

The Level of Knowledge Management Practices and Barriers to Implement Knowledge Management in IT Projects in Sri Lanka

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Knowledge is a critical asset in an organization. New knowledge created while doing projects. IT projects are purely knowledge base projects. It is important to practicing knowledge management within IT projects to capture, store and review knowledge created while doing the project. This research is to identify the level of knowledge management practice within IT projects, what are the barriers to implement the knowledge management and what are the prerequisites to make the knowledge management implementation a success within project organization. A qualitative research approach uses in this research and data collected using semi structured interviews from 15 project managers. The data collected from completed IT projects in telecommunication industry. The code matching method use to analyze the data. The results reveal that knowledge management practicing within IT projects moderately. Further main barriers to implement knowledge management are, limitation of time, additional resources required for knowledge management activities, project culture, lack of leadership and project organization. When considering the prerequisites to implement knowledge management within IT project environment, it is revealed that, incentive schemes, leadership, and establishment of required infrastructure are main prerequisites to implement a successful knowledge management.

Keywords: *Barriers to Knowledge Management, Level of Knowledge Management, Prerequisites for Knowledge Management, Qualitative Approach*

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Introduction

Background

New economy has made organizations focus on innovation as a means of survival, they have increasingly turned to Information Technology (IT) to support and implement their plans for change. (Reich, Gemino and Sauer, 2012). Today, Organizations increasingly recognize the need to manage IT project investments to achieve business value. In many instances, information and communications technology (ICT) initiatives are implemented via projects (Cadle and Yeates, 2008).

Organizations regularly execute projects to improve their performance. (Meredith and Zwikael, 2019). In align with this argument, Fonseka (2010) stated that projects are essential to winning clients and company survival.

Organizational performance is enhanced when projects are completed successfully, hence, it is important managers understand project success correctly. Yet there is little agreement in the literature or in practice on evaluating project success. (Meredith and Zwikael, 2019). Even though there is no unique agreed method to measure the project success, scholars identified that most of the IT projects are low performers. Acceptable project performance may still be an elusive target (Sauer and Reich, 2006). Despite the recognition gained by Sri Lanka for its IT capabilities, the problem besetting the industry is the low completion rate of IT projects which is bound to impact adversely on industry progress. (Fonseka, 2010). Supporting to the same argument, Rosacker and Rosacker, (2010) stated that "...IT projects are far too often...wasteful, inefficient, mismanaged, expensive and behind schedule". As Reich (2007) state that, the high failure rate of IT projects is a major stumbling block to companies that are trying to innovate through new processes and service. While no industry is immune from project failure, the Information Technology (IT) industry is shown to be more susceptible to risk and failure than those of other industries. (Kaitlynn, Whitneya and Daniels, 2013). There are many reason for

failure of IT projects. While these causes of failure are quite common in IT projects, the largest stumbling block in IT projects, and one of the largest and most unrecognized reasons for failure, is the lack of proper knowledge management methodologies throughout the project management lifecycle (Brown, 2009). Knowledge management had positive relationship with implementation of projects. Langat and Kimutai, (2023). IT projects focus on knowledge yields new insights because IT projects are primarily knowledge work (Reich, et al, 2012). Software companies in worldwide face issues such as continuous rework, increased development time and decreased productivity which lead to failed projects due to inefficient and ineffective knowledge management (Ahmed, et al., 2017).

Zheng, (2017) stated that Knowledge is the organization's most important strategic resource that can provide organizations with a sustainable competitive advantage. Further to this argument, Knowledge is an essential resource to the companies in construction sector due to the nature of these organizations deal with projects. The performance of a project required new aptitudes, outlooks, models and responsibility all through the organizations. (Yusof, Yahaya, Awang, Hassan and Cheen, 2019).

