

Investigation of Risk Management Status in IT projects, KPK, Peshawar

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Abstract - The objective of this study is to explore the identification, understanding and application of risk management in information technology (IT) projects in, Peshawar, Pakistan. IT sector holds prominent place economically throughout the globe. However, high failure rate is associated with IT projects, and factors pertaining to risk management is one of the main causes of this failure. Risk management processes and procedures are considered a newly emerging field in Pakistan, so there is need to explore and tackle the status of risk management in IT sector. The adopted methodology of research is quantitative in nature, in the form of survey as research strategy. Primary data is collected by means of questionnaire as a data collection tool. The target population is 40 IT companies of Peshawar registered with Khyber Pakhtunkhwa IT Board and the entire population of IT firms are taken as a sample size. The research results highlight the importance of knowledge base in risk management as well as its role in risk mitigation; however, the availability of databases and tools and techniques for managing knowledge of risk management are found not up to the significant mark. There is a need to develop databases and tools for managing information about risk. A similar study with longitudinal design should be conducted on a considerably bigger sample size through various sectors including IT, Health, mining, and others which allow a more detailed analysis to tackle the whole scenario of the risk management status.

Keywords: Risk management; IT projects; knowledge management; stakeholder management.

1. INTRODUCTION

Project Management Institute (PMI) considers the project as a temporary endeavor, unique, aligned with the organization's policy and generates a new product that has never been generated before (PMI, 2013). Due to this unknown and unique nature of the project, it generally entails risk because the steps to attain the projected objectives are not

wholly known to the people of project environment. The environment changes so rapidly and continuously that new risks might be introduced (Kwak, & Stoddard, 2004).

Hence every project faces troubles and failures throughout the project life but specifically IT project failure rate is recorded more than other projects in literature and risk is considered one of the most influential actors behind this failure [2]. One of the most important considerations is the critical role played by risk management in IT project success and this view is confirmed by various scholars such as Chua [3], Kutsch and Hall [4], and others. Generally, it can be argued that officially risk management within IT projects is now extensively acknowledged and is considered as one of the main contributors in project success.

In risk management, Knowledge Management (KM) is the most critical element i.e. by gathering and processing appropriate information and summarize knowledge from various internal and external sources. Therefore, a well-established, integrated, and organized knowledge management and risk management framework provides the base to decision-making process in IT projects. Several authors and scholars such as Fenton & Neil [5], Neef and Cooper [6] have affirmed that risks occur during IT projects and describe that how knowledge management strengthens the execution of risk management.

Considering the status of Pakistan, it was investigated that very little work has been done on the aspect of risk management. This may be because project management especially risk management is relatively new phenomenon to Pakistan industry. With such limited evidence on application of best practices of risk management in IT projects, it is essential to investigate the risk management status in IT projects especially in Pakistan as there is significant research gap in this area.

Nomenclature

IT - Information technology

PMI - Project Management Institute
 KM - Knowledge Management
 HR - Human resource
 GDP - Gross Domestic Product
 PMBOK - Project Management Body of Knowledge (PMBOK)
 KPITB - Khyber Pakhtunkhwa IT Board

2. CONTRIBUTION / SIGNIFICANCE OF THE STUDY

Although well-established literature is present on the perception of project risk management, the applicability of risk management is still in doubts as several scholars questioned the practicality of risk management in IT projects. This paper addresses this question arise by several scholars on the status of risk management in IT projects. This research also offers productive explanation for recognizing, understanding and applying risk management tools and techniques in an organization to reduce the project failures. The study findings explore the importance of knowledge bases and persuade project administrators to build up knowledge bases for risk management in IT projects, which ultimately enhance probability of IT project success.

As risk management processes and procedures are still in the very growing stage in Pakistan (Haneef et al, 2012) there is a significant research gap in this area as very little work has been done on the aspect of risk management in this field especially in the IT sector. The worlds ranking of Pakistan IT industry is continuously declining and risk management is one of the main causes of IT projects failure throughout the world. So, this study provides assessment to the industrial sector in recognizing the importance of risk management, knowledge management and highlights its impacts on project success and failure.

3. LITERATURE REVIEW

3.1 Project and Project Management

Different resources such as materials, financial and human resources (HR) are required in a project to perform definite work taking into consideration an array of constraints specifically time, scope and budget. Therefore, it is essential for the successful delivery of the project objectives on time and within budget to manage its different aspects efficiently, and hence setting the clear objectives for the projects is considered as a baseline for the project success.

