THE EFFECT OF KNOWLEDGE QUALITY TRIBUTE ON RISK MANAGEMENT EFFECTIVENESS IN THAI PUBLIC SECTOR CONTEXT

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ABSTRACT

Thai public sector organizations have been trying to improve their efficiency for more than decades by implementing Risk Management and Knowledge Management into their operation. However, implemented them separately despite Risk Management uses Knowledge as a foundation of its processes, prevented them to optimize the benefit from the process. Therefore, this study's objective was to explore how Knowledge Management effectiveness; Knowledge Quality contribute to Risk management efficiency?

The study results indicated that Knowledge Quality; Timeliness, Accuracy and Relevancy contributed to Risk Management effectiveness and each Risk Management processes required different Knowledge Quality. To improve Risk Management effectiveness, Thai public sectors organizations must 1) ensured their structure supported the collaboration of Risk Management functions and Knowledge Management functions 2) ensured IT system was stable and accessible in timely manner and 3) monitored process to ensure knowledge was updated, accurate and relevant to Risk Management processes requirement.

KEY WORDS: Risk Management effectiveness / Knowledge Management / Public Organization / Knowledge Quality

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CHAPTER 1
INTRODUCTION

The major challenge for governments is to find new ways to improve their performance using their limited expenditure. Efficiency, transparency and citizen-oriented have been expected from public sectors for the past few decades. However, as the world constantly changing, the expectations have become higher than ever. While improving performance in the national scale is highly complex, those who can't success will find it harder to improve their overall growth. Moreover, numerous governments are not only facing with fiscal challenge but also political challenges as well. (OECD, 2005).

Both academic and business world have been trying to come up with frameworks or concepts that could resolve these issues. Many concepts were invented and mentioned such as Good Governance. The concept is connected with efficiency and effective administration in a democratic framework. It implies how an organization manages their resources to achieve objective and solve upcoming challenges. It also focuses on eliminating trickery in the system by setting criteria. Thus, Good Governance is implemented in numerous governments including Thailand governments (United Nations Economic and Social Commission for Asia and the Pacific) (2009).

Even though, Good Governance concept promises to improve an organization performance, the challenging part is to meet its benchmarks. One of the most related criterions is "Efficiency and Effectiveness" which indicate a relation between the economic and social consequences stem from implementing a program and how to finance each of them. It is an indicator that whether organizations manage their working system cost-effectively or not. Low efficiency means organizations poorly manage their resources and expenditures which raises question of transparency and other questions from the public (Drucker, 2001).

One of the most common problems regard to efficiency is about over budgeting operations. When an organization poorly manages their upcoming risks, it affects their budgets and strategy objectives. Dealing with these risks effectively ensures the efficiency of an organization. Many organizations then implemented the "Risk Management" to their operations. Risk management helps the organizations developing cost-effective method to manage the risks which reduce expenditures. Risk Management; thus, improves organizations efficiency through its processes which in turn improves their performance.

Key concept of Risk Management is to identify risks that could occur in operations. Organization then analyzes and evaluates the risks to develop the cost-effective treatment for them. Risk Management needs knowledge as its processes' input; it can be for instances, employee's experiences and documentations that store information such as lesson learned in the past. Knowledge is considered as a foundation of Risk Management, it enables an organization to understand their risks and ability to deal with them efficiently. For public sector organizations, cost effectively management is an ideal example of transparency. Regarding to this, knowledge is essential for Risk Management processes.

Knowledge is one kind of commodities; it can be obtained and created as well as outdated and lost. Same as Risk Management, Knowledge Management is a framework used for manage knowledge. It involves the process of capture, create, transfer and apply the knowledge to ensure that the knowledge will have the qualities for using in organization operations. Knowledge Quality is characteristics for knowledge that determined usefulness the knowledge is for age. These Knowledge Qualities can be obtained by systematically manage knowledge within organizations.

For many decades, many researches had studied Risk Management concept and mentioned many critical success factors such as top management support and organization structure. However, there is no research about how Knowledge Management, that provides essential qualities to knowledge which is foundation of Risk Management, can contribute to the effective of Risk Management. Therefore, the objective of this paper is to illustrate how Knowledge management can improve Risk management process effectiveness with empirical evidences so that it gives implication of potential ways to leverage Risk Management in public organization which in turn help them to improve their efficiency.

1.1 Research Question

1. How can Knowledge management contribute to Risk management efficiency?

2. How to improve Risk management effectiveness through integration with Knowledge management?

1.2 Research purpose and objectives

The purpose of this research is to use literature reviews and a case study of Thai public organizations to understand Risk Management concept and Knowledge Management concept and how Knowledge management can improve Risk management effectiveness. The research objectives include:

- To understand Risk management concepts in Thai public organization
- To understand Knowledge management concepts in Thai public organization
- To illustrate how Knowledge management effectiveness improves Risk management processes effectiveness.

1.3 Methodology

This research applied literatures on Risk Management and Knowledge Management and quantitative research methodology, survey questionnaires, to explore the relationship between Risk Management effectiveness and Knowledge Quality to examine the benefit from integrating Knowledge Management into Risk management.

1.4 Benefits

1.4.1 Academic

This study was among the first to explore relationship between Risk Management and Knowledge Management

1.4.2 Managerial Implications

This study provide the understanding potential application of Knowledge Management on Risk Management

CHAPTER 2
LITERATURE REVIEW

The objective of this research is to illustrate how Knowledge management can contribute to Risk management efficiency. This chapter will use various literature reviews under three main sections. Section 2.1 provides the details about Management in public sector organizations, Good governance concept and how to improve public sector performance. Section 2.2 provides the details about Risk management concept. Section 2.3 provides the details about Knowledge management. Section 2.4 provides how Risk management and knowledge management related to each other.

2.1 Management in public sector organizations

2.1.1 Public Management Modernization Challenge

Governments have made significant changes to the way they manage the public sector in the past two decades, privatizing commercial activities such as telecommunication services and making government more transparent and responsive to citizens. Financial issues worries triggered reform in many countries, but the underlying pressure for change came from social, economic and technological developments which left governments increasingly out of step with society's expectations (OECD, 2005).

As a result, public administrations have become more efficient, more transparent and customer-oriented. However, these changes have not reduced governments' influence in society indeed; the government now has a different but larger presence in Organization for Economic Cooperation and Development (OECD) countries than 20 years ago. As citizens' demands of government keep on growing. The public expects

them to be more openness, provides better services and solutions to more complex problems, while maintaining their existing social entitlements (OECD, 2005).

The major challenge for 21st-century governments is to find new ways to meet these demands while remaining within tight expenditure limits. Soon, policymakers face hard political choices. Since most governments cannot increase their share of the economy, in some countries this will put pressure on entitlement programs such as pensions, health care or education.

2.1.2 Public Organization Performance Improvement

Developed economies around the work have reached a day of fiscal reckoning; they need to improve public sector performance. Governments need to improve the performance of public services by doing more and better with less, as private sector organizations have done for years. There is reliable evidence show that government simultaneously improves the quality and lower the cost of their activities and those governments around the world can raise to the challenge before them. Setting clear, long-range aspirations for public sector performance, intensifying effort to measure public sector performance and comparing performance within and across countries can contribute to improving government performance. Holding regular, collaborative discussions on performance with those accountable for delivering progress and establishing comprehensive, sustained performance improvement programs are also factors that can improve performance (Mackinsey & company research, 2011).

Meeting this performance imperative will be difficult for governments around the world. Delivering change on this scale is complex, and particularly so in government that accountability is not always clear and where leaders must address concerns of many stakeholders. These difficulties explain why there have been many failed or abandoned improvement projects, and insufficiently frequent instances of sustained performance gains, leading to a lack of credibility for government reform efforts (OECD, 2005).

Improving public sector performances have not only benefited the short-term spending pressures triggered by the financial crisis. Countries with large public areas that continue to grow without achieving the productivity gain seen in the wider

economy find it harder to improve their public sectors performance on overall growth. By enhancing the performance of the public sector, applying proven best practices to cut costs while improving service delivery, offering policy makers another option. Performance improvement can relieve the financial pressure of shrinking budgets while better serving communities and citizens. Practices is to use "Good governance concept" is often used as the criterion for performance measurement (OECD, 2005).

2.1.3 Good Governance

Good governance is connected with efficiency and effective administration in a democratic framework. It is a purposive and development oriented government that committed to improvement in the quality of people life. It implies organizational effectiveness and relates to the capacity of the political and administrative power center responsible for dealing with the upcoming challenges of the society. It refers to the adoption of new values of governance to establish greater efficiency, legitimacy, and credibility of the system. Good governance is, thus, a function of installation of positive virtues of administration and elimination dysfunctional actions.

The concept of "good governance" comes from its relevance in the context of misgovernance which includes nonfeasance, over feasance and malfeasance. Numerous countries have proved to be ineffective for checking swindling of public funds for private gains in the democratic form of government. Misuse of power, chicanery, and embezzlement of funds are systematically perpetrated by the leaders of government and their unions. The concept of good governance becomes attractive as a remedy against this state of affairs.

According to UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) (2009), good governance has eight major characteristics. These components are (1) participatory, (2) consensus oriented, (3) accountable, (4) transparent, (5) responsible, (6) efficiency and effectiveness, (7) equitable and inclusive, and (8) follows the rule of law. Their explanations are following,

2.1.3.1 Participatory: Participation by both men and women is a key to good governance. Participation could be either direct or through legitimate intermediate institutions or representatives. Representative democracy does not always

imply that the concerns of the most vulnerable in society would be taken into consideration in decision making. Participation needs to be informed as well as organized. Freedom of association and expression on one hand and an organized civil society on the contrary (UNESCAP, 2009).

2.1.3.2 Consensus Orientation: There are several actors and viewpoints in society. Good governance requires mediation from different interests in society to reach a consensus in society on its interest of the whole community and how these interests can be achieved. An agreement also requires sustainable human development and how to achieve the goals. Therefore, an understanding of the historical, cultural and social contexts of a given society or community (UNESCAP, 2009).

2.1.3.3 Accountability: Governmental institutions must be accountable to the public and their institutional stakeholders. Who is responsible to whom varies depending on whether decisions or actions taken are internal or external to an organization or institution. An organization is accountable to those will be affected by its actions. Accountability cannot be enforced without transparency and the rule of law (UNESCAP, 2009).

2.1.3.4 Transparency: Decisions taken and their enforcement must be done in a manner that follows rules and regulations. Information must also be available and easily accessible to those who will be affected by such decisions and their enforcement. It means enough information is provided and that it is provided in easily understandable forms and media (UNESCAP, 2009).

2.1.3.5 Responsiveness: Good governance requires institutions and processes to serve all stakeholders within a reasonable timeframe (UNESCAP, 2009).

2.1.3.6 Efficiency and Effectiveness: Processes and institutions produce results need to meet the society's expectations while optimizing the resources at their disposal. It also covers the sustainable use of natural resources and the protection of the environment (UNESCAP, 2009).

2.1.3.7 Equity and Inclusiveness: Society's well-being depends on ensuring that all members feel related to it and do not feel excluded from the

society. To achieve this would require all members to improve or maintain their well-being (UNESCAP, 2009).

2.1.3.8 Following the Rule of Law: Good governance requires legal frameworks that are enforced impartially. It also requires protection of human rights, especially those of minorities. Impartial enforcement of laws demands an independent judiciary and an impartial and incorruptible police force (UNESCAP, 2009).

From these characteristics, effectiveness and efficiency have one of the clearest linking in government performance improvement. While it is widely assumed that lower public spending inevitably leads to fewer or lower-quality public services, comparative research suggests this need not be the case. Cross-country comparisons of public sector functions show striking variations in outcomes achieved for a given level of expenditure. In some services, notably education, there is no clear correlation. In others, such as healthcare, greater spending can lead to better outcomes but not always which means spending more does not guarantee superior public service outcomes or vice versa. The government can do a great boost performance without additional spending (Mackinsey & company research, 2011).

Thailand also implemented good governance concept since 2003. However, its public sector performance have not been improved much, Moreover according to International Institute for Management Development ranking in 2015. Thailand government is getting less efficient over time. The question then arises, what Thai public sector organizations have to do to achieve efficiency.

2.1.4 Efficiency and Effectiveness of Public Organizations

The efficiency and effectiveness indicate a relation between the economic and social consequences stem from implementing a program and the how to finance that program. The efficiency is an indicator that is obtained by reporting the outcome effects to the efforts made. The effectiveness is the index given by the ratio of the result obtained to the one programmed to achieve. "There is no efficiency without effectiveness because it is more important to do well what you have proposed than do well in something else that was not necessarily concerned" (Drucker, 2001).

Efficiency and effectiveness are part of the whole; the effectiveness is a necessary condition for achieving efficiency.

When speaking of efficiency, public sector seeks to obtain economic benefits as well as obtain social benefits, with the primary objective to ensure the public welfare. An important public interest is a concern for human life and quality of life. Providing insurance services for national defense and maintaining the public order are the attribute of the state every nation requires for their existing (Diana, et al. 2010).

Improve efficiency in the public sector is a challenge which most governments have to face, and which is determined by the existence of some major shortfalls. A problem of collecting and redistributing money to and from the budget, but also as a result of implementing some public programs which are based on some performance objectives. Thus, the optimal dimensioning of the public sector's management and staff is the starting point for obtaining real performances that have an impact on the private sector. (Diana, et al. 2010)

Regarding this, Risk Management, one of the accepted best practices, is believed to achieved this objective and usually be implemented (NSW Department of State and Regional Development, 2005). Risk management can help implementation or strategy of public organization stay proactive. It also helps with the transparency issues since its processes need to monitors the activities of the organization. Moreover, Risk management reduces the likelihood of the risk, its impact as well as generated the more cost effective way to deals with the risks for organizations. Thus, it has a high contribution to improving public organization performance.

2.2 Risk Management

2.2.1 Risk and Risk Management Definition

Risks are usually defined as the likelihood and consequence of something occurring that impacting the achievement of objectives. Risk types and degree of risks that organization exposed to depend on upon some factors such as its size, complexity business activities, volume (SBP, 2003). The risk that becomes problematic can

negatively affect cost, time, quality and system performance. Risk can be sorted into systematic and unsystematic risk (Al-Tamimi and Al-Mazrooei, 2007). Systematic risk refers to a risk inherent to the entire system. It is sometimes called market risk. Systematic risk cannot be avoided through diversification. Whereas, the unsystematic risk which is risks that associated with individual assets and thus can be prevented by diversification.

Risk management is a process that seeks to eliminate or reduce risks' consequences, enhance benefits, and avoid loss from speculative exposures Anderson and Terp (2006). The objective of risk management is to maximize the potential of success and minimize the probability of future losses. The process can reduce the negative impact and grasp emerging opportunities. The outcome may help to mitigate the likelihood of risk occurring and the negative consequences when it happens (Partnerships BC, 2005). Risk management involves identifying, analyzing, evaluating, treating, monitoring and controlling risks. The process is to ensure that organization and its employees clearly understands risk management and fulfills the business strategy and objectives (SBP, 2003).

2.2.2 Risk Management Processes

Risk management processes have recently been published in a few papers. It was found in a previous publication that the risk management process is described slightly differently by different authors. According to SBP (2003), a risk management framework encompasses the scope, the processes to manage risks and the roles and responsibilities of the individual related to risk management. The effective risk management framework includes the risk management policies and procedures that cover risk identification, acceptance, measurement, monitoring, reporting, and control.

The National Institute of Standards and Technology (NIST, 2004) reviews the risk management procedures in three parts: risk assessment, risk mitigation and evaluation and assessment. The risk assessment process involves identification, evaluation of risk impact and recommendation of risk-reducing measures. Risk mitigation includes prioritizing, maintaining and implementing the appropriate risk-reducing controls recommended by the risk assessment. Risk evaluation and

assessment emphasize the continual evaluation process and the key factors for a successful risk management program.

The Enterprise-wide Risk Management Guideline describes the model and the process to manage risk according to the sequence steps (figure 2.1): (1) Establishing the context (2) Identifying (3) Analyzing (4) Evaluating (5) Developing the risk mitigation strategy (6) Monitoring and Reviewing the risk mitigation strategy (7) Quantifying the risks and (8) Consulting and communicating the risk (Partnerships BC, 2005).

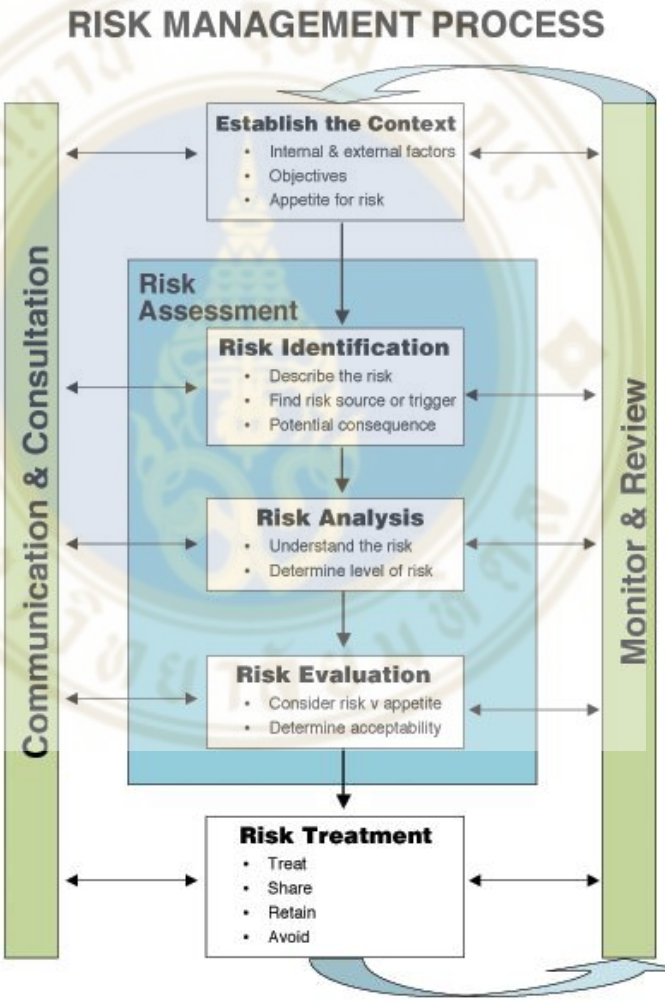

Figure 2.1 Risk Management Process (Partnerships BC, 2005)

Standards Australia and Standards New Zealand (2004) and the International Organization for Standardization (ISO/DIS 31000, 2008) designed the

model of risk management procedures in the same way. The process is comprised of five activities to establish the context of risk, risk assessment which is composed identifying risks, analyzing risks and evaluating risks, risk treatment, communication and consultation, and monitoring and controlling risk events. So the framework for the risk management process presented by Standards Australia and Standards New Zealand (2004) will be the model for this study. The risk management process consists of seven iterative sub-processes shown in figure 1, which follows.

