Usage of Knowledge Management Techniques in IT Based Company in Sri Lanka: A Case Study

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Abstract

Knowledge Management (KM) and Project Management (PM) are very substantial techniques to gain the competitive advantage within the Information Technology (IT) industry. In IT projects, it is essential to get the right knowledge to the right people at the right time. KM techniques are used to fulfill the above knowledge gaps. The main objective of this study is to determine the usage of KM techniques in an IT company in Sri Lanka. Simple random sample of size 108 is selected from the target population of all 150 project team members in the selected company. Since, the hypotheses were tested using statistical methods the positivism philosophy was used in this study. A deductive approach is used in cross-sectional time horizon and mixed approach is used to gather data. Collected data were analyzed to identify the usage of KM techniques in successful and failure projects. KM techniques were compared with respect to the status of the project (Success/Failure) and the category of the project (Government/Privet/Banking/Insurance/other). Male representation is higher than the female representation in the company. Majority of respondents belongs to the age group 26-30 and bachelor's degree holders. More than half of the respondents do not have any KM qualification. Among the projects undertaken by the company 30% projects are related to insurance industry while government, banking, and private company with 20% each. The rest of the projects come under other category. Usages of the different type of KM techniques were examined. The successful projects mainly used after action review, brainstorming, collaborative virtual workshop, communication of practice, peer assist, learning review as important techniques while failure projects do not. In the successful projects knowledge banks is not considered as an important technique while in the failure projects does. The analyzed results stated that after action review, gone well note, learning review have significantly effect on all project categories. Moreover, blog, knowledge bases, storytelling and social networks are found to be effectiveness on successfulness of government and private projects.

Keywords: Knowledge management, Project Management, Knowledge management techniques

INTRODUCTION

The continuous technology advancements and modern economic is making huge market competitions in the Information Technology (IT) industry. Creating unique knowledge and manage the knowledge base through innovation is the ladder which leads the organization in sustainable position in the IT industry. The knowledge created through the IT projects should be properly managed in order to achieve the success of the projects. IT projects may fail due to their incapability to getting the right knowledge to the right people at the right time. Therefore, it is important to understand how knowledge could be formed through in all stages of the IT project lifecycle and how the knowledge is transmitted to other project team members in the form of tacit and explicit knowledge.

The Knowledge Management (KM) which has gained significant attention for successful Project Management (PM). KM which has emerging trend allows organizations to continue to grow and survive in the business. One of the main objectives of PM is to optimally combine the knowledge bases of team members and other stakeholders. Therefore, organizations needs to consider about the managing the knowledge in the organization to success of the PM. So, it is important to find out which KM techniques can be used to improve the PM practices. In this study, this problem was examined based on information collected through a company which undertakes IT projects. All the projects undertaken by the company were classified as successful projects or failure projects. Different types of KM techniques used by each and every project were analyzed.

Problem Statement

The PM approach plays a major role in the successful delivery of a project. Generally project managers strive to do their best to deliver their best on budget, schedule, and scope by managing PM disciplines. The lack of proper knowledge can lead to failures in projects and core PM practices. Based on the previous researchers many IT projects may failed due to lack of KM in PM (Boondao, 2013). Successful KM is a key activity need to be performed in order to improve the IT based PM. In order to overcome gaps between KM and PM the company should build an accurate KM models for successful PM practices. PM signifies the delivery of an output which was specified in the project plan within allocated resources or inputs. Therefore, researchers claimed that altogether PM successes make the overall project success. In this research, PM status (success or fail) is taken as the overall project status.

Main Objective

The main objective of this study is to determine the usage of the KM techniques in PM practices in IT based companies in Sri Lanka. This key research objective has further been subdivided into the following specific objectives.

Specific Objectives

1. To find out the different types of KM techniques use in PM practices in the IT company.
2. To find out the usage of KM techniques in the IT company according to the type of projects.
3. To find out the usage of KM techniques in the IT company according to the status of projects.