Majority of authors have related project management to prehistoric times but the roots of its emergence as a social practice linked with post-World War II (Hodgson & Cicmil, 2006). Although the project management is considered a nascent field in Management sciences, but its categorization

could be done as Pre-Modern, Modern, Post Modern, and Hyper Modern conception of Project Management. But project management mainly raised in the modern period (Gauthier& Ika, 2012).

3.2 Success/Failure of IT Projects

The importance of IT acknowledged globally as it plays a key role in elevating the economic development and IT project's success is pivotal to the organizations. IT project implementation is increasingly used for strategic reasons to enhance productivity, effectiveness and control in organization.

However, higher failure rate is associated with IT projects with respect to other projects (Matta & Ashkenas, 2003), either in a sense of incurring extra costs or run behind schedule. According to The Standish group Chaos Report, published on the IT projects failure and success ratio almost every year since 1994, 71 % of projects in 2015 were failed or considered challenging while 29 % IT projects delivered the proposed benefits. The yearly summary of the 2016 report is given in table 1.

Table 1: Report of IT Project Failure

Year	2011	2012	2013	2014	2015
Success (%)	29	27	31	28	29
Challenging (%)	49	56	50	55	52
Failure (%)	22	17	19	17	19

Note: Reprinted from “Standish Group Chaos Report of IT Project Failure”, (2016).

3.3 IT projects status and scope in developing countries, particularly Pakistan

Due to rapid growth and innovation in the technology in various sectors, the developing countries lag in adopting the technological advancement as compared to the developed countries. This is considered as one of the main barriers in developing countries related to technological aspect of the different projects. Generally project management is considered to be comparatively an emerging field of social sciences, thus, the tools and techniques of project management are mostly unknown to the developing countries and they have no command on these tools compared to other branches of management and social sciences.

However, some developing countries such as India, Philippines, Vietnam, Bulgaria, and Mexico have experienced the significant potential of the IT industry where IT industry play a key role economic development; by the means of providing job opportunities and income generation.

Considering India, for instance, the contribution of IT sector to India's Gross Domestic Product (GDP) has been increased from 1.2% in 1998 to 7.7% in 2017 and exported more than US\$ 180 billion worth of software and IT services in 2019 (NASSCOM, 2017, 2019).

IT is considered as one of the fast growing and rising industry in Pakistan bearing significant potential to provide a major boost to our economic development in next decade. As per Pakistan Software Export Board, global IT industry has total worth of \$303.8 billion in which Pakistan's contribution is only 0.9 percent. The statistics of Economic Survey of Pakistan held for the financial year 2016-17 estimates Pakistan's IT crossed \$2.8 billion annually at the present time.

But unluckily, till now IT industry do not achieve the desired industry status which has been given to textile, construction and other industries, and this is the main barrier to its development. World Economic Forum's ranked Pakistan at number 111th among 144 countries in 2014 while at 110th in 2016 (Global IT Report 2016). Thus, the ranking of Pakistan in IT showed negligible improvement. Hence, there is need to take serious steps to enhance the development and growth of IT industry.

3.4 Risk Management and its sub-processes

All projects are coupled with risk and there is no such situation in the project that has zero-risk. Thus, risk should be managed efficiently as it can impact company ability to achieve its project goals and objective. Risk management is

considered as a complete package consisting of appropriate risk management atmosphere, potential risks identification, a well-organized risk measurement, risk mitigation, monitoring, and setting up an appropriate interior control understanding (Debono, 2016).

Various writers and management institutes have divided risk management into different sub-process. Chapter eleven of Project Management Body of Knowledge (PMBOK) deals with Risk Management processes which is further divided into six sub-processes namely: "Risk Management Planning, Risk Identification, Qualitative Risk Analysis, Quantitative Risk Analysis, Risk Response Planning, Risk Monitoring and Control" (PMI, 2013). But it is quite notable that risk management processes mentioned below in Figure (1), are widely acceptable in the view of approximately all scholars.

Risk identification is the first stair of the risk management process. It is meant to identify potential risks, which could impact the project mostly in negative manner. However, risk identification poses significant challenges to project managers in the implementation of IT projects.