The process of software development requires a high amount of knowledge to carry out knowledge-intensive development activities such as requirement gathering, analysing of problems, designing of solutions, implementing the solution via coding and testing the end product to ensure a quality, bug-free software product. Hence, software teams are required to have strong knowledge on software development methodologies, technologies, and project management processes to make their projects successful (Ryan and O'Connor, 2013). Globalization and market competitiveness create the need, in modern organizations, to adapt their internal policies and procedures, to this, new Era called Knowledge Economy. Therefore, organizations are now focused on understanding and managing the knowledge of people so they can increase their competitiveness in the markets. (Pereira, Santos, Dias and Costa, 2021). In line to this argument, (Kariyapperuma, 2015) stated that,

the world is moving fast from a production-based economy towards a knowledge-based one. Further he argued that, as a result, organizations are becoming more knowledge intensive and are increasingly dependent on innovative knowledge to create value.

KM has become a useful tool for survival within this competitive global arena. However, successful KM implementation should be informed by specific organizational objectives rather than a must-have initiative based on the popularity of KM as a concept. (Arthur, 2013). Companies should be aware that most knowledge-management initiatives in project-based firms have failed for a variety of reasons, which could be technological, cultural, knowledge content and project management reasons (Chua and Lam, 2005).

The article is structured on the following lines. It begins with a description of the research problem and a review of the literature relevant to the problem. This is followed by the conceptual framework and the study design. The data gathered during the field study are presented next, followed by the study findings and a discussion of the findings. The final section contains the conclusions of the study.

Problem Statement

IT projects are mainly knowledge base projects (Reich et al, 2012). Knowledge is created via projects and continuous creation of innovative knowledge is essential for the survival of organizations. (Yeong, 2010). It is required to practice knowledge management within the IT projects to capture and use this knowledge. What is the level of knowledge management practice within the IT projects and what are the barriers to implement this knowledge management within IT projects in Sri Lankan context is unknown. Also what are the prerequisites to make the knowledge management implementation a success?

Research Objectives

In order to answer the said research problem two (03) main objectives of the study were set. By conducting the research, researcher expected to,

1. Determine whether project knowledge management practise within business IT projects and what is the level it practise.
2. What are the identified barriers to implement project knowledge management.
3. Determine the prerequisite to implement project knowledge management.

Literature Review

Knowledge Management

There are many reasons for failure of IT projects. While these causes of failure are quite common in IT projects, the largest stumbling block in IT projects, and one of the largest and most unrecognized reasons for failure, is the lack of proper knowledge management methodologies throughout the project management lifecycle (Brown, 2009).

This can be achieved by having a proper knowledge management system in place to preserve and manage knowledge. Knowledge management can be defined as use of information and communication technology to manage the work of the employees of the organization, or the establishment of a corporate culture focusing on promoting social processes shared between individuals, aiming to achieve a sustainable source of advantages (Ouriques, et al., 2019).

Project Knowledge management

The Knowledge management (KM) and project management (PM) are two technics that provide competitive advantages within IT industry. (Jayasena and Jayasekara, 2017). Tilakaratne and Abegunawardhne (2016) stated that it is essential to get the right knowledge to the right people at right time that In IT projects. Langat and

Kimutai, (2023); Yeong, (2010) stated that there is a positive relationship between knowledge management and successful implementation of a project. Similar argument made by Ahmed, et al., (2017) that most of the rework of projects and increase development time led to IT project failure due to ineffective knowledge management in project environment. This gap needs to be filled by proper project knowledge management. (Jayasena and Jayasekara, 2017). In line to this statement, Barclay (2010) stated that the effective project knowledge management is one strategy to improve project success in It projects.

The effective Knowledge Management (KM) in projects environment affected by different factors. Such as available resources, KM tools, leadership, organizational culture, and project objectives and goals among others. (Alqudah and Shaalan, 2016).

Further, Alqudah and Shaalan, (2016) identified, five main stages in Project Knowledge Management Life Cycle. Such as, the knowledge creation, knowledge storage, knowledge dissemination, knowledge learning, and knowledge improvement. As per them, each phase is essential towards the attainment of overall efficiency in the integration of KM into projects.

As Ryan & O'Connor, (2013) stated software project activities are knowledge base activities. Further they stated that software development team should have strong knowledge on software development methodologies, project management methodologies.