Research Questions

In order to achieve the above research objectives, the following research questions developed for the study.

1. What are the different types of KM techniques used in PM practices in IT based company?
2. What are the KM techniques used in PM practices according to the project status?
3. What are the KM techniques used in PM practices according to the project category?

Significance of the Study

The IT based PM and the role of Project Manager plays a major role in the delivery of a successful project by achieving stakeholder satisfaction. The poor KM could lead to failures in PM practices and IT projects. A number of failed IT projects could affected negatively on IT project based companies and damage the company image in the long run. Hence, it is vital to identify the different types of KM techniques and their usage in the PM practice in the Sri Lankan IT project based companies.

In this research study the usage of KM techniques was identified in PM practices in IT based company in Sri Lanka. This can be used to identify relationships between KM techniques and the status of the project. Furthermore, it can be used to identify usage the KM techniques with respect to the category of the project. In addition, the study intends to develop a conceptual framework for the IT project based companies constructed on the IT KM techniques and PM practices model.

The results of this study would be beneficial to the IT Project Managers to evaluate the usage of KM techniques in IT projects. This research will provide support for the people who are doing PM, in-order to identify most suitable KM technique for the IT projects. Furthermore, results of this study would be beneficial to the Implementation Engineers and Developers in IT industry to get awareness regarding the KM techniques use in PM life cycle. This would expectedly heighten the awareness of the Project Managers and the Project teams regarding the KM gaps in each project space to equip a defense to possible IT project failures.

LITERATURE REVIEW

There are several research were done in KM and PM areas separately and combining both areas. Few of them were review here to prepare good background for the study. Several authors defined KM in different ways. According to the Boondao, (2013) KM is a process to capture, attain, organize, and disseminate employees' knowledge for tacit and explicit knowledge. However, Yeong, and Lim, (2010) defined the KM as the application of knowledge, skills and techniques to execute project effectively and efficiently. Choy (2005) has stated KM is management of organizational knowledge for creating business value and generating a competitive advantage. Furthermore, Boondao (2013) has stated KM is used to ensure get the right knowledge to the right person at the right time. As per the Al-Zayyat, Al-Khaldi, Ibrahem, Tadros, and Al-Balqa (2010) KM facilitates a project team to reduce doing rework and compresses the time that it takes to plan projects.

Effective KM facilitates the creation and integration of knowledge losses and fills knowledge gaps throughout the duration of the project (Brown, 2008). Therefore, KM allows for greater control over the Project: Initiating, Planning, Executing, Monitoring, Controlling and Closing stages by reducing uncertainty. Furthermore, Yeong and Lim (2010) have proposed theoretical framework which emphasize that both KM factors and PM factors could have significant influence on project success. This emphasizes the need for continuous feedback and alignment of knowledge in the project environment.

The effects of KM processes on PM were studied in detail by Al-Zayyat *et al*.,2010. In their study a positivistic approach was adapted using quantitative data. Hundred and fourteen project practitioners including project managers, managers, team leaders, team members, and supervisors were surveyed. Pearson correlation coefficient and multiple regressions were used to investigate the strength of the relationship between application of KM and project

success. Based on the results of the data analysis, they found there is a positive relationship between the use of KM and the improvement in the management of projects. In a case of case of start-up projects in Swedish Incubators done by Karapetyan and Otieno (2011) identify the Challenges of KM in PM. This study has emphasized the KM challenges that are strongly relevant to the incubators. Communication of the lessons learned and open environment for knowledge sharing between team members are the most highlighted KM techniques. Formal documentation and databases were not frequently used in Swedish Incubators. Furthermore, they analyzed the importance of KM practices of peer assist, maintain lessons learned, follow-up meetings (After work review), expert locaters, communication of practice, utilization of large scale databases (intranet and web 2) and documentation.

In a study conducted by Lierni and Ribiere (2008) to find out the relationship between improving the management of projects and use of KM empathized that the KM practices has a positive influence on the improvement of the management of projects. Based on the study the most frequently used KM tools and practices by project managers were identified. Shared repository of project artifacts, Lessons learned, Best practices repositories and Document management systems few of them.