2.2.2.1 Communicate and Consult

Communication and consultation objective is to identify who should be involved in the assessment of risk and who will participate in the treatment, monitoring, and reviewing of risk. Those people should understand the basis of decision-making and the reason why particular actions are required (Standards Australia and Standards New Zealand, 2004).

For its successful adoption, the reporting in its initial stages is visible through the framework. The requirements on the reporting have to be fixed in a qualified and documented procedure. Documentation is a must for demonstrating the systematic process. The methods and scopes identified, the process conducted correctly and that it is fully auditable. Documentation provides a rational basis for decision making, approval and implementation including an appropriate management system.

2.2.2.2 Establish the Context

Organization has to establish the context to understand the environment in which the respective organization operates. The examination is undertaken through establishing the strategic, organizational and risk management context and thenand identifying the restrictions and opportunities of the operating environment. The establishment of the context and culture is done through some environmental analyses that include, e.g., a review of the regulatory requirements, codes, and standards, industry guidelines as well as the relevant corporate documents and the previous year’s risk management and business plans.

By establishing the context, the organization defines the parameters that need to be taken into account when managing risk, then sets the scope and risk criteria for the remaining process. This process needs to be considered in

greater detail and particularly how it relates to the framework of the particular risk management process (Heinz-Peter, 2010)

This step objective is also to develop risk criteria. The criteria should reflect the context depending on an internal policies, goals, and objectives of the organization and the interests of stakeholders. While the broad criteria for making decisions are already developed as part of the process, they may be further developed and more refined in the future as particular risks are identified and risk analysis techniques are chosen. The risk criteria must coincide with the type of risks and the way in which risk levels are expressed.

2.2.2.3 Risk Identification

Risk identification is the process of enumerating risks that could potentially prevent the program, enterprise, or investment from achieving its objectives (Laurie Williams, 2004). It investigates by looking at the activity of organizations in all directions and attempting to introduce the new exposure which will arise in the future from changing the internal and external environment. Organization systematically enumerates as many project risks as possible to make them explicit before they become problems (Laurie Williams, 2004). Therefore, effective risk identification ensures risk management effectiveness (Tcankova, 2002). It should be noted that a risk can be an opportunity or strength that has not been realized.

The risk identification is the most critical stage in the risk assessment process. The sources must be managed for proactive risk management. The better understanding of the sources, the better the effective will be the management of risks (Heinz-Peter, 2010). People with relevant knowledge in the organization needed for collecting experience available in the organization regarding internal risks.

Identifying risks consist of two the main activities: 1)thinking and recognizing the source of the risks and opportunities and 2)identifying both the risks and opportunities. There are various risk elicitation techniques the team can use to systematically and proactively surface risks (Laurie Williams, 2004; Chapman, 2006):

• Meeting: The team member gathers together and brainstorms to contributes as many risks as possible.

• Checklists/Taxonomy: Using of lists and taxonomies that focus on some subset of known and predictable risks. Checklists and taxonomies that refer from past projects are especially beneficial.

• Decomposition. Unmanageable risks that are identified are further broken down into small risks that are easier to be managed. Additionally, by breaking down the risks into small pieces, it is more likely to determine other potential problems.

Knowledge plays a crucial part in Risk identification as inputs are generated from experiences of employees in organizations. All of the techniques use knowledge either from employees such as experiences of experts or documentations such as risk management artifacts of previous projects. Without knowledge, an organization would be unable to generate enough inputs to the process and leave them with blind spots that could cause their result. The knowledge for this purpose must be complete as much as possible. Also, it needs to be accurate as well (Chapman, 2006). Therefore, it would be wise for the organization to manage their knowledge and obtain as much knowledge as possible.

2.2.2.4 Risk Analysis

Risk analysis considers the source the consequence, and likelihood of the risks to estimate the unprotected risk without controls in place. It also involves identification and its effectiveness of the controls and the resultant level of risk with controls in place (Lauria, 2015). Through risk analysis, an organization then transforms the identified risks into decision-making information. The organization then made a judgment on each risk about the probability and the consequences of the risk. (Laurie Williams, 2004).

• Assess the probability of likelihood: Probability of risk occurring is varied. Therefore, setting up a scale that reflects the perceived likelihood of a risk is required (Williams, 2004).

• Assess the consequences if the loss were to occur. Delineate the consequences of the risk, and estimate the impact of the risk on the project and the product (Williams, 2004).

These assessments can be done through risk matrix (Figure 2.2). The assessment is undertaken concerning the effectiveness of the current control

activities. The risk level is analyzed by intersecting the likelihood and consequence levels on the risk matrix.

Decision making becomes much "tighter" as soon as the risks are quantified, no matter how vaguely. Organizations required knowledge to determine either the likelihood or consequences of the risks. The knowledge such as experiences of employees or documentations from their past projects will give the ability to analyze the risks thoroughly (Emanuel Lauria; et al., 2014). Access to this knowledge enables an organization to have more understanding and be able to determine the risks more accurately through their experiences. Assessed knowledge needs to be completed, accurate and updated as much as possible. For example, documentations that used for comparison in analyzing process should have not only much information but also provide accurate information which shown by the consistency and relevancy of the particular topics. Therefore knowledge is a key to ensuring that Risk analysis remains effective for the best result of the overall process (Chapman, 2006).

			Potential Consequences				
			L6	L5	L4	L3	L2
			Minor injuries or discomfort. No medical treatment or measureable physical effects.	Injuries or illness requiring medical treatment. Temporary impairment.	Injuries or illness requiring hospital admission.	Injury or illness resulting in permanent impairment.	Fatality
			Not Significant	Minor	Moderate	Major	Severe
Likelihood	Expected to occur regularly under normal circumstances	Almost Certain	Medium	High	Very High	Very High	Very High
	Expected to occur at some time	Likely	Medium	High	High	Very High	Very High
	May occur at some time	Possible	Low	Medium	High	High	Very High
	Not likely to occur in normal circumstances	Unlikely	Low	Low	Medium	Medium	High
	Could happen, but probably never will	Rare	Low	Low	Low	Low	Medium

Figure 2.2. Risk Matrix (Laurie Williams, 2004)

2.2.2.5 Risk Evaluation

Risk evaluation decides risks be acceptable or need control. This stage is central to the understanding of the risk exposure or potential opportunity arising from a business activity (Lauria, 2015). If the organization or decides that the level of risk be acceptable, the risk may be accepted with no additional treatment. However, acceptable risks should be monitored and periodically reviewed to ensure they remain acceptable, 2015). The level of acceptability is from organizational criteria or safety goals set by the authorities. In case the level of risk is greater than the tolerable risk, the organization needs additional control or improvements in the effectiveness of the existing controls (Tamás, 2015).

Once the risks have been analyzed, an organization can compare them with the previously documented and approved tolerable risk criteria. However, before determining the probability, it is essential to consider risk appetite of the organizations and decide upon acceptable or unacceptable risk. The risk's acceptable level depends on the degree of voluntaries. Risk evaluation is necessary for making sense in specific situations and provides sufficient material for decision making (Vrijling, 1995). A risk may be considered acceptable if the risk is sufficiently low that treatment is not considered cost-effective.

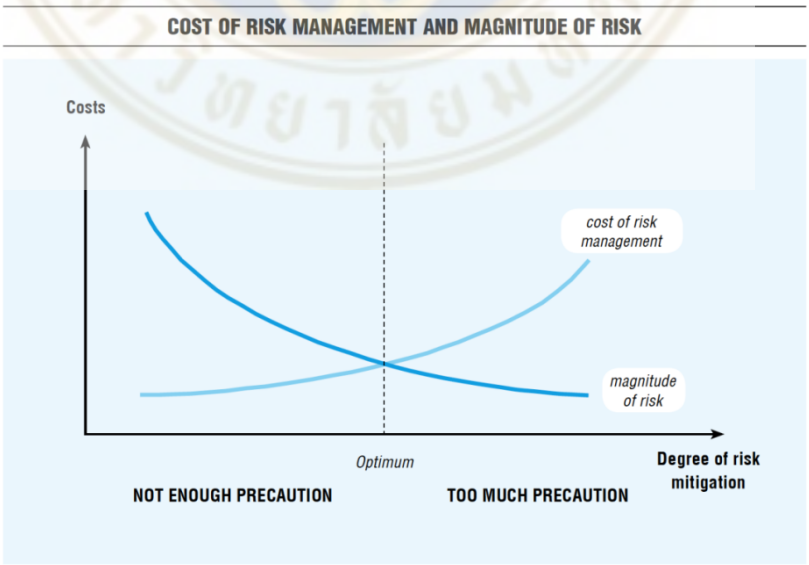

Figure 2.3 Cost of Risk Management and Magnitude of Risk (Tamás Vasvári, 2015).

It is usually not cost-effective to implement all possible risk treatments since the total cost would be more than benefit (Figure 2.3). It is, however, necessary to choose, prioritize and implement the most appropriate combination of risk treatments. (Chapman, 2006). To answer these questions, organizations need employee experiences and documentations from previous projects to compare and decide which risk is acceptable and which is not. For example, to determine the risk appetite level, decision-maker will use their experience and other knowledge from the previous reports to decide which risks need to be treated and which are not worth the budget treating. (Heinz, 2010).

Therefore, the effectiveness of this process depends on the completeness of their knowledge which is stored in documentations and their employees. The more complete, updated and accurate of knowledge is vital to the process. Moreover, relevancy and consistency of knowledge are needed to ensure the effectiveness this process becomes (Chapman, 2006)

2.2.2.6 Risk Treatment

Risk treatment involves selecting and implementing one or more options for treating risks. The objective of this stage is to ensure that effective strategies are in place to minimize the frequency and severity of the identified risk. Develop actions and implement treatments that aim to control the risk. Single treatment option does not fit or appropriate in all circumstances are driven by outcomes (Lauria, 2015). Standards Australia and Standards New Zealand (2004) offer the following options for risk treatment: avoiding, reducing, transferring risk and retaining risk.

- Avoiding the risk: not undertaking the activity that is likely to trigger the risk,
- Reducing (mitigating) the risk: controlling the likelihood of the risk occurring, or controlling the impact of the consequences if the risk occurs,
- Transferring (sharing) the risk: moving the responsibility to another party or sharing the risk through a contract, insurance, or partnership/joint venture.
- Retaining (accepting) the risk: Accepting the consequences of particular risks.

- How to decide which options is best for treating each risk is required knowledge. Knowledge such as lessons learned either store in documentations of previous projects' summary or within employees is crucial for the process. It tells organization which options were used before, its effectiveness and whether they should consider choosing new options and is that option feasible for treating their risks. Therefore, completeness and accuracy of knowledge are required to comprehensively workout for their solutions. (Heinz-Peter, 2010).

After choosing one of the options above, the organization needs to come up with its implementation plan. For example, should the organizations use mitigating option, what actions they can use to reduce it, by reducing human errors and measure it with KPIs or substitute it with computer software? Organization needs knowledge from many areas as well as updated since there might be new innovative options for them that could be more efficient than what they have been doing (Rodriguez, 2009). So the relevancy, as well as consistency, is also required because it gives organization innovative idea for the process.

Moreover, even when a risk was treated, and the controls are in place, the risk may not be entirely controlled. The level of residual risk refers to the likelihood and consequence of the risk occurring after the risk has been treated. The residual risk rating is lower than the original risk rating otherwise the controls were not effective. The residual risk should be documented and monitored and reviewed. Where appropriate, further treatment might be prudent. Having a good awareness of residual risk is important in monitoring and evaluating risk on an ongoing basis.

2.2.2.7 Monitoring and review

Monitoring and review is an essential and integral step in the risk management process. The concept of risk is dynamic and requires periodic and formal review. Risk needs to be monitored to ensure the changing environment does not alter risk priorities and to ensure the risk management process is effective both in design and in operation. Also, new risks and their impact on the organization may be taken into account. The organization should review at least on an annual basis (Standards Australia and Standards New Zealand, 2004).

All information in the previous risk assessment, the choices of controls and its effect and people must be monitored on an on-going basis to ensure risk are in

controlled within criteria. For an efficient risk control, the analysis of risk interactions is necessary. Monitoring guarantees that the influences of one risk to another is identified and assessed.

2.2.3 Risk Management Benefits

Risk management provides benefits in 5 aspects.

2.2.3.1 Increase the range of opportunities. By considering all possibilities – both positive and negative aspects of risk – Risk management help identifying new opportunities and challenges associated with current opportunities. It also helps with the planning process.

2.2.3.2 Identify and manage risk entity-wide. Risks can affect many functions in an organization. Sometimes, a risk can have an effect on multiple parts of organizations. Thus, manages these entity-wide risks to sustain and improve performance.

2.2.3.3 Reduce negative surprises and increase gains. Risk management improves organizations ability to detecting risks and setting up appropriate responses, reducing surprises, the budget required, and allowing them to profit from advantageous developments.

2.2.3.4 Reduce performance variability. The challenge for some entities has less to do with surprises and more to do with variability in performance.

2.2.3.5 Improve resource deployment. Having an enough information on risk allows businesses to assess overall resource needs and enhance resource allocation. Having a greater focus on resources makes resources management such as time, money, and people more efficient.

Despite all of the benefits, implementing Risk Management does not ensure that it is always going to be effective. Ineffective risk management can significantly damage public sector organizations efficiency even more because it will give organization false security feeling which makes them more vulnerable to risks. Therefore, critical success factors for risk management are required and need to be used to ensure its effectiveness.

2.2.4 Critical Success Factors for Effective Risk Management

Critical Success Factors (CSFs) are the areas that if are met, will ensure successful competitive performance for the organization (Rochart, 1979). They are key areas where things must go right for the business to flourish. If results in these areas are not adequate, the organization's efforts for the periods will be less than desired". Critical Success Factors as one of the few things that ensure success for an organization (Boynton and Zmud, 1984). Critical success factors are maintaining a high performance for an organization's currently operating activities and its future.

Critical Success Factors which are appropriate to each unit of business and overall organization aim to fulfill the organization's objectives (Freund, 1988). There are some papers on Critical Success Factors contributing to risk management. Prapawadee and Wariya (2009) reviewed this related literature and concluded that seven critical success factors are contributing to risk management. These are:

2.2.4.1 Commitment and support from top management: The high importance of top management support is considered to be among the Critical Success Factors for Project Management (Zwikael, 2008). Top management support influences the success level of the organizational system. Critical top management support involves a broad range of activities in an organization such as developing project procedures, training programs, establishing a project management office, support quality management and so on (AINEMBABAZI BRENDA, 2013). "The essence of top management support related to effective decision making to manage risk and to authorize business process change" (Young and Jordan, 2008). Moreover, commitment and support from top management play a vital role in influencing the success in almost any initiative within an organization (Hasanali, 2002). Senior management formulated and decides objectives and strategies for organizational risk management activities, mission and overall goals (Henriksen and Uhlenfeldt, 2006).

The organization uses Risk management to figure the probability of an adverse impact. Risk management requires the acknowledgment that risk is a reality and the commitment to identify and manage risk (Galorath, 2006). Top management's commitments are important in every level and type of management, and it is thus an important factor for risk management.

2.2.4.2 Communication: Communication plays an important role in risk mitigation (Grabowski and Roberts, 1999). It provides opportunities for clarification, for making sense of the organization's progress, and for members to discuss how to improve the organization and the impact of using different risk mitigation strategies. The communication process provides opportunities for members to understand their roles and responsibilities as the structure of the organization changes. There is involved in the risk identification and assessment process and if there are no "taboo" subjects which prevent conventional wisdom within the organization being challenged when necessary.

Most organizations accept that good communication is paramount. Different employees have divergent views and discussion between them is therefore based on various conclusions. They simply want to get a clear message across and discussion may be an appropriate channel to deliver messages. Internal communication should support business strategy and improve business processes as well as performance (Quirke, 1996). Effective communication ensures that the team members understand and support not only where the team is now but also what they want to be (Clutterbuck and Hirst, 2002).

2.2.4.3 Organization culture: Culture is defined as "the collective programming of the mind that distinguishes the members of one group from another" (Hofstede 2001). Culture consists of patterns of values, ideas, thoughts and feelings and is conveyed by symbols as factors in shaping behavior. It influences the perception of actions and communications of employees. Proper Culture creates a willingness to learn from mistakes and to exchange best practice within organizations (AINEMBABAZI BRENDA, 2013).

Organizational culture has a significant effect on management success. Long-term management supports a collaborative and corporate organizational culture, team working, collaboration, open communication, risk-taking and so on (Mosadeghrad, 2006). Risk management requires the combination of multiple cultures that make the system into a cohesive whole to build the attitude of each of the member (Grabowski and Roberts, 1999). The importance of culture within effective risk management is that knowledge transference must be there so employees can interact,

exchange ideas and share knowledge with one another. Moreover, culture creates behavior of encouraging generating new ideas, knowledge, and solutions.