Yeong, (2010), stated that, it is important to understand how knowledge could be created via projects and how the knowledge is transferred to other project team members in the form of tacit and explicit knowledge. Further, he stated that, the common factors are culture, process and technology that, in turn, might affect both knowledge management and project management.

Level of Project Knowledge Management Practice

Presently, in the IT project environment project practice the knowledge management in different levels. Where some projects they use the project knowledge management practices. (Terzievaa , 2014). Where they practice After action reviews, project status reviews, project postmortems etc. Shared project folders, shared drives. Shared status reports, program/portfolio master plans, etc . (Terzievaa, 2014;).

Some research reveal that they practice project knowledge management at moderate level. (Yusof, et al., 2019); Jayasuriya, 2018).

Some research found that still projects are not use knowledge management practices. (Pereira, et al., 2021). Where, However, the stages corresponding to i) knowledge transfer among employees within the Organization (Share), and ii) the evaluation of value or benefit of the knowledge transferred (Evaluation), are not being practiced. (Pereira, et al., 2021).

Barriers to implement project knowledge management

Scholars identified some barriers that affected to implement of knowledge management in IT projects environment. Main challenges are; Handling business coach exit, (Karapetyan and Otieno, (2010); Communicating lessons learned, (Karapetyan and Otieno, (2010); Creating knowledge map, (Karapetyan and Otieno, (2010); Jayasuriya (2018); Establishing knowledge network, (Karapetyan and Otieno, (2010); Selecting appropriate team, (Karapetyan and Otieno, (2010) Storing knowledge from previous projects, (Karapetyan and Otieno, (2010); Korkmaz and Bahidrah (2018); Organization culture (Arthur, 2013; Yapa, 2019); Poor and/or inadequate technology infrastructure'(Arthur(2013); Apostolou et al., (1999); lack of time (Arthur, (2013); Jayasuriya (2018); Integrating different expertise (Karapetyan and Otieno, (2010); Transferring complete knowledge. (Karapetyan and Otieno, (2010); More focus on project delivery (Jayasuriya (2018);

Complexity of projects constitutes the main obstacle blocking firms from utilizing knowledge in new settings.(Korkmaz and Bahidrah, 2018).

Prerequisite to success of Project Knowledge Management

Scholars identified different prerequisite to success of implementation of project knowledge management. Such as Culture to effective knowledge sharing (Apostolou et al., 1999; Kariapperuma, 2015; Pereira, et al., 2021; Priyangika and Perera, 2021), Project organization (Apostolou et al., 1999; Kariapperuma, 2015; Pereira, et al., 2021; Basnayake, 2016, Priyangika and Perera, 2021), Leadership to drive the Knowledge management (Alqudah and Shaalan, 2016; Priyangika and Perera, 2021; Basnayake, 2016), Knowledge base incentive program (Alqudah and Shaalan, 2016), Technology infrastructure (Priyangika and Perera, 2021), Knowledge Management Measurements (Priyangika and Perera, 2021), Top management support (Dissanayake and Senathiraja, 2021).

Methods

Introduction

The part discusses the research design, available research approaches, strategies, methods and data analysis techniques. Furthermore, this chapter includes the relevant justification for each selected criterion.

Research design

Research design implies research approach, methods, tools and techniques which are in collective manner to achieve the aims and objectives (Maxwell, 2004). Further, Wyk, (2012) stated that research design is a logical arrangement. In order to prove that statements, research has been designed with contend appropriate approach, strategies, methods, analyzing the collected data, and the recommendations.

Research Approaches

Research approaches have been described by Creswell (2014) as a plan and procedure to do the research which would take research from a more efficient way to details methods of data collections, analysis, and interpretation. Where Creswell (2014) stated that Qualitative studies basically deal with words. Qualitative studies help to answer the “why” and “how” questions (Rajasekar, Philominaathan, & Chinnathambi, 2013). On the other hand, qualitative approach provides personal perspectives and experience-based answers (Hammarberg, Kirkman, and de Lacey, 2016). Most of the time in-depth investigation studies have used the qualitative approach. According to the features that are presented by Creswell (2014) qualitative method was selected to carry out this research considering the nature of the study and the characteristics.