Singh (2012) was investigated the use of KM techniques for Risk Management Application at the Initial stages of a Project. KM techniques for unavailability of information, absence of defined context, and inadequate information flow were identified. Knowledge maps, Benchmarking, Lesson learnt, Knowledge audit, Ineffective linkage systems, Knowledge Audit, Collaborative technologies, Social software, Wikis, Social bookmarking, and blogs were identified as KM techniques used when there is a lack of common framework of references. Meanwhile, Brown (2008) identified basic risks faced in IT projects such as; Lessons aren't learned, Flawed team selection, Changes in the project leadership team, Lack of knowledge of project team roles, Poor knowledge integration, Poor knowledge transfer within projects, Changes in project team, Knowledge maps, Project team changes between phases and Failure to Learn. Furthermore, Brown (2008) suggested seven best practices for project KM as Lessons learned plans, Organizational design/ project teams, Organizational culture, Human capital management practices, Project selection, Risk management, and Knowledge typology management.

Conceptual Framework

Conceptual framework of this study is developed in accordance with the research objectives, literature review the interviews conducted. Status of the project is the dependent variable which gets affected by the many independent variables of KM techniques. The conceptual framework of this study can be summarized as follows (Figure 1).
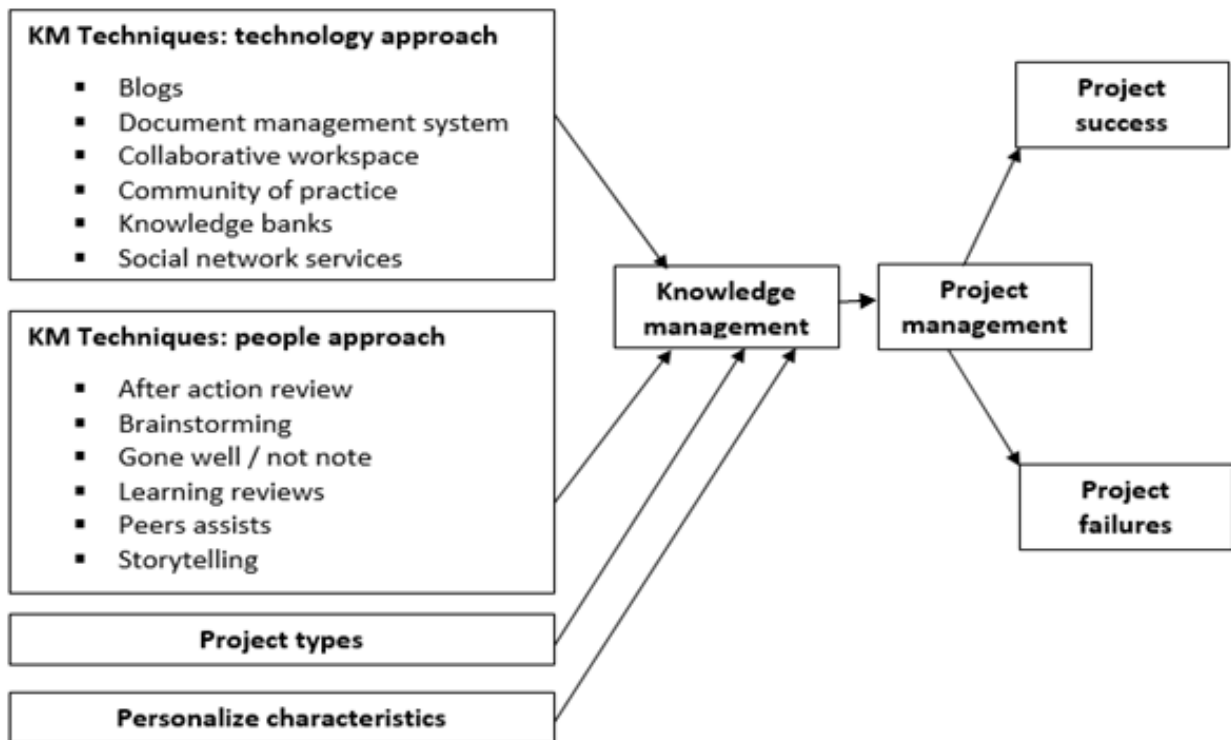