2.2.4.4 Organization Structure: Organizational structure involves an organization's internal pattern of relationships, authority and communication (Stank, Daugherty, and Gustin, 1994). The structure is comprised of formal lines of authority and communication and the information as well as data that flow along these lines. Thus, organizational structure defines the lines of authority and communication, serves to allocate tasks and resources and provides a means of coordination. Organizational structure provides the authority to predetermine the way employees work (Hunter, 2002). Structure and processes of an organization are most effective when their design functions match their environment and have a positive impact on the organization's strategies.

Therefore, one of the most important aspects of effective risk management is organizational structure. Organizational structure provides the concept, guideline, direction and support to the employees that are conducted by the steering committee. They design and teach employees to share and use a common vocabulary. The employees work as a team to prevent a silo mentality and incorporate resistant employees in the process (Hasanali, 2002). Setting clear objectives and guidelines is necessary for risk management. Moreover, Grabowski and Roberts (1999) suggest that risk management is primarily associated with the fluidity of organizational structures. Responding in different ways and responding quickly in the face of changing conditions is a flexible approach.

2.2.4.5 Training: Success of an organization depends on upon its employees. It is important to ensure that staff has appropriate skills for special departmental or managerial positions. The process of staff development and training should fulfill an organization's performance. The purpose of training is to improve knowledge, skills and attitudes which in turn increase confidence, motivation and job satisfaction (Fill and Mullins, 1990)

Almost all companies provide some training to their employees. Some companies have a very formal process of training while other companies use outside consultants to conduct employee training sessions (Hughey and Mussnug, 1997). The training methods used by organizations can be classified into

two approaches (Treven, 2003). The first method is on-the-job training which provides one-on-one instruction, coaching, job rotation and an apprenticeship and internship. The second method is off-the-job training which is conducted away from the worksite. It covers some techniques, classroom lectures, films, demonstrations, case studies, other simulation exercises and programmed instructions.

The endless brief, but vital if risk management is to be brought to the organization. A risk manager should set up training sessions through the directorate manager for members of staff and the risk management team for consultants. The ability to respond to changes environment in an organization's operations relates to a range of activities including the development of risk training courses and the involvement of staff in responding to early warning systems (Symons, 1995).

2.2.4.6 Information Technology(IT): Information Technology (IT) consisting of two components: "(1) the information systems on which the critical business functions and processes depend on and (2) the computer technologies (hardware and software) which support the processing, storage and distribution of the company's data and information" Halliday, Badenhorst and Solms (1996, p.22). It provides information about being the connector between one human to information and one human to another one (Wong, 2005).

Information Technology is vital to achieving an organization's objectives. It relates to all aspects of the business processes, including access to a shared infrastructure consisting of knowledge, human assets, core competencies, resource allocation, performance management, project tasking and communication support (Mutsaers, Zee, and Giertz, 1998). IT relates to better information processing, sharing, fast responsiveness, and better coordination between separate units of an organization and across organizations (Shin, 1999). Moreover, IT is associated with reducing costs such as the cost of documentation, decision information and cost effective monitoring or performance evaluation device. Effective risk management requires effective information technology (Xenomorph, 2007).

Rolland (2008) suggests using IT to drive effective risk management. IT can create a major link between risk management and corporate performance. IT provides data security by employee level, limiting a user's access

to time and individual risk. IT tools gather data used in the past so companies can learn through experience and avoid repeating the same mistakes. The effective risk management information makes more valuable for decision making. Therefore, Information Technology (IT) is another crucial factor for successful risk management.

2.2.4.7 Trust: Trust is the willingness of an individual to be vulnerable to the actions of another personal regard to the expectation that the other will perform a particular action that beyond trustor's ability to control that other party (Mayer, Davis, and Schoorman, 1995, p.711). Trust is important because of the strong desire to understand how to create effective cooperation within organizations. Therefore, Trust a key because it enables cooperation. The success of an organization is related to its ability to manage effective collaboration (Tyler, 2003). Trust enhances the strength of working relationships, solidifies partnering roles, and increases the willingness of various project stakeholders to cooperate (Pinto, Slevin, and English, 2008). Trust comes from responses regarding the sharing of materials, information, resources and displaying good intent behavior (Erden, 2003).

Risk management needs cooperation and teamwork encourage success. Trust among an organization's members is an important prerequisite to changing those related to alliances, thus mitigating risk, as organizations are unwilling to adopt alliance-like organizational structures that make them vulnerable to the fluctuation of the environment (McAllister, 1995). A trust permits an organization's members to focus on their mission, unfettered by doubts about other members' roles, responsibilities, and resources, and that with trust, synergistic efforts in an inter- organization's mission are possible. Risk management engages in activities that encourage shared commitment. Thus, one of the means of driving efficient risk management is trust (Grabowski and Roberts, 1999).

Apart from these critical success factors, knowledge is another crucial factor contributes to risk management. Knowledge is a foundation of risk management, its processes required knowledge. Risk management required knowledge to make it effective. Risk assessment processes which are Risk

Identification, Risk Analysis, Risk Evaluation and Risk Treatment are all required knowledge in their operations. For example, to determine the potential risks, Risk identification need knowledge from the different parts of the organization to identify risks comprehensively. In risk evaluation process, it helps the process how to evaluate each risk through experiences and in risk treatment process it tells the organization how to deal with the risks more effective (Chapman, 2006). The summary of the relationship between risk assessment processes and knowledge are following.

Table 2.1 The summary of the relationship between risk assessment processes and knowledge

RM process	Process Description	Relationship with Knowledge
Risk Identification	• The process of enumerating risks that could potentially prevent the program, enterprise, or investment from achieving its objectives as many as possible. (Laurie Williams, 2004). • Effective risk identification ensures risk management effectiveness (Tcankova, 2002). • Better the understanding of the sources leads to the better outcomes of the Risk Assessment process, and effectiveness will be the management of risks (Heinz-Peter, 2010).	• Knowledge used for generated from experiences of employees in organizations. (Chapman, 2006). • Knowledge such as experience in employees provides the list of risks that occurred in the past that go into the identified risk list. (Rodriguez, 2009) • Knowledge both in the field and relevant field gives organization to forecast the risk that could happen apart from the risk that happens in the past. (Rodriguez, 2009) • Without knowledge, it is more likely that organization will have blind spots that could cause their objective (Chapman, 2006).

Table 2.1 The summary of the relationship between risk assessment processes and knowledge (Cont.)

RM process	Process Description	Relationship with Knowledge
Risk Analysis	• The process of considering the consequence and likelihood to estimate the inherent or unprotected risk without controls in place. (Heinz-Peter, 2010). • Organization transforms the identified risks by decision-making information, considers and made the judgment about the probability and the consequences of the risk (Laurie Williams, 2004). • It is essential to consider risk tolerance of the organizations and decide upon acceptable or unacceptable risk. • Risk evaluation is necessary for making sense in specific situations and provides sufficient material for decision making (Vrijling, Hengel, and Houben, 1995).	• Knowledge storage provides the cause of the risks, what happened in the past and its frequency which helps an organization analyze the risk more accurate. • Knowledge can analyze the likelihood of the risk by comparing it with experiences which has much more accuracy than analyze by ones that have no experiences to refer to the risks. (Emanuel Lauria; et al., 2014). • Knowledge needs to be completed, accurate and updated as much as possible to ensure the effectiveness. (Chapman, 2006). • The relevancy and consistency of knowledge ensure knowledge is reliable for using in analyzing the risks.
Risk Evaluation	• Risk evaluation aims to decide risks impact is acceptable or need treatment to the understanding of the possible risk exposure or potential opportunity arising from a business activity (Lauria, 2015). • It is essential to consider risk appetite of the organizations and decide upon acceptable or unacceptable risk. The acceptable level of risk depends on upon the degree of voluntaries (Heinz-Peter, 2010). • It is cost-effective and necessary to choose, prioritize and implement the most appropriate combination of risk treatments. (Chapman, 2006).	• Organization uses knowledge such as documentations and their experiences to evaluate the impact of each risk to their objectives and compare it with their risk appetite (Heinz-Peter, 2010). • Organization risk appetite come from the knowledge in the organization, their experiences, and documentation that store the past impact in the past. (Heinz-Peter, 2010). • Since the impacts of the risk are varied. The effectiveness of this process depends on the completeness of knowledge their employees as well as update of knowledge (Chapman, 2006)

Table 2.1 The summary of the relationship between risk assessment processes and knowledge (Cont.)

RM process	Process Description	Relationship with Knowledge
Risk Treatment	• Risk treatment involves selecting and implementing one or more options for treating risks. (Lauria, 2015). • The objective is to ensure that effective strategies are in place to minimize the frequency and severity of the identified risk (Heinz-Peter, 2010). • Having a good awareness of residual risk is important in monitoring and reviewing risk on an ongoing basis (Vrijling, Hengel, and Houben, 1995).	• Knowledge provides organization list of options that are employed in the past and their effectiveness.(Heinz-Peter, 2010). • Knowledge provides organization innovative idea and solutions for the process (Cross knowledge) (Rodriguez, 2009) • Knowledge provide organizations effective treatment implementation plan from the experiences, what they have to do as well as what they have to improve from the past. (Rodriguez, 2009)

Knowledge is crucial to Risk management and should be taken into account when studying about Risk Management. Moreover, the quality of knowledge contributes to the effectiveness of Risk Management process. Whether it is experiences or knowledge that store in the information system, both of them are diverse. This knowledge needs to be updated and accurate to ensure the effectiveness of Risk Management process. For example, knowledge such as experience in employees provides the list of risks that occurred in the past that go into the identified risk list and knowledge both in the field and relevant field give organization to forecast the risk that could happen apart from the risk that occurred in the past. (Rodriguez, 2009)

However, high amount of knowledge, as well as high diversity, qualities of knowledge, can drop which could cost the effectiveness of Risk Management. For instances, without updated and accurate knowledge, it is more likely that organization will have blind spots that could cause their objective (Chapman, 2006).

These concerns lead to Knowledge management concept which is accepted worldwide as methodology of managing knowledge. Its objective is to achieve

organizational goals by optimizing knowledge, or “doing what is needed to get the most out of knowledge resources. Therefore, the outcome of the concept which is the knowledge with high quality could benefit to the effectiveness of risk management.

2.3 Knowledge Management

2.3.1 Knowledge and Knowledge Management Definitions

Knowledge has become one of the most highly valued commodities in the modern economy. It is considered the foundation of competitiveness and innovation in the organization globally. It usually defined into two types of knowledge, explicit knowledge and tacit knowledge (Nonaka and Takeuchi, 1995).

Explicit Knowledge is the knowledge that is formalized and codified (Brown & Duguid 1998). It can be articulated and communicated to other (Wellman 2009). Explicit Knowledge can be found storing in many sources such as books, online websites, and oral means. The goal of managing explicit knowledge is to ensure that people can access to knowledge when they need it.

Another type of knowledge is tacit knowledge. It refers to knowledge from human experience, sometimes also referred as know-how knowledge (Brown & Duguid 1998). Tacit knowledge is embodied in human stakeholders, including in their cultural beliefs, values, attitudes, mental models as well as skills, capabilities and expertise (Botha et al. 2008). As tacit knowledge is embodied within the person, it is challenging to identify, codify and use it. To obtain this kind of knowledge, it requires effective communication, a lot of commitment and involvement from stakeholders (Nonaka, 1994). Apart from many requirements, lacking of focus on tacit knowledge could directly reduce innovation and sustained competitiveness capability of organizations. (Gamble & Blackwell, 2001)

Knowledge Management is a method for achieving organizational goals by optimizing knowledge. It is the explicit and systematic management of knowledge (Becerra-Fernandez et al., 2004).

2.3.2 Knowledge Management Processes

Knowledge Management's objective is to create a competitive advantage for organizations by manage knowledge within the organization to its fullest potential to optimize core activities. Knowledge Management is essential for managing knowledge and has been used by numerous organizations as one of the most effective methods of achieving organization's objectives in the information age [Malone, 2002]. Organizational knowledge systems are divided into four sets of knowledge processes: creation, storage/retrieval, transfer and application (Alavi and Leidner, 2001).

2.3.2.1 Knowledge creation: The process of creating new content development and the replacement of the existing content of organizational tacit and explicit knowledge. The SECI process explains the knowledge conversion process of interaction between tacit knowledge and explicit knowledge. SECI is an abbreviation for the four conversion modes in the model: socialization, externalization, combination and internalization (Nonaka, 2000).

Socialization mode refers to the communication of tacit knowledge and experience sharing process between individuals through social interaction In the socialization mode, effective plan and efforts are required to encourage individuals to involve in more communication and interaction (Chen and Gaedian 2012). Externalization is the articulating and knowledge crystallizing process from tacit knowledge to new explicit concepts. In the externalization mode, it enables the individual mindsets to be transformed into collective mindsets (Hubert, 1996). Combination mode refers to the new explicit knowledge creation from the reconfiguration of the existing explicit knowledge Lastly, Internalization mode is the creation of tacit knowledge from explicit knowledge and similar to traditional learning (e.g., the learning as a result of reading). Internalization mode could be considered as the knowledge transformation process from collective knowledge to specific knowledge (Chen and Ghaedian 2012).

As a result, the knowledge creation is a continuous interaction process between tacit knowledge and explicit knowledge. The process helps the organization increase their knowledge as well as updated their current knowledge in the system by creating new knowledge for solving new problems (Nonaka, Toyoma & Konno, 2000).

2.3.2.2 Knowledge Storage and Retrieval: Knowledge Creation and learning process is accompanied by knowledge loss. It is important for the organization to store created knowledge for future retrieval and reuse (Gevorgyan and Ivanovski, 2009). The knowledge stored and available for retrieval in the organization is called organizational knowledge (Walsh and Ungson, 1991). Moreover, could be stored in different forms, such as standardized working procedures, written documentation, structured information saved in databases, codified knowledge stored in the expert systems and tacit knowledge captured by individuals or individuals' network (Tan et al., 1998).

An organization requires the capability to store and transmit the knowledge from the past to the future members of the social system (Stein, 1995). This ability is called the organization's memory. Memory is divided into individual memory and organizational memory (Stein and Zwass, 1995). Individual memory refers to the specific knowledge of personal observations, experiences and actions (Sanderlands and Stablein, 1987). Organizational memory relates to the knowledge that is accumulated in the past which impacts the present performance and activities (Stein and Zwass, 1995).

Memory has both positive and negative influence on the individual and organizational performance and activities. Memory that stored workable solutions could be reused and reapplied to solve present problems and reduce the waste of organizational resources (Alavi and Leidner, 2001). The memory could also improve the implementation process of organizational changes (Wilkins and Bristow, 1987). However, old individual memories could lead to bias in the decision-making (Starbuck and Hedberg, 1977). Therefore, the process helps organization store the relevance knowledge and maintains them in the organization so that organization can retrieve it for future purpose.

2.3.2.3 Knowledge transfer: Knowledge transfer is a process to communicate and apply knowledge from one source to a recipient and mainly focuses on learning (Darr & Kurtzberg, 2000) After the knowledge creation and storage processes, it is important for the organization to transfer the knowledge to avoid knowledge loss, so operational skills and solutions have not to be reinvented. The source and recipient could be separate or any kinds of combination of individuals,

groups and organizations (Darr & Kurtzberg, 2000). Frequent interaction between the sender and recipient enables enhancing the flow of knowledge. Both tacit knowledge, explicit knowledge and the combination of the both could be transferred (Gevorgyan and Ivanovski, 2009). Knowledge transfer could be done more efficiently when the transferred knowledge is more explicit and less tacit . Knowledge transfer process is the key to increasing knowledge for the organization. It gives organization knowledge for making a decision. Moreover, it ensures that knowledge will flow through organization helping them updated any old or inaccuracy knowledge (Grant, 1996).

2.3.2.4 Knowledge application: Knowledge application starts from the recipients using the received knowledge (Gevorgyan and Ivanovski, 2009). During the knowledge application process of the recipients, the knowledge will be re-identified and applied and gradually converted to personalized knowledge which increase the accuracy of knowledge (Szulanski, 1996). To create and improve the organizational capability, Grant (1996) classifies the information integration into three mechanisms: directives, organizational routines, and self-contained task teams.

Directives are the knowledge conversion from specific standards, procedures and requirements to explicit knowledge so as to enable the individuals to understand and learn the specific knowledge such as work instructions (Grant, 1996). Routines refer to integrating individuals' task performance and specific knowledge with the development of patterns, protocols, and specifications so as to minimize the requirement of communication (Alavi and Leidner, 2001). Self-contained task teams refer to a problem-solving process for the teams of individuals by using their knowledge and personal ability when a specification of directives and organizational routines are not applicable due to the uncertainty and complexity of the task (Alavi and Leidner, 2001).

2.3.3 Knowledge Management Measurement

Knowledge management performance can be measured by knowledge quality. The top criteria for knowledge quality that were most frequently discussed in the previous literature are Timeliness, Accuracy, Completeness, Consistency and Relevancy. The definition of the criteria is following (Beverly K. Kahn et al., 2002):

2.3.3.1 Timeliness: The extent to which the age of the knowledge is appropriate for the task at hand and the time used for accessed. Timely knowledge is still current. Implicit is a dynamic process where new knowledge arises to replace the old. Knowledge has a cycle time which depends on how quickly new knowledge can be processed and communicated to its organization. Also Timeliness refers to access to source of knowledge in timely manner. Unable to access to knowledge in time results in perception of lower knowledge for using.

Knowledge timeliness goes hand in hand with knowledge accuracy. The concept of what is timely is itself constantly changing and being redefined, due to changes in organization perceptions caused by technology and the competitive environment. Today, time-based competition and the concomitant reduction in operations cycle times has fueled a demand for evergreen knowledge.

2.3.3.2 Accuracy: The extent to which knowledge is correct, reliable, and certified free of error. Accurate knowledge reflects the underlying reality. That quality knowledge should be accurate seems obvious. In practice, knowledge used for different purposes requires various levels of accuracy, and it is even possible for knowledge to be too accurate in the sense of being too precise.