Risk assessment is the second sub-process of risk management in which identified risks are evaluated and ranked. Large numbers of models have been offered in the literature for risk assessment. Though, the application of these models and analysis techniques in the IT projects is rarely recorded. This is one of the research gaps that encouraged this research to sort out the status of the risk management in IT sector.

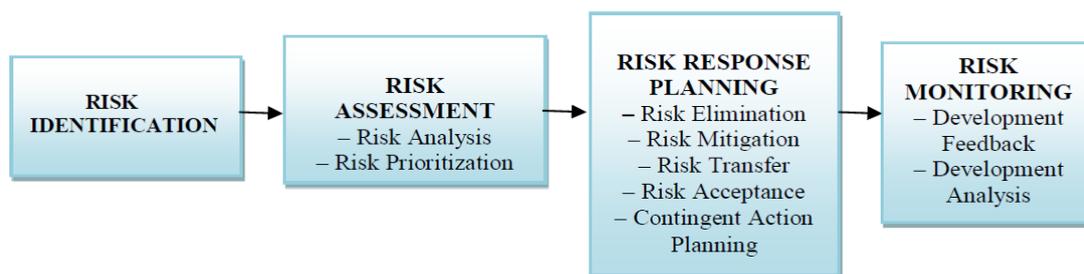


Figure 1: Risk management process. Adapted from "Information technology project risk management: bridging the gap between research and practice" by Taylor et al., 2008, Journal of Information Technology

Risk response planning, the third sub-process, constitutes not only of evaluating the potential impacts of the risks but also assessing and removing the negative impacts, and capitalizing on the positive impacts. However, IT project personnel usually failed to bring the output of risk identification into consequential risk analysis, and response planning linked with uncertainty.

According to PMI (2013) risk monitoring and control refers to the implementation of risk response plans, tracking identified risks, discovering future risks, and evaluating risk process efficiency throughout the project life. Literature suggests that the possibility of following all risk management process by IT project managers has not been met to desired level. As empirical confirmations reveal that in IT project preference were only given to some limited factors while leaving other factors in dark (Moynihan, 2002).

3.4.1 Risk Management status in Pakistan

As it is mentioned earlier that project management is a recent phenomenon to the developing countries, hence risk management has rarely been researched as a subject in Pakistan. Although some work has been done on this aspect especially in the construction industry but IT industry got very little attention. However, Ali and Naseem (2016) have identified some of the potential risk factors faced by the Pakistani IT industry. Further, research conducted Masood and Choudhry (2010) on construction projects, however it only encompasses the identification of risk aspect related to contractor perception. Hence risk management has rarely been searched in Pakistan especially related to IT projects and there is a significant research gap in this aspect. So, there is a need to explore risk management phenomenon related to IT projects.

3.5 Relationship between Risk Management and its application in IT Projects

IT projects management is full of risks and uncertainties and different sources of the environment are responsible for their creation. Thus, for successful implementation of IT projects, it is the basic need to completely understand these possible risks and then create well organized strategic policies to tackle them efficiently (Alhawari et al., 2012). As stated earlier that most of IT projects face failure all over the world and absence of proper risk management is one the main cause of this failure.

According to Chua (2009) IT projects failure is due to its exposure to intense risk. Thus, risk management plays a key role in the timely delivery of any project. It is compulsory for the project success to tackle potentials risk prior to their occurrence. Kutsch and Hall (2009) agreed to the above statements and stated that the main contributor to IT project failure and success is projects risk management.

Since IT sector is more prone to project failure than other sectors, it is a wealthy field of learning and research. A survey was held on more than thousand Canadian projects which revealed that the major cause behind IT project failure was lack of strong project plan and inappropriate risk management (Chua, 2009).

Literature questioned the practicality of project risk knowledge and the effective risk management application in IT projects. Most of the academics on project management agree recognize risk management as the basic contributor to the project success particularly in IT projects. But at the same time Sharma and Gupta (2011) questioned the application of risk management process in IT that there are rare evidences

that IT project managers practically implement risk management.

3.6 Relationship between Risk management and knowledge management (KM)

“The concept of knowledge is far from new and phrases containing the word knowledge such as knowledge bases and knowledge engineering have been around for a while” (Cooper, 2003, p. 123). The KM phenomenon emerged in the mid of 1980’s in order to transfer deluge of information into knowledge (Lawton, 2001). But its commercial use started in the 1990’s where KM was transformed into computer technology for commercial use. The statistical figures of Lawton (2001) suggest that 80 percent of the largest global corporations now have KM projects.