Figure 1: Conceptual framework

According to the literature, the success of the IT Company is highly dependent on how it manages their knowledge within the organization. Hence, KM is within the organization is essential to use within organizations. Organizational knowledge contains the basic domain knowledge and other knowledge sources which come under explicit knowledge. Human experts working in the organization represent the tacit knowledge. PM is more focused on the group or team involved in the project. In-order to create new knowledge within the projects PM is focused on combining and utilize both explicit and tacit knowledge.

To gain long-term sustainability within the competitive IT industry, managing the knowledge collected from the previous failures and successes projects are very important. Project team members frequently need to learn things that are already established in the organization. They need to acquire and adapt to the knowledge that exist within organization. The knowledge

from previous projects is stored in an employee's mind or documents and repositories in the organization. PM is absorbing the organizational knowledge and enclosing that knowledge to project specific KM. KM focused on the ways of organization to manage effectively within the industry and it identifies the way the projects are handled. Any IT projects creates new knowledge and contributes to the learning process of the whole organization, project specific KM increases the overall organizational ability of managing knowledge, as well as projects.

According to the previous research finding there are so many KM techniques and tools which used to manage the knowledge in the project context. These techniques and tools can be used in project environment to create, share, manage and store the knowledge which is created within the project context. This knowledge can be converted to the organizational knowledge and store in the repositories to use in future projects. The effect of the KM techniques and tool can be varied based on the project category and the people or the project team including project manager. Therefore, it is important to identify the relationship between KM and PM, whether the outcome of the project is affected by the types of KM tools used during the project, is there any relationship between KM tools and the project categories as well as the personalized characteristics of the employees.

METHODOLOGY

The research project was conducted in several stages. At the first stage the KM techniques available in literature were studied. And the KM techniques used in the company were investigated. Furthermore, the statuses of the projects under taken by the company were determined. The usages of different type of KM techniques in PM practices in the company were investigated. The data collection tasks involved in the process via face to face interviews, self-administrated questionnaire and document reviews. The main stages and the corresponding tasks of the research can be summarized in Table1.

Table 1: Stages in the research process

Stage	Task
Identify KM techniques used in PM.	Via the literature review.
Identify the KM techniques used in the organization.	Qualitative approach – via interviews.
Identify KM Techniques used by each project (Success / Failure)	Via face-to-face interviews and the structured questionnaires.

The research goes through different layers of the research onion proposed by Saunders, Lewis, and Thornhill, 2009. The research philosophy of this research is positivism and the research approach is deductive. This research used to extensive study of one IT project based company in Sri Lanka in a real life context. Therefore the case study strategy is used as the research strategy. Mixed-methods research is used in the process of the study, data collection and analysis. Both quantitative and qualitative research methods were used. Cross-sectional time horizon is used in the research due to the limited time available to conduct research. In this approach measure the behaviors of many groups or individuals at a single point in time.

Existing IT projects information of the selected IT project based company were taken as the secondary data to know about the KM techniques used in the company. Furthermore, statuses of the past projects were identified through the secondary data. Interviews were the main tool use to collect primary data. Here, semi-structured questionnaires were used to get an idea of the project teams. Data were analyzed descriptively using SPSS version 20 software.