Knowledge inaccuracy and related problems occur in many knowledge systems. The problem is common and is addressed by knowledge systems professionals through the cycle from systems design to implementation to maintenance. Less well understood is that knowledge can be too accurate when its degree of precision exceeds its organization's processing capability. Inaccurate data increases knowledge systems cost, become a drain on system credibility, and creates confusion caused, result in misuse or abandonment.

2.3.3.3 Completeness: The extent to which knowledge are of sufficient breadth, depth, and scope of the task at hand. Incomplete knowledge can lead its organization astray. However, complete knowledge definition depends on each person, for instances, the director of the marketing department is interested in real estate trends while the director of research development might be interested in new machines that can reduce the number of workers

2.3.3.4 The consistency of presentation: The extent to which knowledge are always presented in the same format and are compatible with previous

data. Knowledge quality lies not only in the quality of the information itself but also in how it can be combined with other knowledge and delivered to a customer. Knowledge compatibility often involves systems integrating and working together.

The proper knowledge architecture enhances knowledge quality by making the knowledge suitable for enhanced uses. A quality architecture implies a dynamic structure that can grow with changing users requirements. Knowledge format necessary when companies must leverage their knowledge database to invent new products and optimize their production and management processes (David, 1987).

2.3.3.5 Relevancy: The extent to which knowledge are applicable and helpful for the task at hand. The key component for knowledge quality is whether the knowledge addresses its organization's needs. If not, that organization will find the knowledge inadequate regardless of how well the information rates along with other dimensions discussed below. Irrelevant knowledge to a knowledge customer is not always considered "poor quality." It indicates that the knowledge is a member of a different knowledge

Knowledge Management positively influences the performance of business processes. Knowledge Management benefits the organizations in many ways such as improve efficiency, innovativeness and the organization's performance and so on (Alavi & Linder, 2001). Knowledge management benefits come from several means, including the provision of workable solutions both directions and routines. Effective knowledge management enables the organization's members to collect relevant knowledge (Becerra-Fernandez et al.,2004). Moreover, Knowledge management also create innovative solutions to problems through increasingly rely on knowledge shared across individuals (Storck and Hill, 2000).

Knowledge management improves employee adaptability, help them ready for changes, possess the information and knowledge needed to adapt whenever organizational circumstances changes, less likely to be caught by surprise. It also increases the awareness of new ideas and encourages free-flowing discussions to accept and respond to changes (Hegazy and Ghorab, 2014).

There are several studies that examined the impact of knowledge management. Knowledge infrastructure capability and knowledge process capability

improve organizational effectiveness regarding innovation, adaptability, efficiency and market responsiveness (Gold et al., 2001). Members of an organization that has effective Knowledge management perceive the degree of the overall success of the organization is higher in comparison with the main competitors (Lee and Choi, 2003) .

Also, Knowledge application as a dimension of knowledge management use improves individual learning. Moreover, knowledge application results in personal benefits, which was assessed by measurements related to effectiveness, efficiency, innovation and learning (Al-Busaidi, 2005).

The application of knowledge management improved individual productivity regarding decision making, problem solution, timeliness, and operability assessment documentation; this improved individual productivity further positively impacts organizational productivity (Jennex and Olfman, 2006). The utilization of knowledge channels improves firms' performance (Toe and Men, 2008). The summary relation between Knowledge Management processes and Knowledge Quality criterion are as following:

Table 2.2 The summary relation between Knowledge Management processes and Knowledge Quality criterion

	Knowledge management quality				
KM Processes	Timeliness	Accuracy	Completeness	Consistency	Relevancy
Knowledge Creation	✓		✓		✓
Knowledge Storage/Retrieval			✓	✓	✓
Knowledge Transfer	✓	✓	✓		✓
Knowledge Application	✓	✓			✓

Therefore, organizations must recognize the effect of Knowledge management processes on business processes and employees (Dr. Fadia et. al, 2014). Adopting knowledge management helps organizations improving their capabilities of creating, managing, sharing and applying their knowledge. It also sharpens their business intelligence, enhances their decisions making and ultimately efficiency and effectiveness [Herschel & Jones, 2005; and Lo & Chin, 2009].

2.4 Risk Management and Knowledge Management

Despite relation between Risk management and knowledge management, the practices have so far been studied and implemented almost independently. Enterprise Risk Management requires the integration of organizational silos and more importantly, exchanging and application of knowledge from different operations areas. However, Knowledge management has rarely been mentioned in risk management (Rodriguez, 2014).

There are only some articles that attempt to combine knowledge management and Risk management. Typically the approach has been more on identifying risks of knowledge management practice rather than applying knowledge management to Risk management. Massingham (2010) describes "knowledge risk management," the application of risk management principles, mainly risk scoring approaches, to manage risks relating to knowledge (especially its loss) in a case study from the Australian Department of Defence.

Magementan and Desouza (2012) also use the phrase "knowledge risk management" to refer to the risks associated with knowledge management, for example, that too much sharing of knowledge can adversely impact competitive advantage. They categorize these knowledge risks and examine how these risks affect knowledge transfer. The other interaction between Risk Management and Knowledge Management in the literature is at a higher level. It builds on the consideration of RM as part of security in Knowledge management programs developed by Jennex and Zyngier (2007), to cover the governance of Knowledge management programs and the

risk factors affecting a Knowledge management program. Moreover, (Rodriguez and Edwards, 2014) empirically explained that aligning Knowledge Management and Risk Management processes should achieve better Risk management results in risk control.

Even though, knowledge management helps the organization increase knowledge quality and optimizes usage of knowledge and experiences which are a vital factor in effective risk management. There is no paper study about the benefit of such aspect in public organization yet. Therefore, this research objective is to examine the benefit from integrating Knowledge management process into Risk management process in public organizations.

CHAPTER 3
THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

In this chapter, the research model, through the integrative framework and the hypotheses, explained the relationship between Risk management and Knowledge management using knowledge as a means. The theoretical foundations from previous research were presented in order to construct the new research framework.

3.1 The Integrative Framework

According to the literatures, knowledge was significantly impacted Risk Management effectiveness. Risk Management processes required knowledge to operate. The relationship between the process and knowledge were following:

RM process	• Process Description	Relationship with Knowledge
Risk Identification	• Process of enumerating risks that could potentially prevent enterprise achieving its objectives as many as possible. (Laurie Williams, 2004). • Effective risk identification ensures risk management effectiveness (Tcankova, 2002). • The better understanding of the sources lead to more meaningful and effective the management of risks (Heinz and Peter, 2010).	• Knowledge that used in Risk Management generated from experiences of employees in organizations. (Chapman, 2006). • Experience in employees provides the list of risks that go into the identified risk list. (Rodriguez, 2009) • Knowledge helps forecasting the risk that could happen apart from risk that happen in the past. (Rodriguez, 2009) • Without knowledge, organization will overlook potential risks (Chapman, 2006).

Risk Analysis	• Process of considering the consequence and likelihood to estimate unprotected risk without controls in place (Partnerships BC, 2005). • Organization transforms identified risks into decision making information, then considers and made judgment about the probability and the consequences of the risk (Laurie Williams, 2004). • Risk analysis is important for making sense in specific situations and provides adequate material for decision making (Vrijling, Hengel and Houben, 1995).	• Knowledge storage and experiences provides the element of the risk analysis, what happened in the past and its frequency which help organization analyze the risk more accurate. (Emanuel lauria; et al., 2014). • Knowledge need to be completed, accurate and updated as much as possible to ensure the effectiveness. (Chapman, 2006). • The relevancy and consistency of knowledge ensure that knowledge itself is reliable for using in analyzing the risks. (Chapman, 2006).
Risk Evaluation	• Risk evaluation is about deciding whether risks are acceptable or need treatment to the understanding of the likely risk exposure or potential opportunity arising from a business activity (Lauria, 2015). • It is essential to consider risk appetite of the organizations and decide upon acceptable or unacceptable risk. The acceptable level of risk depends upon the degree of voluntaries (Partnerships BC, 2005). • It is cost-effective and necessary to choose, prioritize and implement the most appropriate combination of risk treatments. (Chapman, 2006).	• Organization uses knowledge such as documentations and their experiences to evaluate the impact of each risk to their objectives and compare it with their risk appetite (Heinz and Peter, 2010). • Organization risk appetite come from the knowledge in organization, their experiences and documentation that store the past impact in the past. (Heinz and Peter, 2010). • Since the impacts of the risk are varied. The effectiveness of this process depend on the completeness of knowledge as well as update of knowledge (Chapman, 2006)
Risk Treatment	• Risk treatment involves selecting and implementing one or more options for treating risks. (Lauria, 2015). • The objective is to ensure that effective strategies are in place to minimize the frequency and severity of the identified risk (Partnerships BC, 2005).	• Knowledge provide organization list of options that are employed in the past and their results .(Heinz and Peter, 2010). • Knowledge provides organization innovative idea and solutions for the process (Rodriguez, 2009)

	• Having a good awareness of residual risk is important in monitoring and reviewing risk on an ongoing basis (Partnerships BC, 2005).	• Knowledge provide organizations effective treatment implementation plan from the experiences, what they have to do as well as what they have to improve from the past. (Rodriguez, 2009)

Knowledge Management is to create competitive advantage for organizations by manages knowledge within organization to its fullest potential to optimize core activities (Becerra et al., 2004). Its' process consists of: knowledge creation, knowledge storage/retrieval, knowledge transfer and knowledge application.

Knowledge management performance can be measured by knowledge quality. The top criteria for knowledge quality that were most frequently discussed in the previous literature are Timeliness, Accuracy, Completeness, Consistency and Relevancy. The definition of the criteria is following (Beverly K. Kahn et al., 2002):

Timeliness: The extent to which the age of the knowledge is appropriate for the task at hand and the time used for accessed.

Accuracy: The extent to which knowledge is correct, reliable, and certified free of error. Accurate knowledge reflects the underlying reality.

Completeness: The extent to which knowledge are of sufficient breadth, depth, and scope of the task at hand. Incomplete knowledge can lead its organization astray.

Consistency of Presentation: The extent to which knowledge are always presented in the same format and are compatible with previous data.

Relevancy: The extent to which knowledge are applicable and helpful for the task at hand.

The following table illustrated how each process contributes to Knowledge Quality. (Nonaka et al., 2000)

	Knowledge Quality				
KM Processes	Timeliness	Accuracy	Completeness	Consistency	Relevancy
Knowledge Creation	✓	✓	✓		✓
Knowledge Storage/Retrieval			✓	✓	✓
Knowledge Transfer	✓	✓	✓		✓
Knowledge Application	✓	✓	✓		✓

3.2 Hypotheses

Hypotheses of this research were generated from the empirical finding in previous researches. It showed that Risk management processes require knowledge to effectively operate.

Risk identification is the basic step of risk management. It reveals and determines the potential risks. Effective risk identification ensures risk management effectiveness (Tcankova, 2002). Organization must enumerate risks that could potentially prevent the program, enterprise, or investment from achieving its objectives as many as possible. (Laurie Williams, 2004). The better the understanding of the sources, the better the outcomes of the risk assessment process and the more meaningful and effective will be the management of risks (Heinz and Peter, 2010).

Organization uses techniques such as brainstorming, meeting and comparing with documentations to generate risks. These techniques use knowledge such as experience in employees provides the list of risks that occurred in the past that go into the identified risk list. (Rodriguez, 2009). Knowledge both in the field and relevant field helps organization forecasting the risk that could possibly happen apart from risk that happen in the past. (Rodriguez, 2009). Without knowledge, it's more likely that organization will have blind spots that could cause their objective

(Chapman, 2006). Therefore, the quality of knowledge which is Timeliness , Accuracy, Completeness, Relevancy and Consistency of Presentation ensure the effectiveness of the risk identification process. Hence, it is hypothesized that:

Hypothesis # 1: Knowledge Management Quality is positively associated with Risk identification process effectiveness

H1a: Knowledge Timeliness is positively associated with Risk identification process effectiveness (Rodriguez, 2009)

H1b: Knowledge Accuracy is positively associated with Risk identification process effectiveness (Chapman, 2006)

H1c: Knowledge Completeness is positively associated with Risk identification process effectiveness (Chapman, 2006)

H1d: Knowledge Consistency is positively associated with Risk identification process effectiveness (Heinz and Peter, 2010)

H1e: Knowledge Relevancy is positively associated with Risk identification process effectiveness (Rodriguez, 2009)

Risk Analysis is the process of considering the consequence and likelihood to estimate unprotected risk. Organization transforms the risks that were identified into decision-making information, considers and make judgment about the probability and the consequences of the risk (Laurie Williams, 2004).

To determine either the likelihood or consequences of the risks, organizations required knowledge. Knowledge storage provides the root cause of the risks, what happened in the past which help organization analyze the risk more accurate. Knowledge can analyzes the likelihood of the risk by compare it with experiences which has more accuracy than analyze by ones that has no experiences to refer to the risks. (Emanuel lauria; et al., 2014). Therefore, risk analysis requires Knowledge Quality to be Timeliness, Accuracy, Completeness, Relevancy and Consistency of Presentation for its effectiveness (Chapman, 2006). Hence, it is hypothesized that:

Hypothesis # 2: Knowledge Management Quality is positively associated with Risk analysis process effectiveness

H2a: Knowledge Timeliness is positively associated with Risk analysis process effectiveness (Rodriguez, 2009)

H2b: Knowledge Accuracy is positively associated with Risk analysis process effectiveness (Chapman, 2006)

H2c: Knowledge Completeness is positively associated with Risk analysis process effectiveness (Chapman, 2006)

H2d: Knowledge Consistency is positively associated with Risk analysis process effectiveness (Heinz and Peter, 2010)

H2e: Knowledge Relevancy is positively associated with Risk analysis process effectiveness (Rodriguez, 2009)

Risk evaluation process is about deciding whether risks are acceptable or need treatment depend on risk exposure or potential opportunity arising from a business activity (Lauria, 2015). It is essential to consider risk appetite of the organizations and decide upon acceptable or unacceptable risk. The acceptable level of risk depends upon the degree of voluntaries. Should the protected risk be greater than the tolerable risk then the specific risk needs additional control measures. It is cost-effective and necessary to choose, prioritize and implement the most appropriate combination of risk treatments. (Chapman, 2006).

Organization uses knowledge such as documentations and employees' experiences to evaluate the impact of each risk to their objectives and compare it with their risk appetite (Heinz and Peter, 2010). Organization risk appetite come from the knowledge in organization, their experiences and documentation that store the past impact in the past (Heinz and Peter, 2010). Since the impacts of the risk are varied, the effectiveness of this process depends on the Knowledge Quality which is Timeliness , Accuracy, Completeness, Relevancy and Consistency of Presentation (Chapman, 2006) Hence, it is hypothesized that:

Hypothesis # 3: Knowledge Management Quality is positively associated with Risk evaluation process effectiveness

H3a: Knowledge Timeliness is positively associated with Risk Evaluation process effectiveness (Rodriguez, 2009)

H3b: Knowledge Accuracy is positively associated with Risk Evaluation process effectiveness (Chapman, 2006)

H3c: Knowledge Completeness is positively associated with Risk Evaluation process effectiveness (Chapman, 2006)

H3d: Knowledge Consistency is positively associated with Risk Evaluation process effectiveness (Heinz and Peter, 2010)

H3e: Knowledge Relevancy is positively associated with Risk Evaluation process effectiveness (Rodriguez, 2009)

Risk treatment involves selecting and implementing one or more options for treating risks (Lauria, 2015). The objective is to ensure that effective strategies are in place to minimize the frequency and severity of the identified risk. Having a good awareness of residual risk is important in monitoring and reviewing risk on an ongoing basis.

Knowledge is required for inventing or choosing the effective options for treating risks. Knowledge provides organization list of options that are employed in the past and their effectiveness (Heinz and Peter, 2010). It also provides innovative ideas and solutions for the process (Rodriguez, 2009). Knowledge provides organizations effective treatment implementation plan from the experiences, what they have to do as well as what they have to improve (Rodriguez, 2009). Therefore, Risk Treatments requires Knowledge Quality; Timeliness, Accuracy, Completeness, Relevancy and Consistency of Presentation for its effectiveness (Chapman, 2006). Hence, it is hypothesized that:

Hypothesis # 4: Knowledge Management Quality is positively associated with Risk treatment process effectiveness

H4a: Knowledge Timeliness is positively associated with Risk Treatment process effectiveness (Rodriguez, 2009)

H4b: Knowledge Accuracy is positively associated with Risk Treatment process effectiveness (Chapman, 2006)

H4c: Knowledge Completeness is positively associated with Risk Treatment process effectiveness (Chapman, 2006)

H4d: Knowledge Consistency is positively associated with Risk Treatment process effectiveness (Heinz and Peter, 2010)

H5d: Knowledge Relevancy is positively associated with Risk Treatment process effectiveness (Rodriguez, 2009)

To summarize the hypotheses as above, the research model is illustrated in figure 3.