The isolation of KM from risk management in functional departments like HR or IT results in loss of its benefits. As stated by Neef (2005) that without efficient management of knowledge it is impossible to handle project risk effectively. This was further supported by Cooper (2003) by ranking knowledge as the most influential mean of risk management. Global economy is facing increasing instability and continuous ecological changes might bring in new risks thus there is a need of comprehensive knowledge to cope with these newly introduced risks.

Risk management and knowledge are interlinked with each other as an efficient risk management is mainly dependent on efficient KM, which requires untie, clear and continuing communication inside the project team (Neef,2005). Though, significance of KM processes in the application of risk management processes has been very rarely researched and it is a novel and momentous area to explore. Thus, the existence of knowledge bases especially in IT sector projects is worthy of consideration and there is need to sort out the implementation of KM in risk management.

3.7 Relationship between Risk management and project clients

According PMI (2013) a stakeholder is defined as “an individual, group, or organization who may affect, be affected by, or make itself out to be affected by a project decision, activity, or outcome”. In today’s management field stakeholder’s role as key actors in organizational dynamics is extensively accepted and documented (Al-Shibly et al., 2013) as the stakeholders have become more aware about the project outcomes. Nowadays the word stakeholders’ satisfaction is used in management field as synonymous to successful project delivery. As Mia and Ramage, (2011) argues that a successful project is the one which satisfy its stakeholders, if not, then costs and time becomes immaterial.

Numerous scholars are agreed to the significant linkage of risk management to stakeholder management and this relationship became more signified when organization considered stakeholders as a main source of risk as Zhang (2017) argues that successful risk management necessitates handy performance of the stakeholders.

It has been noted that stakeholders usually considered only the negative aspect of risks while the positive risks are often overlooked (Hartono et al., 2014). Thus, understanding of risk management by project clients are essential, and efficiently impact the project outcomes. So, here there is a need to test the knowledge status of project clients and their understanding about risk management.

4. RESEARCH AIM AND OBJECTIVES

The aim of this study is to investigate the identification, application and understanding of risk management in IT projects in Pakistan.

Research Objectives with corresponding hypothesis (H) and contribution:

To meet the above aim of the research study following research objectives are to be addressed:

- To determine recognition of risk management as a knowledge base among IT project experts.
- H1: Risk management is being recognized amongst IT project professionals as a knowledge base in IT sector Peshawar, KPK, Pakistan.
- To determine the application of risk management in current IT projects.
- H2: Risk management is practiced/ applied in existing IT projects in IT sector Peshawar, KPK, Pakistan.
- To determine the understanding of risk management by IT project clients.
- H3: Risk management is being understood by IT project clients in IT sector Peshawar, KPK, Pakistan.

5. DATA AND METHODOLOGY

The methodology here refers to research design, approach, strategy, data collection methods and the tools and techniques of data analysis. Since this study begins with the specific and then moves to the generalization, deductive approach was followed in this research which significantly explained the relationship between the theory and the research.

The association of survey strategy is mostly linked with the deductive approach and is the most popular and most common strategy in management and business research (Saunders, Lewis & Thornhill, 2009). Survey also provides a quantitative or numeric explanation of trends, thoughts, or

attitudes of a population by investigating a sample of selected population by quantitative analysis using descriptive and inferential statistics, and provides generalization about study population (Creswell, 2014). That is why survey is commonly used in quantitative research and in this research.

As academic studies are time constrained, academic research are mostly cross-sectional in nature (Saunders et al., 2009). Accordingly, this study was also cross-sectional in nature due to time concern. In this study primary data source and data was collected by mean of questionnaire. Primary data enabled collection of data that is more specific and more relevant to the research objectives.

The decision of selecting sample size for the research depends on various concerns and there are no distinct answers, however it is typically concerned with the time, cost and respondent response. The targeted population was 40 IT companies of Peshawar registered with Khyber Pakhtunkhwa IT Board (KPITB). For populations of fewer than 50 it is generally more rational to collect data from the whole population where you are taking into consideration probability sampling (Saunders et al., 2009). Therefore, the entire population of IT firms was selected for data collection.