Research method

Research methods are the tools to give correct answers for the questions (Walliman N. , 2011). Researchers use different tools such as structured, semi- structured and unstructured interviews are the three fundamental types of research interviews. The structured interviews can be described as a set of predetermined questions used to administer the questionnaire directly through verbal communication modes with very few or zero variations and no further elaboration or follow-up question scope. Thus, structured questionnaire uses this research.

Data collection and Analysis

As the core stage of the data collection process of this research, fifteen (15) semi-structured interviews were conducted with the project managers who has experience in IT project management in telecom domain. The findings which hold different opinions and perceptions of project knowledge management with managing cost, scope and time of the project were analyzed using the content analysis. The respondents were interviewed face to face within approximately 60 – 90 minutes.

Interviews were based on completion of IT projects in telecom domain. Some respondents from operator side as well as some were from vendor side.

Findings and discussion

This is going to be elaborate different findings obtained over structured interviews conducted in order to collect required research data. For the analysis of interview data, it is used pattern matching method.

Respondents' details for interviews.

In that research fifteen (15) interviews were carried out successfully according to the structured interview guidelines. All the interviews were conducted with the IT project managers in telecom industry. As this research carried out in IT project success with project knowledge management, the sample of the experts was a heterogeneous purposive sampling, which helped to select those with experience and knowledge in the research area, in different contexts and different age groups. The interview respondents, who had to have more than 5 years of working experience in IT projects in telecom industry implemented in Sri Lanka were selected using purposive sampling. The sample selected includes participants from different age categories. Hence it was possible to get ideas based on their different levels of experiences. Importantly, selected sample contended with different level of industry practices related to measure the IT project success. Following table 4.1 illustrates the profile of the respective interviewees.

Table 1

Details of Interviews

Code	Designation	Experience (No. of Years of)	Type of Organization	Key Expertise Areas related
I1.	CIO	30 Years	Operator	<ul style="list-style-type: none"> • Project manager • Project sponsor
I2.	Senior Engineer	12 Years	Operator	<ul style="list-style-type: none"> • Project manager
I3.	General Manager	25 Years	Operator	<ul style="list-style-type: none"> • Project Manager • Project sponsor
I4.	Project manager	10 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager • Software Developer
I5.	Project manager	20 Years	System Integrator	<ul style="list-style-type: none"> • Software Developer • Project Manager
I6.	Project director	25 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager • Project sponsor
I7.	Deputy General manager	15 Years	Operator	<ul style="list-style-type: none"> • Project Manager • Software developer
I8.	Project manager	8 years	Operator	<ul style="list-style-type: none"> • Project manager • Software developer
I9.	Project Manager	8 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager
I10.	Project Manager	5 Years	System Integrator	<ul style="list-style-type: none"> • Project Manager
I11.	System Engineer	14 Years	Operator	<ul style="list-style-type: none"> • Project Manager • System Integrator
I12.	Project Manager	5 Years	Operator	<ul style="list-style-type: none"> • Project Manager
I13.	Project Manager	5 Years	System developer	<ul style="list-style-type: none"> • Project Manager • Software developer

Code	Designation	Experience (No. of Years of)	Type of Organization	Key Expertise Areas related
I14	Deputy General Manager	14 Years	Operator	<ul style="list-style-type: none"> • Project manager • Business process designer
I15	Project manager	7 Years	System Developer	<ul style="list-style-type: none"> • Project Manager • Support Engineer

What is the level of project knowledge management practice now?

Majority of the respondent mentioned that project knowledge management does not practice presently. Respondent I7, I9, I10, I11, I12 and I14 said that they use at lower level. Respondent I8 and I15 said that they use the project knowledge management in their projects.

I1 respond that only the lesson learns documenting and no further usage of those lesson learns. Respondent I1, I2, I7, I10, I14 and I15 said that they presently practice lesson learn logs in their projects.