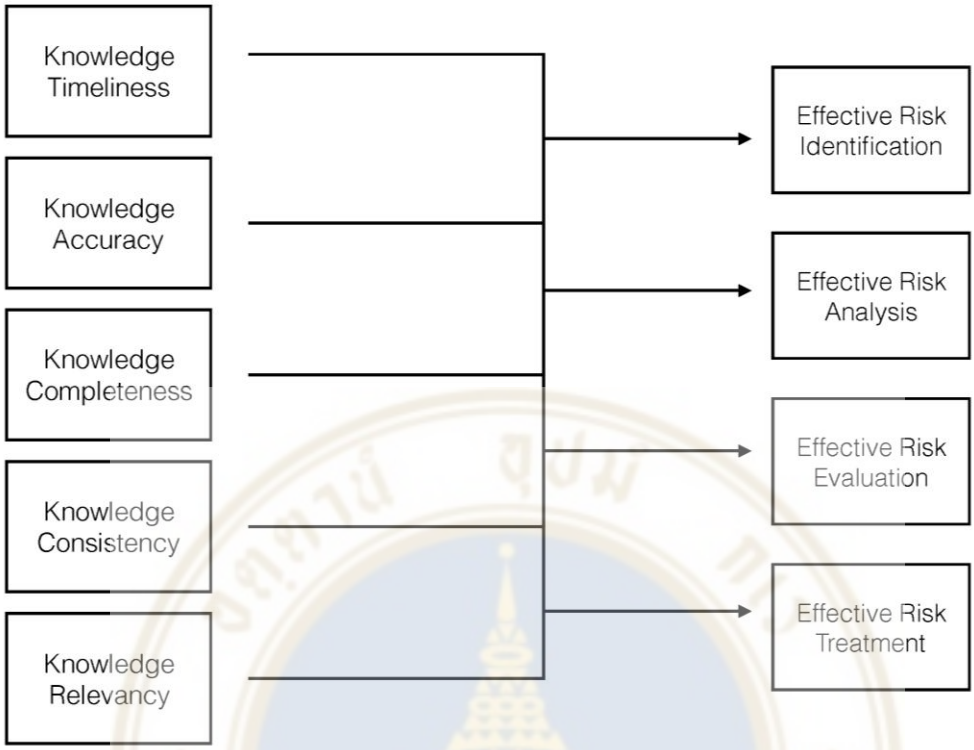

Figure 3.1 Research Model

CHAPTER IV
RESEARCH METHODOLOGY

This chapter presents the methodological discussion. The research method and measurement of this study were developed through prior empirical study research. This chapter consists of Research Design, Questionnaire Development, Sample Selection, Data Collection and, Data Analysis.

4.1 Research Design

This research used quantitative research methodology as it was used measurable data to formulate facts and uncover patterns in research. It was used to quantify attitudes and other defined variables and generalize results from a larger sample population (Kaplan and Duchon,1988). Survey were used to explore the relationship between Risk Management effectiveness and Knowledge Quality. Survey was selected for this study because it is a method of primary data collection and has capability of collecting big amount of data about individual respondents at one time. It also provides accurate means of assessing information about a population (Kumer, 1999). All of the data was analyzed using descriptive and correlation analysis. Descriptive statically analysis was used to analyze demographic data and basic findings. Correlation analysis was employed to explore the relationship between variables.

4.2 Questionnaire Development

The questionnaire was constructed based on empirical studies on Risk Management concept and Knowledge Management concept. The questionnaire was consists of four parts. The purpose of the first parts of questionnaires was to get general information of respondents, such as departments and experiences in Risk

Management. The purpose of the second parts of questionnaires was to explore the relationship between Risk Management effectiveness and Knowledge Management performance. The respondents were asked to answer questionnaire items with five-point Likert scale anchored by 1 (“Strongly Disagree”) and 5 (“Strongly Agree”). Table 4.1 showeds Risk Management process variables and table 4.2 showeds Knowledge Quality variables that were constructed from items in questionnaires. The final part of questionnaires was open for other suggestions about the topic. All questionnaire items appear in the Appendix 1.

Table 4.1 Risk Management process variables items

Risk Management Effectiveness items	Variables
Your organization can identify risks comprehensively.	Risk Identification
Your organization can identify risks quickly.	
Your organization can identify all risks causes correctly.	Risk Analysis
Your organization can analyze probability of risk occurring accurately according to the data in the past.	
Your organization can analyze the impact of risks accurately and according to the data in the past.	
Your organization can set the risk acceptance level properly.	Risk Evaluation
Your organization can decide which risks is acceptable effectively	
Your organization can find effectively risk treatment.	Risk Treatment
Your organization can find cost-effective risk treatment.	
Your organization can plan Risk Management plans effectively	

Table 4.2 Knowledge Quality variables items

Knowledge Quality items	Variables
Knowledge in your organization is updated	Timeliness
Knowledge in your organization is highly accessible.	
Knowledge in your organization is accurate.	Accuracy
Amount of Knowledge in your organization is enough for working.	Completeness
Knowledge in your organization is completed.	
Knowledge in your organization is relevance to employee tasks.	Relevancy
Knowledge in your organization shwere same presentation format.	Consistency

Validity

The questionnaire items were tested the content validity; each items was translated from English to Thai and sent to Panel of experts familiar with the Risk Management and Knowledge Management concept to determine the questionnaire's validity (Czaja and Blair, 2004) Then it was adjusted the items regarding to the comments to meet the standard of questionnaire validity.

Reliability

Cronbach Alpha was used to check reliability of each variable that constructed by at least two items. It is used as a estimate of the reliability of a psychometric test. It has been proposed that alpha can be viewed as the expected correlation of two tests that measure the same construct. By using this definition, it is implicitly assumed that the average correlation of a set of items is an accurate estimate of the average correlation of all items that pertain to a certain construct (Nunnally, 1978). The Cronbach Alpha was calculated by testing the questionnaire with pilot

experiment. Pilot experiments are frequently carried out before large-scale quantitative research, in an attempt to avoid time and money being wasted on an inadequately designed project. A pilot study is usually carried out on members of the relevant population, but not on those who will form part of the final sample (Haralambos and Holborn, 2000).

In this study, thirty respondents who work in Thai public organization who had the same characteristic with the sample were respondents. Table 4.3 showed the Cronbach Alpha in each variable. A high value of alpha supports high reliability (maximum value being 1) and a low value indicates low reliability (minimum value being 0.0). For variables constructed from one variable, the reliability calculated from Test–Retest reliability method. Test–retest reliability is the variation in measurements taken by a instrument on the same item, under the same conditions, and in a short period of time (The Research Methods Knowledge Base, 2006) Table 4.4 showeded mean, standard deviation and Pearson correlation significant of the rest of variables (Correlation is significant at the 0.01 level (2-tailed)).

Table 4.3 The piloted Cronbach Alpha in each variable (N=30)

Variables (Risk Management effectiveness)	Cronbach Alpha
Risk Identification	.858
Risk Analysis	.947
Risk Evaluation	.924
Risk Treatment	.913
Variables (Knowledge Quality)	Cronbach Alpha
Timeliness	.655
Completeness	.857

Table 4.4 The Test-Retest statistic of pilot data (N=30)

Variables (Knowledge Quality)	Mean (1st)	Mean (2nd)	Standard Deviation (1st)	Standard Deviation (2nd)	Sig
Accuracy	3.8	3.8667	.71438	.57135	.00
Relevancy	3.9667	4.1333	.66868	.62881	.00
Consistency	3.9	4	.54772	.58722	.00

4.3 Sample Selection

This research used stratified sampling in Thai public organizations, and then snowball sampling technique was used to recruit future subjects from among their acquaintances. Targets of this study were an employee who has experiences or responsibility related to Risk Management and Knowledge Management. The questionnaires were administrated to target on both manager and operational level employee. They were asked to rate their opinion on their organization Risk Management effectiveness and Knowledge Management effectiveness.

4.4 Data Collection

The questionnaires were distributed to employees in Thai public organization; Office of National Broadcasting and Telecommunication Communications Commission, Electricity Generating Authority of Thailand, Ministry of Labour, Ministry of Culture, Office of Auditor General of Thailand and other Thai public organizations. The data were collected in December 2016. The sample size of this study was calculated by using the Taro Yamane's simplified formula with 95% confidence level and population of sample, 1.27 million in 2015 (SITA, 2016). Therefore, the calculation for the sample size by using Yamane's formula (Israel, 1992) was as given in below

When: n = sample size,

N = population, and

e = error of the sampling.

Thus, the sample size for this study can be calculated as follow:

n = 1,270,000,000 / 1 + ((1,270,000,000)(0.05)2)

= 399.99 or approximately 400 samples

4.5 Data Analysis

This study used Mean, One way Anova and Linear Regression as statistical tools. First, Mean was used to show the frequencies and descriptive information of responses. Then One way Anova was used for comparing means between group to check if there was any difference in respondents group. Finally, Linear Regression was used to test hypotheses in this study. For significant level, it was set at 0.05 (α=0.05) in order to provide more stringent to the hypotheses.

CHAPTER V
RESEARCH RESULTS

This chapter presented the research findings and the test results based on the proposed model. The chapter was divided into three parts. The first part described respondent's demographic profile. The second explain descriptive statistic. The third part deals with hypothesis testing.

5.1 Respondent Demographic Profile

Demographic characteristics of the respondents participating in the main study (sample size = 400) were reported in table 5.1

Table 5.1. Respondent Demographic Profiles

Demographic	Frequency	Percent
1. Gender		
- Male	189	47.3
- Female	211	52.7
2. Age		
- 19-24 years	58	14.5
- 25-34 years	107	26.8
- 35-44 years	131	32.8
- 45-54 years	62	15.5
- over 55 years	42	10.5

Table 5.1. Respondent Demographic Profiles (cont.)

3. Organization		
- Office Of NBTC	86	21.5
- Electricity Generating Authority of Thailand	73	18.3
- Ministry of Labour	61	15.3
- Ministry of Culture	56	14.0
- Office of Auditor General of Thailand	58	14.5
- Others	66	16.5
4. Position		
- Equivalent to Junior Operation Official	88	22
- Equivalent to Middle Operation Official	163	40.8
- Equivalent to Senior Operation Official	113	28.2
- Equivalent to Official Director	36	9
5. Experiences in Risk Management		
- under 1 years	50	12.5
- 1-3 years	141	35.2
- 4-5 years	99	24.8
- over 5 years	110	27.5
5. Experiences in Knowledge Management		
- under 1 years	82	20.5
- 1-3 years	160	40
- 4-5 years	88	22
- over 5 years	70	17.5

189 respondents (47.3%) of the respondents were male, and 211 respondents (52.7%) were female. Two-thirds of the respondents' age were in the range of 25 – 44 years with 131 respondents (32.8%) were between 35 – 44 years and 107 respondents (26.8%) were between 25 – 34 years, the rest consist of 45 – 54 years (15.5%), 19-24 years (14.5%) and over 55 years (10.5%)

Respondents mainly come from 5 organizations, 86 respondents (21.5%) were from Office of NBTC, 73 respondents (18.3%) were from Electricity Generating Authority of Thailand, 61 respondents (15.3) were from Ministry of Labour, 56 respondents (14%) were from Ministry of Culture, 58 respondents (14.5%) were from Office of Auditor General of Thailand and the rest which were 66 respondents (16.5%) come from multiple Thai public organization.

For respondents' position, Middle Operation Official was the biggest group with 163 respondents (40.8%), following by Senior Operation Official with 113 respondents (28.2%), Junior Operation Official with 88 respondents (22%) and Official Director with 36 respondents (9%)

As for Experience in Risk Management, 141 respondents (35.2%) had 1-3 years in Risk Management, 110 respondents (27.5%) had experience in Risk Management over 5 years, 99 respondents (24.8%) had 4-5 years in Risk Management and 50 respondents (12.5%) had experience in Risk Management less than 1 year.

Finally, As for Experience in Knowledge Management, 160 respondents (40%) had 1-3 years in Risk Management, 88 respondents (22%) had 4-5 years in Knowledge Management, 82 respondents (20.5%) had experience in Risk Management less than 1 year and 70 respondents (17.5%) had over 5 years experiences in Knowledge Management.

5.2 Descriptive Statistics of Variables

Means and standard deviation tables of Rating of Risk Management effectiveness in respondents' organizations (table 5.2) and Risk Management benefits (table 5.3) were computed and reported. Also, means and standard deviation tables of Rating of Knowledge Management effectiveness in respondents' organizations (table 5.4) and Knowledge Management benefits (table 5.5) were computed and reported respectively.

Table 5.2 Rating of Risk Management effectiveness in respondents' organizations

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean	S.D.	Level
45 (11.3%)	229 (57.3%)	98 (24.5%)	28 (7%)	0 (0%)	3.7275	.75144	High

Table 5.3 Benefit of Risk Management

Items	Mean	S.D.	Level
Risk Management improves decision making.	4.1825	.64826	High
Risk Management reduces management cost.	4.1275	.63423	High
Risk Management helps organization plan business planning.	4.2475	.69097	High
Risk Management reduces risk impact that could happen to the organization.	4.1975	.66302	High
Risk Management improves employee's capabilities.	4.0025	.68092	High
Risk Management improves organization efficiency.	4.1575	.65096	High
Risk Management improve organization financial planning	3.68083	0.7916	High
Total	4.0851	0.68	High

The means of Rating of Risk Management effectiveness was 3.7275, and Standard Deviation was .75144. For Risk Management benefits, the mean was 4.0851, and Standard Deviation was .068.

Table 5.4 Rating of Knowledge Management effectiveness in respondents' organizations

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	Mean	S.D.	Level
45 (11.3%)	197 (49.3%)	118 (29.5%)	40 (10%)	0 (0%)	3.6175	.81416	High

Table 5.5 Benefits of Knowledge Management

Items	Mean	S.D.	Level
Knowledge Management improve organization working process	4.1275	.61006	High
Knowledge Management increase creativity	4.0725	.59001	High
Knowledge Management creates innovations	4.0325	.67274	High
Knowledge Management help integrates knowledge between fields.	4.1025	.61068	High
Knowledge Management improves employee's capabilities.	4.1525	.64830	High
Knowledge Management improves organization efficiency.	4.1475	.62186	High
Total	4.1058	0.6256	High

The means of Rating of Knowledge Management effectiveness was 3.6175, and Standard Deviation was .81416. For Knowledge Management benefits, the mean was 4.1058, and Standard Deviation was .06256.

After means and standard deviations were reported, ANOVA Analysis and multiple comparison tables were used for comparing means between Experience on Risk Management and Experience on Knowledge management to check if there was any statistic significant in Response of Risk Management effectiveness and Knowledge Manage effectiveness respectively. (table 5.6 –table 5.14)

Table 5.6 One-way ANOVA analysis of experiences in Risk Management on Risk Management effectiveness variables

		Sum of Squares	df	Mean Square	F	Sig.
RI	Between Groups	13.164	3	4.388	7.474	.000
	Within Groups	232.480	396	.587		
	Total	245.644	399			
RA	Between Groups	9.062	3	3.021	4.343	.005
	Within Groups	275.416	396	.695		
	Total	284.478	399			
RE	Between Groups	4.698	3	1.566	2.394	.068
	Within Groups	259.036	396	.654		
	Total	263.734	399			
RT	Between Groups	6.793	3	2.264	3.776	.011
	Within Groups	237.493	396	.600		
	Total	244.286	399			

Table 5.7 Comparing Mean on Risk Management effectiveness variables (Risk Identification) by working experiences on Risk Management

Working experiences in Risk Management	Working experiences in Risk Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	-.24149	.12612	.056	-.4894	.0064
	4 - 5 years	-.43889*	.13293	.001	-.7002	-.1775
	more than 5 years	-.55455*	.13068	.000	-.8115	-.2976
2 -3 years	less than 1 years	.24149	.12612	.056	-.0064	.4894
	4 - 5 years	-.19740	.10047	.050	-.3949	.0001
	more than 5 years	-.31306*	.09747	.001	-.5047	-.1214
4 - 5 years	less than 1 years	.43889*	.13293	.001	.1775	.7002
	2 -3 years	.19740	.10047	.050	-.0001	.3949
	more than 5 years	-.11566	.10615	.277	-.3243	.0930
more than 5 years	less than 1 years	.55455*	.13068	.000	.2976	.8115
	2 -3 years	.31306*	.09747	.001	.1214	.5047
	4 - 5 years	.11566	.10615	.277	-.0930	.3243

*. The mean difference was significant at the 0.05 level.

Table 5.8 Comparing Mean on Risk Management effectiveness variables (Risk Analysis) by working experiences on Risk Management

Working experiences in Risk Management	Working experiences in Risk Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	-.34340*	.13727	.013	-.6133	-.0735
	4 - 5 years	-.41798*	.14469	.004	-.7024	-.1335
	more than 5 years	-.50182*	.14224	.000	-.7815	-.2222
2 -3 years	less than 1 years	.34340*	.13727	.013	.0735	.6133
	4 - 5 years	-.07458	.10935	.496	-.2896	.1404
	more than 5 years	-.15841	.10609	.136	-.3670	.0502
4 - 5 years	less than 1 years	.41798*	.14469	.004	.1335	.7024
	2 -3 years	.07458	.10935	.496	-.1404	.2896
	more than 5 years	-.08384	.11553	.468	-.3110	.1433
more than 5 years	less than 1 years	.50182*	.14224	.000	.2222	.7815
	2 -3 years	.15841	.10609	.136	-.0502	.3670
	4 - 5 years	.08384	.11553	.468	-.1433	.3110

*. The mean difference was significant at the 0.05 level.

Table 5.9 Comparing Mean on Risk Management effectiveness variables (Risk Evaluation) by working experiences on Risk Management

Working experiences in Risk Management	Working experiences in Risk Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	-.16830	.13312	.207	-.4300	.0934
	4 - 5 years	-.32798*	.14032	.020	-.6038	-.0521
	more than 5 years	-.30273*	.13795	.029	-.5739	-.0315
2 -3 years	less than 1 years	.16830	.13312	.207	-.0934	.4300
	4 - 5 years	-.15968	.10605	.133	-.3682	.0488
	more than 5 years	-.13443	.10289	.192	-.3367	.0678
4 - 5 years	less than 1 years	.32798*	.14032	.020	.0521	.6038
	2 -3 years	.15968	.10605	.133	-.0488	.3682
	more than 5 years	.02525	.11204	.822	-.1950	.2455
more than 5 years	less than 1 years	.30273*	.13795	.029	.0315	.5739
	2 -3 years	.13443	.10289	.192	-.0678	.3367
	4 - 5 years	-.02525	.11204	.822	-.2455	.1950

*. The mean difference was significant at the 0.05 level.