Table 2: Reliability result of three sections

Aspect	No of constructs	Cronbach's α
Risk management as a knowledge base	10	0.694
Risk management in current IT projects	11	0.862
Risk management and project clients	9	0.687

5.1 Population Characteristics

The research population is IT project team members, includes 40 companies of Peshawar registered with KPITB and KPITB employees. A hundred and fifty questionnaires were distributed among the IT firms' employees out of which one hundred and six were returned in which 5 were not usable for analysis. Thus, one hundred one questionnaires were selected for data analysis. So, the overall response was 70.66 %. Hence response rate of questionnaire is generally low as mentioned by Leedy and Ormrod (2010) and Saunders and Lewis (2012).

Project managers/ Specialists, Business analysts and others (software engineers, software developers, web developers, sale engineers etc.) comprise the largest portion of the respondents i.e. 21.8% (n=22), 19.8 (20) and 28.7 % (n=29) respectively.

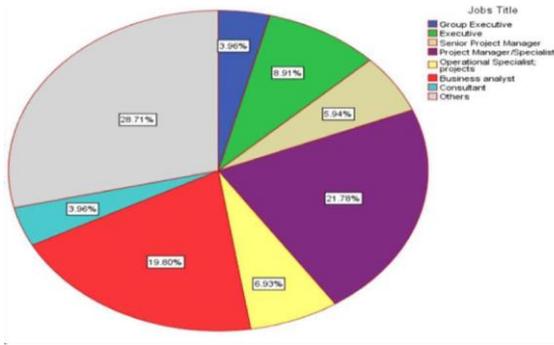


Figure 2: Number of participants in each group

In terms of gender 90 respondents (89.1 %) were male and 11 (11.9 %) were female. According to Bunton and Brewer (2012) IT projects are dominated by male, same is the case here as the female respondents' comprise only 11.9 % portion of the selected population. Regarding experience in project management in IT projects 69 respondents have 1-5 year experience, 29 have 6-10 year experience while only 3 respondents have experience greater than 10 years. In terms of experience in the field of risk management 94 responders have 1-5 years, 7 respondents have 6-10 years' experience.

5.2 Descriptive and Normality test statistics

Composite variables were used to explain the data. One of the advantages of composite variable is that they aggregate data group to measure a multidimensional concept. The creation of composite variables were based on multiple data

items of questionnaire by using Statistical Package for the Social Sciences (SPSS) and named as “risk management as a knowledge base”, “status of risk management in IT projects”, “risk management in current IT projects” and “risk management and project clients”. Except the status of risk management in IT projects all other composite variables were created by incorporating the average mean of all related aspects while the “status of risk management in IT projects” is calculated by summing the scores to achieve the totality for the status of risk management in IT projects because the section comprising only the yes and no questions. A value of 1 denotes to a yes whereas a value of 0 to no. Furthermore, composite variable is also used to find out whether social demographic factors such as experience might cause any differences while ranking the answers or not.

To find out the normal distribution of data of various composite variables, the Shapiro-Wilk test was applied, and the p-values obtained were 0.029, 0.022, 0.012 and 0.001 significantly less than 0.05, respectively. All these p-values show that data is not normally distributed. Log transformation was applied to transform the non-normal data to normal. The p values obtained for composite variables again after transformations were 0.000, 0.040, 0.000 and 0.000, respectively. The p value obtained were significantly less than 0.05. Hence the assumption of parametric tests was violated again and thus, nonparametric tests were applied for data analysis. The results of descriptive statistics and test of normality can be accessed in the table below.

Table 3: Descriptive statistics and Test of Normality

Summary Statistics	Risk Management as a Knowledge Base	Risk Management in current IT Projects	Status of risk management in IT projects	Risk Management and Project Clients
Mean	3.8812	3.6598	10.8911	3.8361
Std. Error of Mean	.04494	.06566	.32271	.04938
Median	3.9000	3.6364	11.0000	3.8889
Mode	3.70	4.36	13.00	4.00
Std. Deviation	.45160	.65991	3.24315	.49631
Variance	.204	.435	10.518	.246
Range	2.40	2.91	15.00	2.89
Minimum	2.30	2.09	2.00	2.11
Maximum	4.70	5.00	17.00	5.00
P-value before data transformation (Shapiro-Wilk)	0.029	0.022	0.012	0.01
P-value after data transformation (Shapiro-Wilk)	0.000	0.040	0.000	0.000

Kruskal-Wallis test was applied to find out if distribution of risk management features is same across categories of experience in Project management in IT projects as well as experience in risk management in IT projects. The identical possibility of distribution of null hypothesis of the population was retained if the p-value found to be greater than 0.05, else rejected. The p-values of all composite variables were found

to be significantly greater than 0.05 indicating that the ranking of constructs, experience in IT projects do not have signified influence expect “status of risk management in IT projects” where p-value is less than 0.05.