Data Collection and Sampling

There are nearly 150 employees in the selected company including Project Managers, Implementation Engineers, Support Engineers, Quality Assurance Engineers and Development team. They considered as the target population of this study. Sample size was determined based on the sample size table given in the Research Advisors (Krejcie and Morgan. 1970). Using 95% confidence level and 5% margin of error the sample size was determined. The resultant sample size was 108. Then the entire population was divided into five different subgroups (strata) according to the job category. Random samples of individuals were selected from the five strata to get the final sample. Sample size for each strata was determined proportionally. Same person may involve in many projects under different categories and they might use different KM techniques in these different projects.

Table 2: Sample sizes for different strata

Strata (Sub-group)	Population Size	Calculation	Sample Size
Project Managers	10	(108/150)*10	7
Implementation Engineers	40	(108/150)*40	29
Support Engineers	10	(108/150)*10	7
Quality Assurance Engineers	10	(108/150)*10	7
Developers	80	(108/150)*80	58

Data Presentation

Summaries of the data collection are illustrated through the pie charts, stack bar charts and the bar chart etc. generated through Excel and SPSS software. Each and every graph is described in-line with the research objective of the research. Descriptive methods and correlation analysis were used to analyze data.

RESULTS

Based on preliminary investigation conducted about the company through the secondary data and in-depth interviews conducted with the top management it was found that various KM techniques are using to manage different projects. These techniques have an overall impact on the outcome of the status of the project (Success/Failure). The main KM techniques used in the company are Brainstorming, Peer Assist, Learning Reviews, After Action Review, Storytelling, Document Management System, Blogs, Social Network Services, Collaborative Virtual Workspaces, Gone well/not note, Knowledge Bases/Banks, Community of practice (CopS). All the findings were assessed and presented using the statistical software tool SPSS. Primarily the analysis of the individual variables was presented in a statistical way with visual and summary representations. This section shows the distribution of demographics features of the respondents participated for the study.

According to the results found that the most of the respondents in the selected organization are male (85%). Only 15% of the respondents are female. The knowledge about the KM techniques of the respondent in the selected company was investigated. It was found that about 60% of the respondents in the study do not have any qualification related to the KM. However, about 40% of the respondents working in the IT field of this company has some qualification on KM. That is a very positive factor to use KM techniques in IT project based companies.
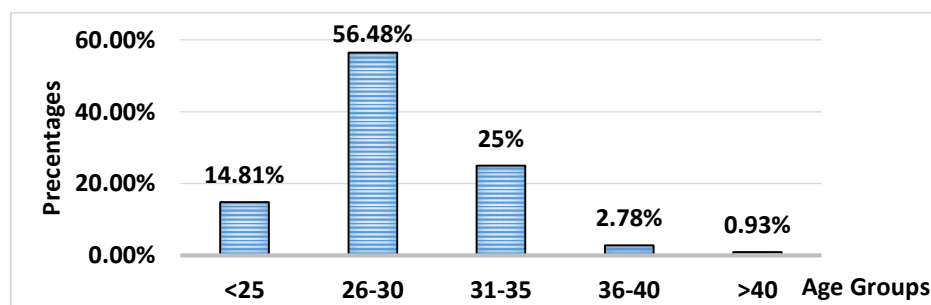

Figure 2: Age distribution

The age distribution of the respondents (Figure 2) in the company shows most of the employees in the IT sector are age between 26 to 35 years old. Majority of respondents are bachelor's degree holders and they are belonging to the age group 26-30.