Table 5.10 Comparing Mean on Risk Management effectiveness variables (Risk Treatment) by working experiences on Risk Management

Working experiences in Risk Management	Working experiences in Risk Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	-.16730	.12747	.190	-.4179	.0833
	4 - 5 years	-.34101*	.13436	.012	-.6052	-.0769
	more than 5 years	-.38091*	.13209	.004	-.6406	-.1212
2 -3 years	less than 1 years	.16730	.12747	.190	-.0833	.4179
	4 - 5 years	-.17371	.10154	.088	-.3733	.0259
	more than 5 years	-.21360*	.09852	.031	-.4073	-.0199
4 - 5 years	less than 1 years	.34101*	.13436	.012	.0769	.6052
	2 -3 years	.17371	.10154	.088	-.0259	.3733
	more than 5 years	-.03990	.10728	.710	-.2508	.1710
more than 5 years	less than 1 years	.38091*	.13209	.004	.1212	.6406
	2 -3 years	.21360*	.09852	.031	.0199	.4073
	4 - 5 years	.03990	.10728	.710	-.1710	.2508

*. The mean difference was significant at the 0.05 level.

Table 5.11 One-way ANOVA analysis of experiences in Risk Management on Knowledge Management effectiveness variables

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
RI	Between Groups	3.487	3	1.162	1.901	.129
	Within Groups	242.157	396	.612		
	Total	245.644	399			
RA	Between Groups	6.133	3	2.044	2.908	.034
	Within Groups	278.345	396	.703		
	Total	284.478	399			
RE	Between Groups	7.333	3	2.444	3.775	.011
	Within Groups	256.402	396	.647		
	Total	263.734	399			
RT	Between Groups	3.352	3	1.117	1.836	.140
	Within Groups	240.935	396	.608		
	Total	244.286	399			

Table 5.12 Comparing Mean on Risk Management effectiveness variables (Risk Analysis) by working experiences on Knowledge Management

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.21677	.11386	.058	-.0071	.4406
	4 - 5 years	.09063	.12868	.482	-.1624	.3436
	more than 5 years	-.11359	.13643	.406	-.3818	.1546
2 -3 years	less than 1 years	-.21677	.11386	.058	-.4406	.0071
	4 - 5 years	-.12614	.11127	.258	-.3449	.0926
	more than 5 years	-.33036*	.12014	.006	-.5666	-.0942
4 - 5 years	less than 1 years	-.09063	.12868	.482	-.3436	.1624
	2 -3 years	.12614	.11127	.258	-.0926	.3449
	more than 5 years	-.20422	.13427	.129	-.4682	.0598
more than 5 years	less than 1 years	.11359	.13643	.406	-.1546	.3818
	2 -3 years	.33036*	.12014	.006	.0942	.5666
	4 - 5 years	.20422	.13427	.129	-.0598	.4682

*. The mean difference was significant at the 0.05 level.

Table 5.13 Comparing Mean on Risk Management effectiveness variables (Risk Evaluation) by working experiences on Knowledge Management

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.15404	.10928	.159	-.0608	.3689
	4 - 5 years	-.00818	.12351	.947	-.2510	.2346
	more than 5 years	-.22944	.13094	.081	-.4869	.0280
2 -3 years	less than 1 years	-.15404	.10928	.159	-.3689	.0608
	4 - 5 years	-.16222	.10679	.130	-.3722	.0477
	more than 5 years	-.38348*	.11531	.001	-.6102	-.1568
4 - 5 years	less than 1 years	.00818	.12351	.947	-.2346	.2510
	2 -3 years	.16222	.10679	.130	-.0477	.3722
	more than 5 years	-.22127	.12887	.087	-.4746	.0321
more than 5 years	less than 1 years	.22944	.13094	.081	-.0280	.4869
	2 -3 years	.38348*	.11531	.001	.1568	.6102
	4 - 5 years	.22127	.12887	.087	-.0321	.4746

*. The mean difference was significant at the 0.05 level.

Table 5.14 Comparing Mean on Risk Management effectiveness variables (Risk Treatment) by working experiences on Knowledge Management

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.12683	.10594	.232	-.0814	.3351
	4 - 5 years	.06887	.11972	.565	-.1665	.3042
	more than 5 years	-.12674	.12693	.319	-.3763	.1228
2 -3 years	less than 1 years	-.12683	.10594	.232	-.3351	.0814
	4 - 5 years	-.05795	.10352	.576	-.2615	.1456
	more than 5 years	-.25357*	.11178	.024	-.4733	-.0338
4 - 5 years	less than 1 years	-.06887	.11972	.565	-.3042	.1665
	2 -3 years	.05795	.10352	.576	-.1456	.2615
	more than 5 years	-.19562	.12492	.118	-.4412	.0500
more than 5 years	less than 1 years	.12674	.12693	.319	-.1228	.3763
	2 -3 years	.25357*	.11178	.024	.0338	.4733
	4 - 5 years	.19562	.12492	.118	-.0500	.4412

*. The mean difference was significant at the 0.05 level.

Table 5.6 showed the output of the ANOVA analysis ; the result showed that there was statistically significant in Risk Identification effectiveness (p = 0.00), Risk Analysis effectiveness (p = 0.005) and Risk Treatment effectiveness (p = 0.11) between experience in Risk Management.

Table 5.7, multiple Comparison, show that there was a statistically significant difference in Risk Identification between respondents that had working experiences in Risk Management less than 1 year and those who had 4 - 5 years experiences (p = 0.001) and those who had more than 5 years experiences (p = 0.00). Also, there was a statistically significant difference in Risk Identification between respondents that had 2 – 3 years working experiences in Risk Management and those who had 4 - 5 years experiences (p = 0.50) and those who had more than 5 years experiences (p = 0.01).

Table 5.8 showed multiple Comparison, indicate that there was a statistically significant difference in Risk Analysis between first, respondents that had working experiences in Risk Management less than 1 year and those who had 2 – 3 years experiences (p = 0.13). Second, between those who had working experiences in Risk Management less than 1 year and those who had 4 – 5 years experiences (p = 0.04) and third, between those who had working experiences in Risk Management less than 1 year and those who had more than 5 years experiences (p = 0.00)

Table 5.9 showed multiple Comparison, show that there was a statistically significant difference in Risk Evaluation between first, respondents that had working experiences in Risk Management less than 1 year and those who had 4 – 5 years experiences (p = 0.20). Second, between those who had working experiences in Risk Management less than 1 year and those who had more than 5 years experiences (p = 0.29).

Table 5.10, multiple Comparison, show that there was a statistically significant difference in Risk Treatment between respondents that had working experiences in Risk Management less than 1 year and those who had 4 - 5 years experiences (p = 0.012) and those who had more than 5 years experiences (p = 0.04). Also, there was a statistically significant difference in Risk Identification between respondents that had 2 – 3 years working experiences in Risk Management and those who had more than 5 years (p = 0.031).

Table 5.11 showed the response of Risk Management effectiveness that group into Risk Management processes variables with Mean and Stand Deviation. The table showed that all Risk Management processes variables were in high level with mean = 3.747675 and Standard Deviation = .80612.

Table 5.12 showed the output of the ANOVA Analysis; the result showed that it was statistically significant in Risk Analysis effectiveness (p = 0.034) and with Risk Evaluation effectiveness (p = 0.11) between experience in Knowledge Management.

Table 5.13, multiple Comparison, show that there was a statistically significant difference in Risk Analysis between respondents that had 2 -3-year working experiences in Knowledge Management and those who had experienced more than 5 years (p = 0.006)

Finally, Table 5.14, multiple Comparison, show that there was a statistically significant difference in Risk Evaluation between respondents that had 2 -3-year working experiences in Knowledge Management and those who had more than 5 years (p = 0.001)

Table 5.15 One-way ANOVA analysis of experiences in Risk Management on Knowledge Management effectiveness variables

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Timeliness	Between Groups	4.335	3	1.445	2.976	.031
	Within Groups	192.275	396	.486		
	Total	196.610	399			
Accuracy	Between Groups	1.967	3	.656	.895	.444
	Within Groups	290.030	396	.732		
	Total	291.998	399			
Completeness	Between Groups	1.607	3	.536	.741	.528
	Within Groups	286.333	396	.723		
	Total	287.940	399			
Relevancy	Between Groups	2.038	3	.679	.934	.424
	Within Groups	288.060	396	.727		
	Total	290.098	399			
Consistency	Between Groups	1.031	3	.344	.503	.680
	Within Groups	270.406	396	.683		
	Total	271.438	399			

Table 5.16 Comparing Mean on Knowledge Management effectiveness variables (Timeliness) by working experiences on Risk Management

Multiple Comparisons

Working experiences in Risk Management	Working experiences in Risk Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	-.14993	.11469	.559	-.4458	.1460
	4 - 5 years	-.32788*	.12089	.035	-.6398	-.0160
	more than 5 years	-.25818	.11885	.133	-.5648	.0484
2 -3 years	less than 1 years	.14993	.11469	.559	-.1460	.4458
	4 - 5 years	-.17795	.09137	.210	-.4137	.0578
	more than 5 years	-.10825	.08864	.614	-.3369	.1204
4 - 5 years	less than 1 years	.32788*	.12089	.035	.0160	.6398
	2 -3 years	.17795	.09137	.210	-.0578	.4137
	more than 5 years	.06970	.09653	.888	-.1794	.3187
more than 5 years	less than 1 years	.25818	.11885	.133	-.0484	.5648
	2 -3 years	.10825	.08864	.614	-.1204	.3369
	4 - 5 years	-.06970	.09653	.888	-.3187	.1794

*. The mean difference was significant at the 0.05 level.

Table 5.17 One-way ANOVA analysis of experiences in Knowledge Management on Knowledge Management effectiveness variables

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Timeliness	Between Groups	9.356	3	3.119	6.595	.000
	Within Groups	187.254	396	.473		
	Total	196.610	399			
Accuracy	Between Groups	27.724	3	9.241	13.848	.000
	Within Groups	264.274	396	.667		
	Total	291.998	399			
Completeness	Between Groups	26.760	3	8.920	13.524	.000
	Within Groups	261.180	396	.660		
	Total	287.940	399			
Relevancy	Between Groups	26.930	3	8.977	13.507	.000
	Within Groups	263.168	396	.665		
	Total	290.098	399			
Consistency	Between Groups	22.611	3	7.537	11.995	.000
	Within Groups	248.827	396	.628		
	Total	271.438	399			

Table 5.18 Comparing Mean on Knowledge Management effectiveness variables (Timeliness) by working experiences on Knowledge Management

Multiple Comparisons

Dependent Variable: Timeliness

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.15823	.09339	.328	-.0827	.3992
	4 - 5 years	-.04518	.10555	.974	-.3175	.2271
	more than 5 years	-.27213	.11190	.073	-.5608	.0166
2 -3 years	less than 1 years	-.15823	.09339	.328	-.3992	.0827
	4 - 5 years	-.20341	.09126	.117	-.4389	.0320
	more than 5 years	-.43036*	.09854	.000	-.6846	-.1761
4 - 5 years	less than 1 years	.04518	.10555	.974	-.2271	.3175
	2 -3 years	.20341	.09126	.117	-.0320	.4389
	more than 5 years	-.22695	.11013	.168	-.5111	.0572
more than 5 years	less than 1 years	.27213	.11190	.073	-.0166	.5608
	2 -3 years	.43036*	.09854	.000	.1761	.6846
	4 - 5 years	.22695	.11013	.168	-.0572	.5111

*. The mean difference was significant at the 0.05 level.

Table 5.19 Comparing Mean on Knowledge Management effectiveness variables (Accuracy) by working experiences on Knowledge Management

Multiple Comparisons

Dependent Variable: Accuracy

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.16159	.11095	.465	-.1247	.4478
	4 - 5 years	-.24751	.12539	.200	-.5710	.0760
	more than 5 years	-.54913*	.13294	.000	-.8921	-.2062
2 -3 years	less than 1 years	-.16159	.11095	.465	-.4478	.1247
	4 - 5 years	-.40909*	.10842	.001	-.6888	-.1294
	more than 5 years	-.71071*	.11707	.000	-1.0127	-.4087
4 - 5 years	less than 1 years	.24751	.12539	.200	-.0760	.5710
	2 -3 years	.40909*	.10842	.001	.1294	.6888
	more than 5 years	-.30162	.13083	.099	-.6392	.0359
more than 5 years	less than 1 years	.54913*	.13294	.000	.2062	.8921
	2 -3 years	.71071*	.11707	.000	.4087	1.0127
	4 - 5 years	.30162	.13083	.099	-.0359	.6392

*. The mean difference was significant at the 0.05 level.

Table 5.20 Comparing Mean on Knowledge Management effectiveness variables (Completeness) by working experiences on Knowledge Management

Multiple Comparisons

Dependent Variable: Completeness

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.23384	.11030	.148	-.0507	.5184
	4 - 5 years	-.14911	.12465	.630	-.4707	.1725
	more than 5 years	-.48223*	.13216	.002	-.8232	-.1413
2 -3 years	less than 1 years	-.23384	.11030	.148	-.5184	.0507
	4 - 5 years	-.38295*	.10778	.002	-.6610	-.1049
	more than 5 years	-.71607*	.11638	.000	-1.0163	-.4158
4 - 5 years	less than 1 years	.14911	.12465	.630	-.1725	.4707
	2 -3 years	.38295*	.10778	.002	.1049	.6610
	more than 5 years	-.33312	.13007	.053	-.6687	.0024
more than 5 years	less than 1 years	.48223*	.13216	.002	.1413	.8232
	2 -3 years	.71607*	.11638	.000	.4158	1.0163
	4 - 5 years	.33312	.13007	.053	-.0024	.6687

*. The mean difference was significant at the 0.05 level.

Table 5.21 Comparing Mean on Knowledge Management effectiveness variables (Relevancy) by working experiences on Knowledge Management

Multiple Comparisons

Dependent Variable: Relevancy

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.16037	.11072	.470	-.1253	.4460
	4 - 5 years	-.26691	.12513	.144	-.5897	.0559
	more than 5 years	-.52892*	.13266	.000	-.8712	-.1867
2 -3 years	less than 1 years	-.16037	.11072	.470	-.4460	.1253
	4 - 5 years	-.42727*	.10819	.001	-.7064	-.1481
	more than 5 years	-.68929*	.11682	.000	-.9907	-.3879
4 - 5 years	less than 1 years	.26691	.12513	.144	-.0559	.5897
	2 -3 years	.42727*	.10819	.001	.1481	.7064
	more than 5 years	-.26201	.13056	.187	-.5989	.0748
more than 5 years	less than 1 years	.52892*	.13266	.000	.1867	.8712
	2 -3 years	.68929*	.11682	.000	.3879	.9907
	4 - 5 years	.26201	.13056	.187	-.0748	.5989

*. The mean difference was significant at the 0.05 level.

Table 5.22 Comparing Mean on Knowledge Management effectiveness variables (Treatment) by working experiences on Knowledge Management

Multiple Comparisons

Dependent Variable: Consistency

Working experiences in Knowledge Management	Working experiences in Knowledge Management	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
less than 1 years	2 -3 years	.18476	.10766	.317	-.0930	.4625
	4 - 5 years	-.21979	.12167	.272	-.5337	.0941
	more than 5 years	-.44739*	.12899	.003	-.7802	-.1146
2 -3 years	less than 1 years	-.18476	.10766	.317	-.4625	.0930
	4 - 5 years	-.40455*	.10520	.001	-.6760	-.1331
	more than 5 years	-.63214*	.11359	.000	-.9252	-.3391
4 - 5 years	less than 1 years	.21979	.12167	.272	-.0941	.5337
	2 -3 years	.40455*	.10520	.001	.1331	.6760
	more than 5 years	-.22760	.12695	.278	-.5551	.0999
more than 5 years	less than 1 years	.44739*	.12899	.003	.1146	.7802
	2 -3 years	.63214*	.11359	.000	.3391	.9252
	4 - 5 years	.22760	.12695	.278	-.0999	.5551

*. The mean difference was significant at the 0.05 level.

Table 5.15 showed the output of the ANOVA analysis; the result showed that there was statistically significant in Knowledge Management effectiveness (p = 0.31) between experience in Risk Management.

Table 5.16, multiple Comparison, show that there was a statistically significant difference in Knowledge Timeliness between respondents that had 2 – 3 years working experiences in Knowledge and those who had 4 - 5 years experiences (p = 0.035)

Table 5.17 showed the output of the ANOVA analysis, the result showed that there was statistically significant in Timeliness (p = 0.00), Accuracy (p = 0.00), Completeness (p = 0.00), Relevancy (p = 0.00), Consistency (p = 0.00) between experience in Knowledge Management.

Table 5.18 showed multiple Comparison, show that there was a statistically significant difference in Timeliness between respondents that had 2 – 3 years working experiences in Knowledge Management and those who had more than 5 years experiences (p = 0.00)

Table 5.19 showed multiple Comparison, show that there was a statistically significant difference in Accuracy between first, respondents that had working experiences in Knowledge Management less than 1 year and those who had more than 5 years experiences (p = 0.00). Second, between those who had 2 -3 years experiences and those who had 4 -5 years (p =0.01). Finally, between those who had 2 -3 years experiences and those who had more than 5 years experiences (p = 0.00)

Table 5.20 showed multiple Comparison, show that there was a statistically significant difference in Completeness between first, respondents that had working experiences in Knowledge Management less than 1 year and those who had more than 5 years experiences (p = 0.02). Second, between those who had 2 -3 years experiences and those who had 4 -5 years (p =0.02). Finally, between those who had 2 -3 years experiences and those who had more than 5 years experiences (p = 0.00)

Table 5.21 showed multiple Comparison, indicate that there was a statistically significant difference in Relevancy between first, respondents that had working experiences in Knowledge Management less than 1 year and those who had more than 5 years experiences (p = 0.00). Second, between those who had 2 -3 years

experiences and those who had 4 -5 years (p =0.01). Finally, between those who had 2 -3 years experiences and those who had more than 5 years experiences(p = 0.00)

Table 5.22 showed multiple Comparison, show that there was a statistically significant difference in Consistency between first, respondents that had working experiences in Knowledge Management less than 1 year and those who had more than 5 years experiences (p = 0.03). Second, between those who had 2 -3 years experiences and those who had 4 -5 years (p =0.01). Finally, between those who had 2 -3 years experiences and those who had more than 5 years experiences (p = 0.00)

5.3 Test of Hypotheses

Simple Linear Regression was the main tool used to test hypotheses 1 to 4. All variables of Risk Management effectiveness and Knowledge quality were from items in questionnaires. Beta coefficient and significant value were used to explain the relationship between independent variables and dependent variables.