These results contrasted with the various research scholars such as Javani and Rwelamila (2016) who found that

the ranking of variables is greatly influenced by experience in project management and risk management. The reason behind these contrary results may be because project management and risk management are relatively new to this context and all the project personnel have <10 years experience in the risk management.

5.3 Hypothesis Testing

Three hypotheses have been proposed to capture the recognition of risk management as knowledge base, application of risk management in current IT projects and

understanding of risk management by IT project clients in IT industry. Hypothesis testing were done by applying the one-sample Wilcoxon Signed Rank Test. The respondents rank the constructs from 1-5, starting from strongly disagree having value 1 to strongly agree having value of 5. Thus, a score of 3.5 and above would be a sign of harmony to the characteristic and the score of 3.45 and below would indicate the non-agreement of the respondents on the given aspect. The cut off score of the scale was postulated 3.45 based on the mathematical rounding.

Table 4: One sample Wilcoxon Signed Rank Test Results

Null Hypothesis	Test	Sig.	Decision
The median of Risk Management as a Knowledge base equals 3.450.	“One-Sample Wilcoxon Signed Rank Test”	0.000	Not Accepted.
The median of Risk Management in Current IT Projects is the same across the categories 3.450.	“One-Sample Wilcoxon Signed Rank Test”	0.001	Not Accepted.

To fulfill the first objective of the research that is to determine recognition of risk management as a knowledge base amongst IT project professionals. Following research hypothesis was addressed:

H1: Risk management is being recognized amongst IT project professionals as a knowledge base in IT sector Peshawar, KPK, Pakistan.

To determine the recognition of risk management as a knowledge base, the results were analyzed on the individual aspect and then based on composite variables. According to data 91 % of the responders were agreed that knowledge base is important in handling risk management in IT projects. Risk management as knowledge base assists in risk mitigation in the view of 89 % of the respondents. 50 % of the respondents agreed that their organization has data bases containing information on risk management while 49 % highlighted the availability of knowledge of risk management within their organization. These knowledge bases got the core concern in handling IT projects as 50 % of the respondents were not in agreement of the availability of data bases. Overall, the respondents were strongly agreed on the significance of risk management as knowledge base and knowledge’s sharing and the impact of these aspects on IT project success. These outcomes are in line with Karadsheh et al., (2008) that organizations need inclusive knowledge to cope with the risks set up by these unsteady surroundings. Furthermore Cooper (2003) argues that managing IT project risks, knowledge is considered as the most influential tool. These results also strengthen the findings of Chua (2009) who argues that risk management is the fundamental aspect to get the desired outcomes and delivery of IT projects.

Overall, the sample mean was 3.88 is nearly 4 indicates that the responders are agreed with risk management recognition as a knowledge base. And p-value of composite variable “risk management as knowledge base” was less than 0.05, results in failing to retain the null hypothesis, hence indicates that the observed median is significantly different from 3.45. Thus, the stated hypothesis was acknowledged.

To determine the application of risk management in current IT projects, following research hypothesis was formulated:

H2: Risk management is practiced/applied in existing IT projects in IT sector Peshawar, KPK, Pakistan.

Results associated with the application of risk management in IT projects implied that 47 % of responders were agreed to practice risk management on each IT project within their organization. Thus, results indicated that half of the responders were not in concurrence on the practice of risk management on each IT project and throughout the IT project life. These results were in line with Sharma and Gupta (2011), who questioned the application of risk management process in IT that there is rare evidence that IT project managers practically apply the process to handle risks. Results indicated that approximately half of the respondents were not agreed that risk management processes are completely implemented on each IT project. These results strengthen the claim of Taylor et al., (2008), who argues that IT project managers failed to bring the output of risk identification into consequential risk analysis and response planning and risk assessment, hence not following systematic approach. Overall maximum of the respondents accepted the role of risk management in project success. These results were also in line

to the claims of various scholars such as Alhawari et al., (2012), Chua (2009), Koopman (2010) and others that risk management is one of the main contributors to project success.