Respondents I3, I6, I7, I8, I10, I11 and I15 said that they have practice knowledge share between business team and technical team. Respondent I3, I11, I14 and I15 said that they have maintain the project meeting minutes where it captures the critical decision taken during the project. I9 stated that some of the knowledge capture during the project.

I6 response that if new person assigned to the project, previous project knowledge transfer to him for easy understand the customer requirements.

I13 stated that, effective project knowledge management in implementing a project will involve documenting system configurations, documenting system requirements, documenting solution, testing results for future reference & improvement, etc.

I3 specifically said that, Since the project took almost over three years some trained team members promoted and some were transfer for other division. That make a loss to the project. Further he said that it is an additional cost to maintain logs. But he think that it will be an investment.

When considering this response with literature, the results in line with the literature review results. Where literature review identified similarly that some projects use knowledge management, some project moderately use knowledge management and some project does not use project knowledge management at all. Further some projects use knowledge sharing at different level within their projects.

What is the impact of not practicing project knowledge management and barriers to implement project knowledge management?

Majority of respondent said that knowledge does not capture during the project affected to operation of the system. Respondent I3, I6, I10, I11 and I15 said that it will ease the operation when capture the knowledge during project period. I12 stated that when similar project going to implement, similar effort needs to be done to complete the project.

I9 specifically stated that, lack of practice in project knowledge management will lead to, inefficient decision-making, reduced productivity, limited innovation, and poor risk management.

When considering the barriers to project knowledge management, some respondents said that due to additional time required for maintain documenting the knowledge develop during the project time, they were not capturing the project knowledge.

Respondent I6, I7, I8, I9, I10, I13 and I15 mentioned that they need additional time and resources to document the knowledge. Due to that they were not practice the project knowledge management. In line to the response, I8, I10, I11 and I15 said that due to project time limitation, they cannot capture the project knowledge. Respondent I9, I11 and I13 said that due to project cultural issues it is difficult to practice the project knowledge management. Respondent I9, I11 and I13 said that lack of leadership and organization structure also are barriers for the project knowledge practice. Responder I2 said that not given proper priority for knowledge management where more technical problem had to resolve during the project. Further due to system integrator had to change during the project highly affect to the project implementation where at the beginning of the project he gains certain knowledge about the company requirements, company process knowledge lost after he left the project.

Respondent I6, I7, I8 and I15 said that project members reluctant to document the knowledge and experience is another barrier for project knowledge management.

I3 response that, company should have a policy to not allow transfer staff to transfer before completion of the project. It is required additional resources to log all the activities and lessons during project period and additional resources will cost to the project.

I6 mentioned that keeping knowledge capturing make ease the operational team life. Further he mentioned that another barrier for knowledge management is that most of the time staff assigned for assignment basis hence there is no permanent nature of their jobs and they move one company to another company within short period. Hence there is no requirement for them to log the new knowledge.

I7 responded that the lack of understanding about the knowledge management and poor awareness about the advantages that company can gain by knowledge management is another case. I15 response that there are several advantages with

maintain project knowledge management where it will be useful for the system maintain purpose.

The results indicated that poor project knowledge management leads to recurrent failures in projects. I12 stated that when similar project going to implement, similar effort needs to be done to complete the project. This is in line with the literature where (Ahmed, et al., (2017) stated that most of the rework of projects and increase development time led to IT project failure due to ineffective knowledge management in project environment. Further literature identified a relationship between project knowledge management, and project success (. Langat and Kimutai, (2023); Yeong, (2010).

Further I9 specifically stated that, lack of practice in project knowledge management will lead to, inefficient decision-making, reduced productivity, limited innovation, and poor risk management. This is prove by the literature where non practicing knowledge management increase the

Some respondents said that due to additional time required for maintain documenting the knowledge develop during the project time, they were not capturing the project knowledge. This is in line with the literature finding that time limitation is a barrier to implement knowledge management. (Arthur, (2013); Jayasuriya (2018).