Hypothesis # 1: Knowledge Management performance was positively associated with Risk identification process effectiveness

H1a: Knowledge Timeliness was positively associated with Risk identification process effectiveness

H1b: Knowledge Accuracy was positively associated with Risk identification process effectiveness

H1c: Knowledge Completeness was positively associated with Risk identification process effectiveness

H1d: Knowledge Consistency was positively associated with Risk identification process effectiveness

H1e: Knowledge Relevancy was positively associated with Risk identification process effectiveness

Table 5.23: Finding of the relationship of Risk Identification effectiveness and Knowledge Management quality.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.843[a]	.710	.706	.42517

a. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	174.421	5	34.884	192.975	.000[b]
	Residual	71.224	394	.181		
	Total	245.644	399			

a. Dependent Variable: RI

b. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	.614	.115		5.333	.000
	Timeliness	1.265	.051	1.131	24.581	.000
	Accuracy	-.294	.066	-.320	-4.457	.000
	Completeness	-.215	.078	-.233	-2.755	.006
	Relevancy	.207	.070	.225	2.961	.003
	Consistency	-.098	.064	-.103	-1.521	.129

a. Dependent Variable: RI

Table 5.23 indicated that two out of five knowledge quality in this study; Timeliness, and Relevancy P-value were lower 0.05 (Timeliness p-value = 0.00 and Relevancy = 0.00) and beta coefficients of both variables were positive (Timeliness's β = 24.581 and Relevancy's β =2.961). Thus, the null hypothesis of H1a and H1d was rejected at the 0.05 significant level. This means that Timeliness and Relevancy of knowledge had positive impact on Risk identification effectiveness.

Hypothesis # 2: Knowledge Management Quality was positively associated with Risk analysis process effectiveness

H2a: Knowledge Timeliness was positively associated with Risk analysis process effectiveness

H2b: Knowledge Accuracy was positively associated with Risk analysis process effectiveness

H2c: Knowledge Completeness was positively associated with Risk analysis process effectiveness

H2d: Knowledge Consistency was positively associated with Risk analysis process effectiveness

H2e: Knowledge Relevancy was positively associated with Risk analysis process effectiveness

Table 5.24: Finding of the relationship of Risk Analysis effectiveness and Knowledge Management quality.

Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.815[a]	.664	.659	.49285

a. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	188.776	5	37.755	155.437	.000[b]
	Residual	95.702	394	.243		
	Total	284.478	399			

a. Dependent Variable: RA

b. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.311	.133		2.333	.020
	Timeliness	1.138	.060	.946	19.089	.000
	Accuracy	.201	.076	.204	2.633	.009
	Completeness	-.416	.091	-.419	-4.597	.000
	Relevancy	.169	.081	.171	2.088	.037
	Consistency	-.154	.075	-.151	-2.064	.040

Table 5.24 indicated that three out of five knowledge quality in this study; Timeliness, Accuracy and Relevancy P-value were lower 0.05 (Timeliness p-value = 0.00, Accuracy p-value = 0.09 and Relevancy = 0.37) and beta coefficients of these variables were positive (Timeliness's β = 19.089, Accuracy's β = 2.633 and Relevancy's β =2.088). Thus, the null hypothesis of H2a, H2b, and H2d was rejected at the 0.05 significant level. This means that Timeliness, Accuracy, and Relevancy of knowledge had positive impact on Risk Analysis effectiveness.

Hypothesis # 3: Knowledge Management Quality was positively associated with Risk evaluation process effectiveness

H3a: Knowledge Timeliness was positively associated with Risk Evaluation process effectiveness

H3b: Knowledge Accuracy was positively associated with Risk Evaluation process effectiveness

H3c: Knowledge Completeness was positively associated with Risk Evaluation process effectiveness

H3d: Knowledge Consistency was positively associated with Risk Evaluation process effectiveness

H3e: Knowledge Relevancy was positively associated with Risk Evaluation process effectiveness

Table 5.25: Finding of the relationship of Risk Evaluation effectiveness and Knowledge Management quality.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.807[a]	.651	.646	.48362

a. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	171.582	5	34.316	146.721	.000[b]
	Residual	92.152	394	.234		
	Total	263.734	399			

a. Dependent Variable: RE

b. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.307	.131		2.345	.020
	Timeliness	.918	.059	.793	15.693	.000
	Accuracy	.189	.075	.199	2.521	.012
	Completeness	.040	.089	.042	.448	.654
	Relevancy	-.169	.080	-.177	-2.126	.034
	Consistency	-.052	.073	-.053	-.706	.480

a. Dependent Variable: RE

Table 5.25 indicated that two out of five knowledge quality in this study; Timeliness and Accuracy P-value were lower 0.05 (Timeliness p-value = 0.00, Accuracy p-value = 0.12) and beta coefficients of these variables were positive (Timeliness's $\beta = 15.693$, Accuracy's $\beta = 2.521$). Thus, the null hypothesis of H3a and

H3b was rejected at the 0.05 significant levels. This means that Timeliness and Accuracy of knowledge had positive impact on Risk Evaluation effectiveness.

Hypothesis # 4: Knowledge Management Quality was positively associated with Risk treatment process effectiveness

H4a: Knowledge Timeliness was positively associated with Risk Treatment process effectiveness

H4b: Knowledge Accuracy was positively associated with Risk Treatment process effectiveness

H4c:Knowledge Completeness was positively associated with Risk Treatment process effectiveness

H4d: Knowledge Consistency was positively associated with Risk Treatment process effectiveness

H5d: Knowledge Relevancy was positively associated with Risk Treatment process effectiveness

Table 5.26: Finding of the relationship of Risk Treatment effectiveness and Knowledge Management quality.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.875[a]	.766	.763	.38074

a. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	187.170	5	37.434	258.230	.000[b]
	Residual	57.116	394	.145		
	Total	244.286	399			

a. Dependent Variable: RT

b. Predictors: (Constant), Consistency, Timeliness, Relevancy, Accuracy, Completeness

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.435	.103		4.219	.000
	Timeliness	1.268	.046	1.137	27.519	.000
	Accuracy	.199	.059	.218	3.369	.001
	Completeness	-.252	.070	-.273	-3.601	.000
	Relevancy	.259	.063	.283	4.142	.000
	Consistency	-.172	.058	-.182	-2.985	.003
a. Dependent Variable: RT						

Table 5.26 indicated that three out of five knowledge quality in this study; Timeliness and Relevancy P-value were lower 0.05 (Timeliness p-value = 0.00, Accuracy p-value = 0.1, Relevancy =p-value=0.00) and beta coefficients of these variables were positive (Timeliness's β = 27.519, Accuracy's β = 4.142). Thus, the null hypothesis of H3a and H3d was rejected at the 0.05 significant level. This means that Timeliness, Accuracy, and Relevancy of knowledge had positive impact on Risk Treatment effectiveness.

5.4 Finding Summary

In this study, 400 respondents were asked about their organization's Risk Management effectiveness and Knowledge Management effectiveness to explore how Knowledge Quality helps improving Risk Management effectiveness. The finding indicates that Knowledge Timeliness had the positive impact on all Risk Management process and had the biggest impact on Risk Management processes effectiveness as well. This means Thai public organization had to prioritize this Quality as the first one to achieve. However, in this study, two of Knowledge Quality; Completeness and Consistency of Knowledge had no impact on Risk Management effectiveness due to either their significant value more than 0.05 or beta coefficient was negative.

Moreover, while Knowledge Qualities which were Knowledge Accuracy and Knowledge Relevancy had an impact on some of Risk Management processes effectiveness; the result indicated that each of these processes effectiveness requires different Knowledge Qualities. First of all, Risk identification was positively associated with Knowledge Timeliness and Relevancy. Risk Analysis was positively associated with Knowledge Timeliness, Accuracy and Relevancy. Risk Evaluation was positively associated with Knowledge Timeliness and Accuracy. Finally, Risk Treatment was positively associated with Knowledge Timeliness, Accuracy and Relevancy.

CHAPTER VI
CONCLUSION, DISCUSSION, AND RECOMMENDATION

This chapter presented the conclusion and discussion drawn from this study. The managerial and research implications of the finding were also examined. In addition, limitations were discussed. Finally, directions for future research were suggested.

6.1 Conclusion

Thailand had been trying to improve their efficiency for more than decades as Royal Decree on Criteria and Procedures for Good Governance, B.E. 2546 stated Thai public organizations have to improve their efficiency for Thailand to compete globally. Risk Management and Knowledge Management were some of concept that had been implemented to achieve this goal. While implementing these practices was proved to be beneficial for public organization, followed past policy, they implemented them separately despite of Risk Management uses Knowledge as a foundation of its processes. Not only, it takes more resources but it prevents them to optimize the benefit from the process. Therefore, this study objective was to explore the relationship between Risk Management effectiveness and Knowledge Management effectiveness.

This study included Good Governance, Risk Management and Knowledge Management literatures to create a framework and hypotheses of this study. The hypotheses were that Knowledge Quality which were 1)Timeliness, 2)Accuracy, 3)Completeness, 4)Relevancy and 5)Consistency were positive associated with Risk Management effectiveness. Data for testing hypotheses came from 400 respondents who were working in Thai public organization and have responsibility in Risk Management or Knowledge Management in their organization. This research used stratified sampling and snowball sampling technique for data collecting and used

Mean, Standard Deviation, One way Anova and Linear Regression as statistical tools for Data analysis.

Result of this study indicatedd that out of 5 Knowledge Quality in this study, Knowledge Timeliness had the biggest relationship with Risk Management effectiveness. Moreover, Knowledge Accuracy and Relevancy also positive associate with Risk Management effectiveness as well. Further discussions were below.

6.2 Discussion

The main purpose of this study was to examine the benefit from integrating Knowledge Management into Risk Management process in public organizations. The descriptive statistics presented in the previous chapter: Regression was the main tool used to investigate the relationships between variables and path analysis was employed to test the direct and indirect effects.

Discussion of the result of four hypotheses

6.2.1 Hypotheses 1: Knowledge Quality was positively associated with Risk Identification process effectiveness

The result of this study showed that Knowledge Timeliness was positive associate with Risk Identification. The finding suggests that updated knowledge was vital in identify risks. Knowledge has a cycle time which depends on how quickly new knowledge can be processed and communicated to its organization. All constant changing in the world shorten this cycle. Moreover, new risks arise as time goes by. Updated knowledge ensures that knowledge was new and reliable for identify these new risks. Moreover, in Risk Identification, to be able to access required knowledge in the time needed was crucial. Access knowledge within time of identifying risk ensures that organization can identify risk comprehensively. This result was supported with past research that knowledge plays a crucial part in Risk identification as inputs were generated from experiences of employees in organizations (Chapman, 2006).

The study also indicated that Knowledge Relevancy contribute to the effectiveness of Risk Identification process. This was because to identify risks, knowledge in relevance fields was required. Identify financial risks requires financial

knowledge and this concept was same with other fields such as human resources and Information Technology. This result similar with study in the past, experience in employees provides the list of risks occurred in the past that go into the identified risk list (Rodriguez, 2009).

However, the study showed that Accuracy, Completeness and Consistency of Knowledge don't positive associate with Risk Identification process which conflict with studies in the past. This might be because Risk Identification was the process that aims to identify possible risks both internal and external as much as possible within limit of time. Accuracy was not the main objective of the process. Moreover, it's impossible for organization to know whether knowledge was complete or not and it could cost too much time to gather a few more knowledge for identifying risks (Migues, 2007). Finally, consistency of knowledge platform might not be necessarily for understanding knowledge.

It can be concluded that Knowledge Timeliness and Relevancy was positively associated with Risk Identification process effectiveness. Knowledge Timeliness provided updated knowledge for identifying risks as well as ensures the accessibility of knowledge in organization in timely manner. And Knowledge Relevancy provides essential experiences and knowledge in particular area to Risk Management team. Therefore, organization should manage Knowledge Management to acquire this Knowledge Quality in order to optimize their Risk identification process.

6.2.2 Hypotheses 2: Knowledge Management Quality was positively associated with Risk Analysis process effectiveness

The result of this study showed that Timeliness, Accuracy and Relevancy of knowledge were positive associate with Risk Analysis effectiveness. The finding suggests that updated knowledge was vital in analyzing risks. Knowledge had a cycle time which depends on how quickly new knowledge can be processed and communicated to its organization. As new risks arise, updated knowledge ensures that organization understand these risks and can analyze them effectively. Moreover, in Risk analysis, to be able to access required knowledge in the time needed was time

saving. Access knowledge within time of analyzing risk ensures time saving in Risk Analysis (Chapman, 2006).

Accuracy goes hand in hand with Timeliness, to analyze risks effectively and organization needs accurate knowledge to analyze risks accurately. It can be used to analyze the likelihood of the risk by compare it with experiences. It was crucial to have accurate knowledge in order for organization to analyze risks effectively. Inaccurate knowledge leads to inaccurate risk analyzing output (Emanuel lauria; et al., 2014).

The study also indicated that Knowledge Relevancy contributes to the effectiveness of Risk Analysis process. This was because to analyze risks, knowledge in relevance fields was required. Analyzing financial risks requires financial knowledge and this concept was same with other fields such as human resources and Information Technology. This result similar with study in the past, experience in employees provides the fundamental information for analyzing risks which make the analysis output reliable for the rest of process (Chapman, 2006).

However, Completeness and Consistency of Knowledge don't have positive associate with Risk Analysis process in this study which conflict with studies in the past. This might be because Risk Analysis was the process that aims to analyze risks likelihood and consequences within limit of time, it was rare for organization to know whether knowledge was complete or not and it could cost too much time and organization resources to gather a few more knowledge for additional risks analyzing (Migues, 2007). Finally, consistency of knowledge platform might not be necessarily for using knowledge. Thus, in this study, Completeness and Consistency of knowledge don't positive associate with Risk Analysis Process.

It can be concluded that Knowledge Timeliness, Accuracy and Relevancy was positively associated with Risk Identification process effectiveness. Knowledge Timeliness provided updated knowledge for identifying risks as well as ensures the accessibility of knowledge in organization in timely manner. Knowledge Accuracy ensures the accurate and correct knowledge for analyzing Risk lists from Risk Identification process. Finally, Knowledge Relevancy provides essential experiences and knowledge in particular area to Risk Management team. Therefore,

organization should manage Knowledge Management to acquire this Knowledge Quality in order to optimize their Risk identification process.

6.2.3 Hypotheses 3: Knowledge Management Quality was positively associated with Risk Evaluation process effectiveness

The result of this study showed that Knowledge Timeliness was positive associate with Risk Evaluation. The finding suggests that updated knowledge was crucial for evaluating risks. Risk appetite of organization was dynamic and change as environment change. Updated knowledge helps organization set their risk appetite level appropriate to contexts. It also ensures that organization understand risks and evaluate their impact and likelihood accurately. Moreover, in Risk evaluation, to be able to access required knowledge in the time needed was time saving. Access knowledge within time of analyzing risk ensures time saving in Risk Analysis (Chapman, 2006).

Accuracy goes hand in hand with Timeliness, organization needs accurate knowledge to evaluate risks likelihood and consequences accurately. Inaccurate knowledge leads to inaccurate risk evaluation. Thus, higher chance that organization to select to treat less important risks which might take their resource more since they need to come back and treat another risks in their operation otherwise, they have to embrace on bigger consequences. (Emanuel lauria; et al., 2014).

Risk Evaluation was the process that aims to evaluate risks and decide which ones should be treat regarding to efficiency of organization within limit of time, it was rare for organization to know whether knowledge was complete or not and it could cost too much time and resources to gather a few more knowledge for additional risks evaluation (Migues, 2007).

As for Relevancy, Risk evaluation required variety filed of knowledge to comprehensively evaluate each risks, for example, risk of some employee injured while doing their jobs might need knowledge from financial, marketing, public relation and Human resources. So it could be said that most of the time, multiple knowledge area was needed and that every knowledge could be consider relevance to the risk and that organization need not to classify the relevancy issues. Finally,

consistency of knowledge platform might not be necessarily for using or understand knowledge.

It can be concluded that Knowledge Timeliness and Accuracy was positively associated with Risk Identification process effectiveness. Knowledge Timeliness provided updated knowledge for identifying risks as well as ensures the accessibility of knowledge in organization in timely manner. Whereas Knowledge Accuracy ensures the accurate and correct knowledge for evaluating Risk lists from Risk Analysis process.

6.2.4 Hypotheses 4: Knowledge Management Quality was positively associated with Risk Treatment process effectiveness

The result of this study showed that Knowledge Timeliness was positive associate with Risk Treatment. The finding suggests that updated knowledge was crucial for treating risks. Knowledge provide organization list of options for treating risks, updated knowledge also means new solutions of option (Heinz-Peter, 2010). It was crucial that organization always updated their knowledge to find or even create these new solutions to have the best cost effective solution for treating each risk. Moreover, in Risk Treatment, to be able to access required knowledge in the time needed was time saving. Access knowledge within time of finding solution ensures time saving in Risk Treatment (Chapman, 2006).