However, the sample mean recorded was 3.65 which was very close to 4, indicating the agreement of the respondents to the application of aspects of risk management in current IT projects. Also 7 aspects have p-value <0.05 , result in rejecting the null hypothesis, representing that hypothesized median was considerably diverse from 3.45. Furthermore, the composite variable "risk management in current IT projects" has p-value (0.01) <0.05 , indicating that hypothesized median is considerably greater than 3.45. Thus, from the above results it could be concluded that majority of the respondents were agreed with most of the constructs on the application of risk management in current IT projects.

To determine the understanding of risk management by IT project clients, the following research hypothesis was originated in association with the objective:

H3: Risk management is being understood by IT project clients in IT sector Peshawar, KPK, Pakistan.

According to the outcomes 66 % responders were agreed to the awareness of project clients regarding risk inheritance in IT projects and approximately same number of respondents agreed on the involvement of project clients in risk management strategies and continuous communication on risk management. These results elucidate the client's awareness regarding risk inherent as also stated by Al-Shibly et al., (2013) stakeholders became more aware about the project outcomes. However, on the contrary, Dey et al., (2007) denied the participation of stakeholders, stating that in the risk management process only top management and end user's involvement is essential. Further in the view of 70 % respondents, communication promotes trust between project clients and IT project managers while 77 % respondents highlighted that continuous communication enables the understanding of project contents. These results were aligned with work done by Javani and Rwelamila (2016), who stipulate that for any successful project effective communication and collaboration between all stakeholders is very crucial and also regular communication contribute to build up trust amongst various project parties. A sample mean of 3.83 was observed which indicates that overall IT project clients understand risk management in the organizations.

Collectively the composite variable "risk management and project clients" had an observed median of 3.88 and p-value=0.000 results in rejecting the null hypothesis, signifies that IT project clients generally understand risk management. Thus, results provide sufficient evidence to accept the above hypothesis.

6. CONCLUSION, RECOMMENDATIONS AND WAY FORWARD

6.1 Results Conclusion

- The overall survey results highlighted that the risk management as a knowledge base is very essential and contributing significantly to risk mitigation as a significant number of respondents agreed to this aspect. This was one of the principal observations and mapping with the previous findings of various research projects recorded in literature. However, the availability of databases containing information on risk management and tools for managing knowledge of risk management was not up to the significant mark. Furthermore, the results explored the importance of knowledge sharing in risk management which further contributes to risk identification and speeds up the association of IT project clients and project team. However, its practicality was not up to the satisfied mark.
- The study highlighted the overall application of risk management held in IT sector. The responders agreed with most of the constructs and to the role of risk management in IT threats reduction and IT project success. However, the results demonstrate that organizations did not practice risk management on every IT project and do not commence complete risk assessment on every IT project. It was also realized during the study that there is lack of applying systematic approach to handle the risk management in the organizations.
- The study results investigated the full awareness of project clients regarding risk inheritance in IT projects and their involvement in risk management strategies are not up to satisfied level. Also, there is minimal evidence of continuous communication between IT project managers and projects clients. However, the importance of projects clients' involvement in risk management as well as its impact on project outcomes was recognized. Overall results indicate that IT project clients understand risk management.

6.2 Recommendations

- There is a need to develop catalog and databases for managing information about risk. These will aid in communicating project risk during project implementation, thus help in reducing IT project threats and increasing probability of project success.
- Further it is recommended that information should be shared throughout the IT project life. The information on risk would be shared between project executive, project

team and project clients. This sharing of information brings risk awareness among all the stakeholders.

- Formal systematic approach should follow while implementing the risk management as it is recommended as one of the best approaches to tackle risks and contributing to project success.
- Continuous communication between project managers and project clients is of worth consideration as this will assess in building trust between them, reducing the conflicts and hence minimizing the IT risks. Project executive should ensure continuous communication between various stakeholders of the projects.

6.3 Future Research

- As literature demonstrated the nominal confirmation of risk management application within IT projects. That is why it is essential to find out the application of risk management in various other industrial sectors such as engineering, health and construction etc.
- Future research may also examine in different countries throughout the world to make a comparative study, between Pakistan and other regions of the world.
- The effectiveness of risk management application in IT along with other industries such health, engineering and construction projects can be investigated. This would help in tackling the ground reasons of project manager failure in applying risk management practically.

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