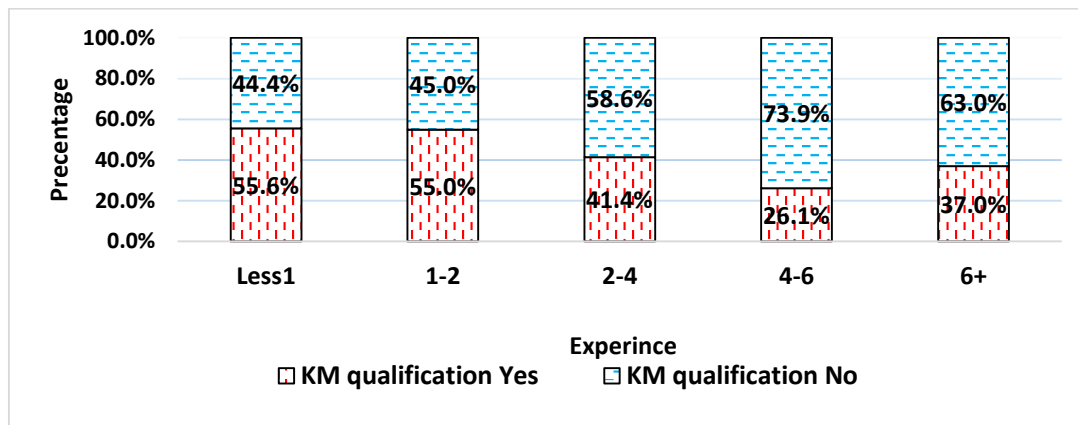The experience of the respondents in the IT industry and the KM qualification was investigated.

Figure 3: KM qualification and the experience

It was found that more than half of the respondent who has less than 2 years' experience has some KM qualifications. It shows some tendency to gain KM techniques among new employees.

It was found that among the projects undertaken by the company 30% projects are related to insurance industry while government, banking, and private company with 20 each. The rest of the projects come under other category. Among the projects undertook by the company more than 90% of the projects were successfully completed. Only about 6% of the projects were failed due to many reasons.

The Table 3 shows percentages successfully completed and fail projects according to the project category.

Table 3: Status of the project with respect to the category of the project

			Project Status		Total
			Fail	Successful	
		Project Category * Project Status Crosstabulation			
Project Category	BankingIndustry	Count	5	44	49
		% within Project	10.2%	89.8%	100.0%
		% within Project Status	14.3%	8.7%	9.1%
	Insurance	Count	0	30	30
		% within Project	0.0%	100.0%	100.0%
		% within Project Status	0.0%	5.9%	5.6%
	GovernmentDepartments	Count	6	41	47
		% within Project	12.8%	87.2%	100.0%
		% within Project Status	17.1%	8.1%	8.7%
	Privatecompanies	Count	10	316	326
		% within Project	3.1%	96.9%	100.0%
		% within Project Status	28.6%	62.6%	60.4%
	Other	Count	14	74	88
		% within Project	15.9%	84.1%	100.0%
		% within Project Status	40.0%	14.7%	16.3%
Total		Count	35	505	540
		% within Project	6.5%	93.5%	100.0%
		% within Project Status	100.0%	100.0%	100.0%

As presented in the Table 3, all the projects in the insurance industry were successfully completed and no project had failed. Within the each industry success rate is higher than the failure rates of the projects. Within the failed projects of the all industries "other" projects represented the highest percentage (40%) of failed projects. Private companies show the second highest failure project percentage (28.6%). Banking industry is representing the second lowest number of failed project percentage (14.3%). Within the succeeded project status private companies represented the highest percentage. Then private companies show highest success rate (62.6%). Banking industry is representing the lowest percentage of succeeded project (5.9%). Since the same person may involve in many projects at the different time the total is not equals to the sample size.

Furthermore, the overall usages of the different type of KM techniques according to the project status were compared as illustrated in below (Table 4 -Table 9).

Table 4: Usage of After Action Review (AAR) according to the project status

KM1-After Action Review						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	34.3%	20.0%	22.9%	14.3%	8.6%	100.0%
Successful	4.6%	14.7%	35.6%	33.3%	11.9%	100.0%

In the failed projects, more than half of the respondents think AAR is very less or less important. Only about 23% of the respondent thinks AAR is important or very important. In the successful projects about 45% of the respondents think an AAR technique is important or very important. While only about 20% of them think it is very less or less important. According to table it is clear that successful projects assume AAR is important tool while failure project does not.

