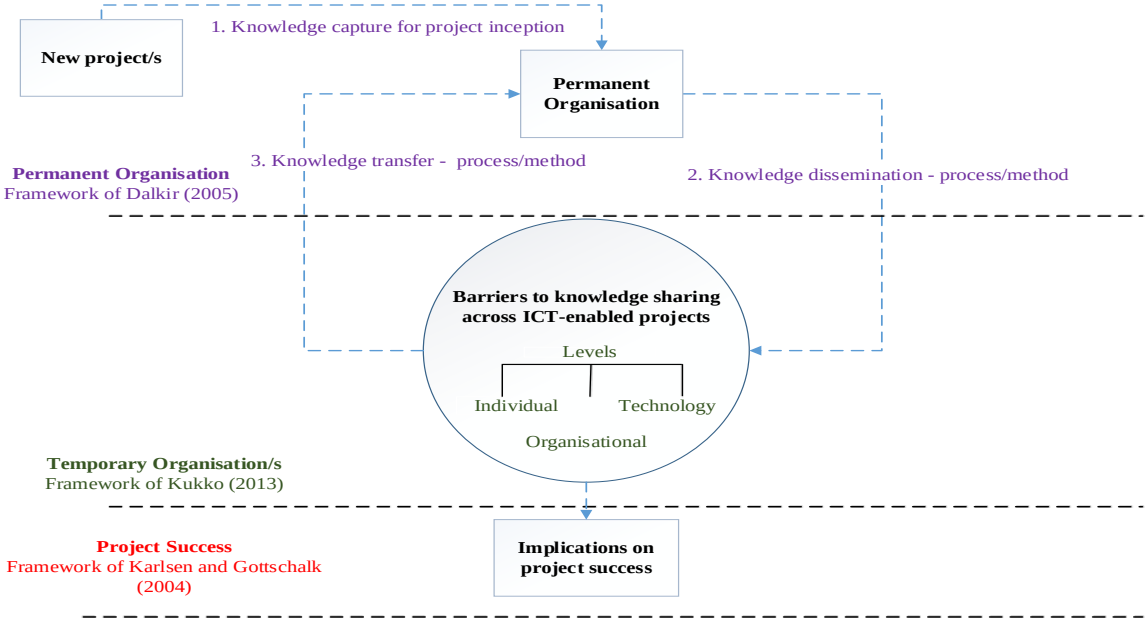

Figure 3: Proposed Conceptual Framework

Dalkir's (2005) model will be qualitatively deployed to practically examine current practices and processes of KM within the context of project related activities. This includes knowledge capture, dissemination and transfer processes. Kukko's (2013) knowledge sharing barrier framework will be used to analyse barriers to knowledge sharing in projects across individual, organisational and technological levels to capture a holistic perspective relating to the subject matter. Using the multi-faceted project success model of Karlsen and Gottschalk (2004), the study will determine the impact of such knowledge sharing barriers on the management and success of projects across the VPS. These frameworks were selected to offer a systematic and a structured approach to evaluating the KM process, knowledge sharing barriers and project success to provide a comprehensive and telling account to meet the research objectives.

CONCLUSION

Projects and project management are complex undertakings that are beset by issues such as increases in complexity, ever-changing scope, developments in technology and large numbers of stakeholders involved. The ongoing propagation of PM methodologies, systems, tools, processors, standards and certifications have all evolved to address a common purpose - how to successfully manage projects and achieve project success. However, there is little agreement in the PM literature about CSFs and definitions of project success, and KM in the context of PM is yet to be fully explored. This paper investigated the key influences driving project success and examined the study of KM in project environments. It classified PM CSF research and research on KM in the PM context. It also presented a timeline highlighting key milestones in KM and PM research. It was noted that effective KM practices plays an important role for project delivery, particularly knowledge sharing. However, a gap in existing scholarly works was identified and a conceptual framework was put forth that will inform the planned empirical research study of the VPS as a strategy to bridge this gap.

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APPENDIX 1 – LIST OF ACRONYMS

JBR: Journal of Business Research, JIS: Journal of Information Systems, JKM: Journal of Knowledge Management, PMJ: Project Management Journal, KMRP: Knowledge Management Research and Practice, IJPM: International Journal of Project Management, ACIS: Australasian Conference on Information Systems, ICIS: International Conference on Information Systems, HICSS: Hawaii International Conference on System Sciences, PMI: Project Management Institute, AMCIS: Americas Conference on Information Systems

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