Some responders identified the culture as a barrier for implementation of knowledge management. This too captured in literature, where culture identified as a barrier to implement knowledge management. (Arthur, 2013; Yapa, 2019).

Some responders identified leadership and organization structure as a barrier to implement knowledge management. Where literature did not identify the leadership as a barrier to implement knowledge management.

Respondents identified more focus on project technical components and not priority to implement knowledge management. This is in line with literature finding. Where literature identified that more focus on project deliverable as a barrier to implement knowledge management. (Jayasuriya, 2018).

Further respondents identified that lack of awareness about knowledge management as a barrier to implement knowledge management. In line to this response, literature find that communication of lesson learn (Karapetyan and Otieno, 2010) and developing knowledge maps (Karapetyan and Otieno, 2010; Jayasuriya, 2018) as barrier to implement knowledge management.

Another barrier that respondents identified is the knowledge loss during the project when project member leave from project team. This is similar to the findings of literature where, integrating different expertise (Karapetyan and Otieno, (2010) and transferring complete knowledge. (Karapetyan and Otieno, (2010).

What is the prerequisite to implement project knowledge management?

I7 response that Management should provide some mechanism to reward the staff who willing to share their knowledge.

I9 response that designating a knowledge management lead or team responsible for capturing and organizing project information. Further I4. Conduct regular knowledge-sharing sessions and post-implementation reviews to learn from each deployment.

I11 Identify the critical knowledge and implementing the processes to follow the knowledge repositories, documentation and sharing.

I12 Designating a knowledge management lead or team responsible for capturing and organizing project information.

I12 Conduct regular knowledge-sharing sessions and post-implementation reviews to learn from each deployment.

I13 1. Designating a knowledge management lead or team responsible for capturing and organizing project information. 4. Conduct regular knowledge-sharing sessions and post-implementation reviews to learn from each deployment.

I14 So, It will there forever. So, anybody can access, can refer, even after, like for an example, after file was shifted another upgrade is coming on, So, you can easily refer you don't need to search for what did you do? or how did you templates.

When compare the response with literature findings, Alqudah and Shaalan, (2016) identified the Knowledge base incentive program. Responders also identified the establishment of knowledge base incentive scheme as a prerequisite.

Literature identified, leadership to drive the Knowledge management (Alqudah and Shaalan, (2016); Priyangika and Perera, 2021; Basnayake, 2016). In line to this, respondents identified that leadership required to drive the capturing knowledge.

Literature review identified that, Technology infrastructure (Priyangika and Perera, 2021) as a prerequisite to successful implementation of project knowledge management. In line to these responders identified that requirement of proper knowledge management system.

Literature review identified that culture and organization structure as prerequisites for successful implementation of project knowledge management. But responders did not identify those factors as prerequisite for successful implementation of project knowledge management.

Conclusion

The results reveal the moderate level of practise of knowledge management within IT projects. Further barriers to implement the knowledge management with short period of time, lack of awareness about knowledge management, poor leadership. These barriers affect the knowledge management implementation and that may be the reason why the moderate level of knowledge management practise within IT projects. Mainly due to the limitation of time affect the knowledge management practises. Further moderate level of knowledge management practise due to additional resources required to practise the knowledge management activities. Due to require additional resources, these activities add additional cost to the project. The knowledge management practises gain most of the benefits in long run where it supports to improve the success rate of future projects. But considering the additional time required and additional cost require for the knowledge management activities directly impact to the ongoing projects. This may be a reason that project managers not highly supportive to implement the knowledge management activities.

Another main barrier of implementing a knowledge management is the project culture. Due to short period of time, it is not eased to change the project culture within short period. If the project team built with experience person who implemented project knowledge management, then it is much ease to implement knowledge management activities. Otherwise, it is required to have awareness sessions to practise the knowledge management activities. This affected the moderate practising of knowledge management within IT projects.

The incentive scheme for knowledge practitioners will increase the team members who use the knowledge management. This will increase the level of knowledge management within IT projects. Further leadership within project environment increase the knowledge management practitioners. Also the leaders can overcome the barriers and provide culture encourage to practise knowledge management.

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