Table 5: Usage of Blogs according to the project status

Project Status * KM2-Blog Crosstabulation						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	57.1%	11.4%	17.1%	8.6%	5.7%	100.0%
Successful	21.4%	24.0%	31.1%	19.0%	4.6%	100.0%

Table 6: Usage of Brainstorming according to the project status

Project Status * KM3-Brainstorming Crosstabulation						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	31.4%	25.7%	22.9%	14.3%	5.7%	100.0%
Successful	6.1%	18.0%	39.0%	25.3%	11.5%	100.0%

Table 7: Usage of Collaborative Virtual Workspaces (CVW) according to the project status

Project Status * KM4-Collaborative Virtual Workspaces						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	40.0%	17.1%	20.0%	11.4%	11.4%	100.0%
Successful	9.9%	17.0%	39.0%	25.7%	8.3%	100.0%

Table 8: Usage of Community of Practice (CopS)

according to the project status

Project Status * KM5-Community of practice (CopS) Crosstabulation						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	40.0%	22.9%	17.1%	14.3%	5.7%	100.0%
Successful	10.1%	22.8%	36.4%	24.4%	6.3%	100.0%

Table 9: Usage of Gone Well/not (GN) according to the project status

Project Status * KM7-Gone well/not note(GN) Crosstabulation						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	45.7%	34.3%	8.6%	11.4%	0.0%	100.0%
Successfu	12.7%	18.8%	42.8%	20.0%	5.7%	100.0%

Table 4 to Table 9 clearly shows that the most of the failure projects do not consider the respective KM technique as an important tool. Most of the successful projects considered the above KM technique as a moderately important or somewhat important too. That means most of the successful projects were used After Action Review, Blogs, Brainstorming, Collaborative Virtual Workspaces, Community of Practice and Gone Well/not are important KM techniques. Same patterns in the results were found in the KM techniques of Knowledge Banks, Learning Reviews, Peer Assist, Social Network Services and Story Telling.

Table 10: Usage of Document Management Systems (DMS)

according to the project status

Project Status * KM6-Document Management System (DMS)						
Status	Very Less Important	Less Important	Moderate	Important	Very Important	Total
Fail	0.0%	17.1%	28.6%	40.0%	14.3%	100.0%
Successfu	4.8%	13.5%	31.9%	35.0%	14.9%	100.0%

The interesting finding is that the Document Management Systems is considered as same level of importance in both successful and failure projects.

The usages of the different type of KM techniques in different type of project category were identified. Moreover, the usages of the different type of KM techniques according to the project status in different project categories were compared.
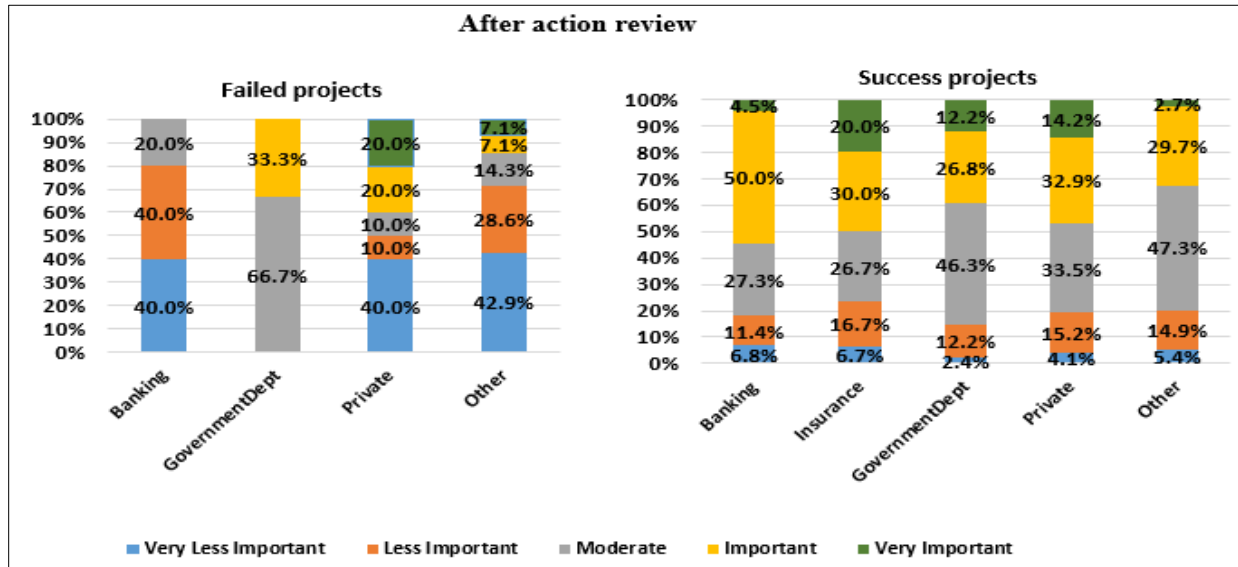

Figure 4: The AAR impact to the project status

The Figure 4 illustrates the AAR technique usage in the projects. the in the failed projects of the banking industry, more than 75% of the respondents think AAR is very less or less important. In the failed projects of the government industry, one third of the respondents think AAR is an important technique. In the failed projects of the private companies, half of the respondents think AAR is very less or less important. While only about 40% of them think, it is an important or very important. In other failed projects, about 60% of the respondents think AAR is very less or less important. While only about 14% of them think it is an important or very important. No project related to insurance industry is failed. In the successful projects of the banking industry, about 18% of the respondents think AAR is very less or less important. While more than 50% of the respondent thinks AAR is important or very important. In the successful projects of the insurance industry more than 20% of the respondents think that AAR is very less or less important. While half of the respondents think AAR is very important or important. In the successful projects of the government industry, about 15% of the respondents think AAR is an important technique. While about 40% of the respondents think it is very important or important. In the successful projects of the private companies, about 20% of the respondents think AAR is very less or less important. While about 68% of them think it is an important or very important.

In other successful projects, about 20% of the respondents think AAR is very less or less important while about 32% of them think it is an important or very important. All the other KM techniques were evaluated as described in the above. The analyzed result stated that after action review, gone well note, learning review have used in all project categories. Moreover, blog, knowledge bases, storytelling and social networks are found to be effect on successfulness of government and private projects. Moreover, the correlations between different types of KM techniques were evaluated using Spearman correlation coefficients. The results show that all the KM techniques were correlated to each other, at the 5% level of significance.

CONCLUSION AND DISCUSSION

This paper has presented some empirical findings on various aspects of usage KM techniques in PM environment in IT based companies in Sri Lanka. The result of this statistical analysis has shown the usage of the KM techniques, personalized characteristics and the project categories to the projects' status. Moreover, this research analysis has been studied the compliance of PM success is related to the KM techniques such as Storytelling, After Action Review, Knowledge banks, Blog, Brainstorming. Usage of the KM techniques for the different project categories also derived based on the collected data. For the banking industry AAR, GN and LR techniques, on the government projects all 12 techniques, in private companies AAR, Blog, GN, KB, LR, SNS and ST and in other projects AAR, Blog, BS, CVWS, CoPs, GN, KB, LR, PA, SNS and ST techniques shows which is there is a difference between improvements of PM in IT with respective to the category of the project. Failure to practice effective KM techniques means that many organizations are unable to appraise projects and lessons learned from them. The past errors which have done in previous projects are likely to be repeated. Enhancing KM techniques in project context can help to reduce project time lines, reduce costs, improve quality and customer satisfactions, reduce errors, produce better decisions, increase performance and develop profitability. This will help to reduce the failure rate of the projects due to lack of KM techniques issues in the projects in IT industry. It is important for any IT project based organizations to strive for continuous improvement and implementing proper KM techniques as an integral step. It is greatly recommended to the management of software project based organizations to use necessary KM techniques in projects to prevent or reduce the knowledge

gaps among members of the project team. This will enable project managers to maintain strong team commitment throughout the project or product development lifecycle towards a successful delivery of the project by achieving project and project management obligations.

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