Accuracy goes hand in hand with Timeliness, to generate cost effective solution and organization needs accurate knowledge to ensure the reliable and effective result of these solutions. It was crucial to have accurate knowledge in order for organization to generate cost effective and reliable solutions in Risk Treatment process. Inaccurate knowledge leads to unreliable solutions in Risk Treatment Process which could lead to new risks or waste of resources. (Emanuel lauria; et al., 2014).

The study also indicated that Knowledge Relevancy had positive associate with Risk Treatment effectiveness. This was because to treat risks, knowledge in relevance fields was required. Treating financial risks requires financial knowledge and this concept was same with other fields such as human resources and Information Technology. This result similar with study in the past, knowledge provide

organizations effective treatment implementation plan from the experiences, what they have to do as well as what they have to improve from the past. (Rodriguez, 2009)

Risk Treatment was the process that aims to generate the most cost effective solution to each risks within limit of time. While cost effective solutions were the goals, delay of implement this solution could cost organization more time and resources which contradict to goals. Thus, it was best practice to do the best within time limit. (Migues, 2007). Finally, consistency of knowledge platform might not be necessarily for using or understand knowledge.

It can be concluded that Knowledge Timeliness, Accuracy and Relevancy was positively associated with Risk Treatment process effectiveness. Knowledge Timeliness provided updated knowledge for Risk Management team to come up with the most cost effective options as well as ensures the accessibility of knowledge in organization in timely manner. Knowledge Accuracy provide reliable knowledge for generate solutions and Knowledge Relevancy provides essential experiences and knowledge in particular area to Risk Management team to generate cost effective options. Therefore, organization should manage Knowledge Management to acquire this Knowledge Quality in order to optimize their Risk Treatment process.

6.3 Implication of the Results

6.3.1 Theoretical Implications

This study was among the first to give evidences to explain the relationship between Risk Management effectiveness and Knowledge Quality. Previous research focused on identifying risks of knowledge management practice rather than applying knowledge management to Risk management called “Knowledge Risk Management” (Massingham, 2010). However, this study explores the Knowledge Management effectiveness on Risk Management effectiveness and provides evidences that integrating Knowledge Management effectiveness with Risk Management was the key to the Risk Management effectiveness in public organization.

6.3.2 Managerial Implications

The result of this study was useful for Thai public organizations. This study suggests that implementing Knowledge Management and Risk Management were proved to be beneficial for the organizations. However, implementing two concepts separately will limit the effectiveness of Risk Management concept. Rather, they should integrate the concept together to optimize their assets and provide support on Risk Management foundation so that they can improve Risk Management effectiveness. Thus, managerial implications can be discussed in 3 parts; 1) Organization Structure, 2) System and 3) Process Monitoring.

Organization Structure

One of the most important aspects of effective risk management is organizational structure. Organizational structure provides the concept, guideline, direction and support to the employees that were conducted by the steering committee. They design and teach employees to share and use a common vocabulary. The employees work as a team to prevent a silo mentality and incorporate resistant employees in the process (Hasanali, 2002). The result in this study showed that Knowledge Quality contributed to Risk Management effectiveness. However, in Thai public organization, Risk Management and Knowledge Management responsibilities were distributed to each department. Each department would assign their staff to write a report about Risk Management and Knowledge Management. This silos working prevent them from cooperate and integrate their knowledge and to optimize their resource.

Instead, restructure organization so organization had a main team that prioritizes Risk Management and Knowledge Management so that both concepts would operate alongside each other, reduce resources required as well as increase effectiveness of internal communication which was critical for operations. Effective communication ensures that the team members understand and support each others. Therefore, restructure organization to integrate Risk Management and Knowledge Management provides organization a better performance for Risk Management (Clutterbuck and Hirst, 2002).

IT System

Information Technology system was vital to achieving an organization's objectives. It was a main tool for accessing to a shared infrastructure consisting of knowledge (Mutsaers et al,. 1998). IT relates to better information processing, sharing, fast responsiveness, and better coordination between separate units of an organization and across organizations (Shin, 1999). Moreover, IT was associated with cost effective monitoring or performance evaluation device. Effective risk management requires effective information technology (Xenomorph, 2007). IT can create a major link between risk management and corporate performance. IT provides data security by employee level, limiting a user's access to time and individual risk. IT tools gather data used in the past so companies can learn through experience and avoid repeating the same mistakes (Rolland, 2008). The effective risk management information makes more valuable for decision making.

The result from this research point out that Knowledge Quality; Timeliness was highly positive associate with effective Risk Management. To manage risks effectively, Risk Management team needed to be able to access variety and sufficient amount of knowledge as fast as possible. IT system must be ensured that it was easily access in timely manner since it provide infrastructure consisting of knowledge (Mutsaers et al,. 1998). IT tools gather data used in the past so companies can learn through experience and avoid repeating the same mistakes (Gevorgyan and Ivanovski, 2009). The effective risk management information makes more valuable for decision making. Stable and friendly-user interface system was always appreciated for employees. Therefore, system-wise, Thai public organization priority is to maintenance their system and ensures the stability of system for their Risk Management process.

Process Monitoring

Earlier implication, Organization Structure and IT system contain the important foundation of improve Risk Management effectiveness in Thai public organization. However, Monitoring and review was an essential and integral step to ensure the expected results. The concept of risk was dynamic and requires periodic and formal review. Risk needs to be monitored to ensure the changing environment does not alter risk priorities and to ensure the risk management process was effective

both in design and in operation. The organization should review at least on an annual basis (Standards Australia and Standards New Zealand, 2004).

The result showed that Knowledge Quality plays an important role to ensure the Risk Management effectiveness. For that reason, Thai public organization must monitor their knowledge and guarantee that knowledge in organization was always updated and accurate. These knowledge revisions should be integrated with the database so that when new knowledge arises or old ones get extended, it can be updated right away. Internal communication should support business strategy and improve business processes as well as performance (Quirke, 1996).

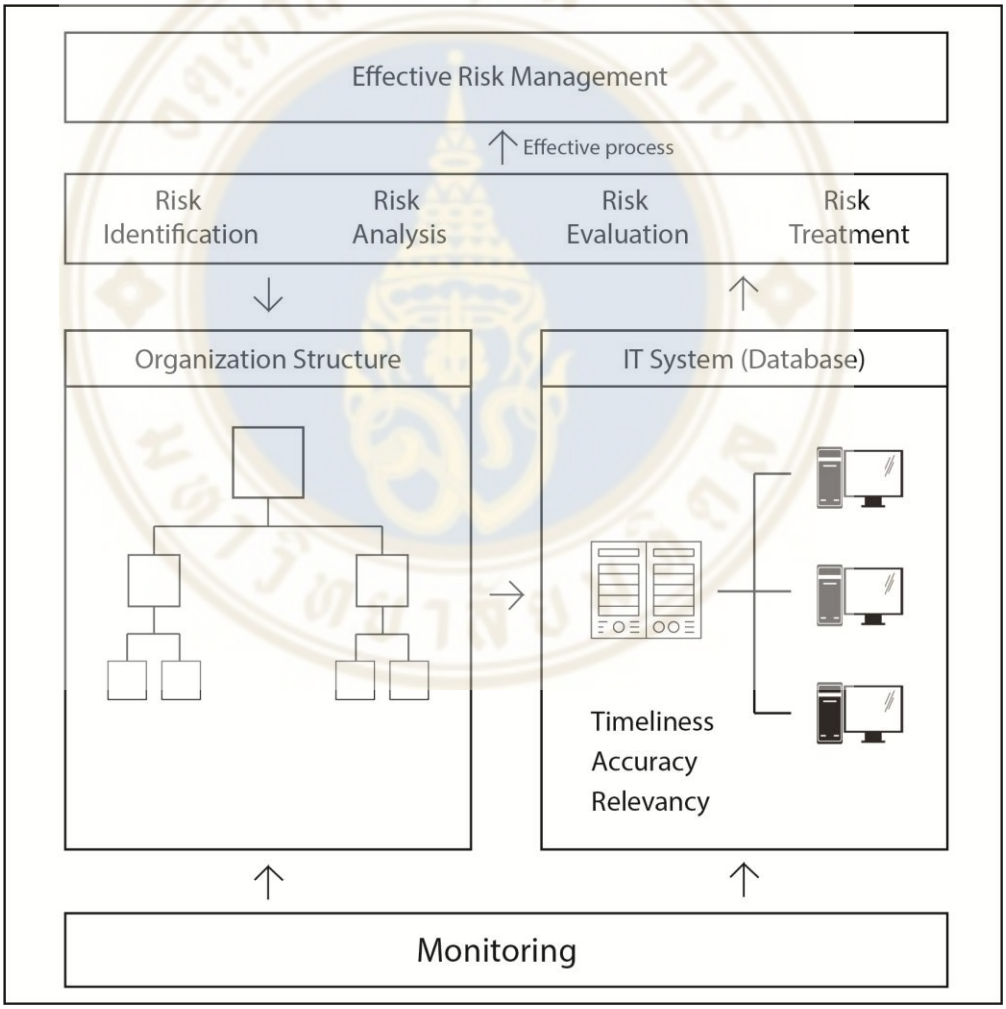

Figure 6.1 Risk Management Model for Thai public organization

6.4. Limitations of this Study

The limitations in this study can be identified. First this study was conducted in only some of Thai public organization; therefore further researches were required to generalize this result in private organizations.

Second, this study was conducted in Thai context; therefore the results might be difference in other countries so further researches were required to generalize this result in public organization in other countries.

Third, this study collected data by using Snowball sampling which had very little control over the sampling method, which becomes mainly dependent on the original and subsequent subjects, who may add to the known sampling pool using a method outside of the researcher's control. However, this study began with a set of diverse initial informants or Respondent Driven Sampling (RDS) method. RDS refer to weighting the sample in order to compensate for the initial non-random selection, which may lead to the reduction of errors occurring in sampling by the referral method.

Although some limitations do exist in this study, they do not invalidate the results and contributions of the study in terms of both theoretical and practical aspects.

6.5 Suggestions for Future Research

Suggestions of future researches can be introduced, as the result of the study indicated that Risk Management and Knowledge Quality were related. The first suggestion was to explore tools and techniques for integrated Knowledge Management activities with Risk Management activities to increase Risk Management effectiveness.

Second, while the study provides the relationship of Knowledge Quality and Risk Management effectiveness, it was conducted only in Thai public organizations. The recommendation for future research was to extend the result in context such as private organization context or other countries context.

Third, while Risk Management process uses knowledge as a foundation, each of them required different quality of knowledge. It was interesting to explore

further on what each of Risk Management process needed to maximize their performance.

Finally, in this study Knowledge Timeliness had highest positive associate with all four Risk Management process which show that it was vital for the processes. Moreover, missing Knowledge Timeliness can impact perception of Knowledge availability in organization. It was interesting to explore on how each Knowledge Quality such as Timeliness could have impact on other Knowledge Quality.

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APPENDICES

THE EFFECT OF KNOWLEDGE QUALITY TRIBUTE ON RISK MANAGEMENT EFFECTIVENESS IN THAI PUBLIC SECTOR CONTEXT

This questionnaire is conducted in partial fulfillment of the requirement for the Master of Management's Degree, College of Management Mahidol University. The research project entitled "The relationship between Risk management effectiveness and knowledge management performance in Thai Public organization in Thailand" aims to explore the relationship between Risk Management effectiveness and Knowledge Management effectiveness.

This research project has no funding obtained nor applied for, and also no compensation nor cost in the participation. You are free to decide to whether participate or not. All data collected in this research will be kept confidential and will only be included in the research report as part of the overall results.

This questionnaires consisted of 3 parts which are:
Part 1: General Information
Part 2: Question Related to Risk Management and Knowledge Quality
Part 3: Suggestions

Part 1: General Information

Organization .....

Position

☐Equivalent to Junior Operational Level
☐Equivalent toMiddle Operational Level
☐Equivalent toSenior Operational Level
☐Equivalent to Director Level or Above

Gender

☐Male ☐Female

Age

☐Less than 18 ☐18-24 ☐25-34 ☐35-44 ☐45-54 ☐55 or more

Working experiences on Risk Management

☐Less than 1 year ☐1-3 years ☐4-5 years ☐More than 5 year

What would you rate for your organization Risk Management effectiveness

☐Very high ☐High ☐Normal ☐Low ☐Very Low

Working experiences on Knowledge Management

☐Less than 1 year ☐1-3 years ☐4-5 years ☐More than 5 year

What would you rate for your organization Knowledge Management effectiveness

☐Very high ☐High ☐Normal ☐Low ☐Very Low

Part 2: The following table contain a number of statement of Risk Management and Knowledge Management in organization Please rate how much you agree or disagree with these statement

Risk Management Effectiveness	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Your organization can identify risks comprehensively.					
Your organization can identify risks quickly.					
Your organization can identify all risks causes correctly.					
Your organization can analyze probability of risk occurring accurately according to the data in the past.					

Your organization can analyze the impact of risks accurately and according to the data in the past.					
Your organization can evaluate the impact of risks accurately and according to the data in the past.					
Your organization can set the risk acceptance level properly.					
Your organization can find effectively risk treatment.					
Your organization can find cost-effective risk treatment.					
Your organization can plan Risk Management plans effectively					
Knowledge Quality	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Knowledge in your organization is updated					
Knowledge in your organization is highly accessible.					
Knowledge in your organization is accurate.					
Amount of Knowledge in your organization is enough for working.					
Knowledge in your organization is completed.					
Knowledge in your organization is relevance to employee tasks.					
Knowledge in your organization share same presentation format.					
Benefits of Risk Management	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Risk Management improve decision making.					
Risk Management reduce management cost.					
Risk Management helps organization plan business planning.					
Risk Management reduce risk impact that could happen to organization.					
Risk Management improves employees capabilities.					
Risk Management improve organization efficiency.					
Risk Management improve organization financial planning					
Benefits of Knowledge Management	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Knowledge Management improve organization working process					
Knowledge Management creates innovations					
Knowledge Management help integrate knowledge between fields.					
Knowledge Management improve employees capabilities.					
Knowledge Management improve organization efficiency.					

Part 3: Suggestion .....

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แบบสอบถามเรื่องผลกระทบของคุณภาพองค์ความรู้ที่มีผลต่อประสิทธิภาพในการบริหารจัดการความเสี่ยงขององค์กรภาครัฐในประเทศไทย

คำชี้แจง: แบบสอบถามนี้จัดทำขึ้นเพื่อเป็นส่วนหนึ่งในการทำวิทยานิพนธ์เพื่อสำเร็จการศึกษาระดับปริญญาโท วิทยาลัยการจัดการ มหิดล มีจุดประสงค์เพื่อสอบเกี่ยวกับประสบการณ์และความคิดเห็นของท่านในเรื่องประสิทธิภาพการบริหารความเสี่ยงในองค์กรและความสัมพันธ์ของการจัดการความรู้และการ บริหารความเสี่ยง ข้อมูลของท่านจะถูกเก็บเป็นความลับและใช้ประโยชน์ในด้านการศึกษาเท่านั้น
แบบสอบถามฉบับนี้แบ่งออกเป็น 3 ส่วนคือ

ส่วนที่ 1: แบบสอบถามข้อมูลทั่วไป
ส่วนที่ 2: แบบสอบถามความรู้และประสบการณ์เกี่ยวกับการบริหารความเสี่ยงและองค์ความรู้
ส่วนที่ 3: ข้อเสนอแนะหรือข้อคิดเห็นอื่นๆ

ส่วนที่ 1: ข้อมูลทั่วไป

หน่วยงาน/องค์กร .....

ตำแหน่ง

☐**พนักงานปฏิบัติ**การระดับต้นหรือเทียบเท่า
☐**พนักงานปฏิบัติ**การระดับกลางหรือเทียบเท่า
☐**พนักงานปฏิบัติ**การระดับสูงหรือเทียบเท่า
☐**ระดับผู้บริหาร**ขึ้นไป

เพศ

☐**ชาย** ☐หญิง

อายุ

☐**18 ปีหรือน้อย**กว่า ☐18-24 ปี ☐25-34 ปี ☐35-44 ปี ☐45-54 ปี ☐55 ปีหรือมา**กกว่า**

ประสบการณ์การทำงานที่เกี่ยวข้องกับการบริหารจัดการความเสี่ยง

☐**น้อยกว่า 1 ปี** ☐1-3 ปี ☐4-5 ปี ☐มากกว่า 5 ปี

ประสิทธิภาพการบริหารจัดการความเสี่ยงในองค์กรของท่าน

☐**สูงมาก** ☐สูง ☐ทั่วไป ☐น้อย ☐น้อยมาก

ประสบการณ์การทำงานที่เกี่ยวข้องกับการบริหารจัดการองค์ความรู้

☐**น้อยกว่า 1 ปี** ☐1-3 ปี ☐4-5 ปี ☐มากกว่า 5 ปี

ประสิทธิภาพการบริหารจัดการองค์ความรู้ในองค์กรของท่าน

☐**สูงมาก** ☐สูง ☐ทั่วไป ☐น้อย ☐น้อยมาก

ส่วนที่ 2: การบริหารจัดการความเสี่ยงและองค์ความรู้ในองค์กร **โปรดทำเครื่องห**มาย x ลงในช่องว่างตามระดับความคิดเห็นของท่าน	ระดับความคิดเห็น				
ประสิทธิภาพในการบริหารจัดการความเสี่ยง	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
องค์กรของท่านสามารถระบุความเสี่ยงได้อย่างครบถ้วนครอบคลุมภาพรวม					
องค์กรของท่านสามารถระบุความเสี่ยงได้อย่างรวดเร็ว					
องค์กรของท่านสามารถหาสาเหตุของความเสี่ยงได้ถูกต้องและครบถ้วน					
องค์กรของท่านสามารถวิเคราะห์โอกาสที่ความเสี่ยงจะเกิดขึ้นได้อย่างแม่นยำและสอดคล้องกับข้อมูลในอดีต					
องค์กรของท่านสามารถวิเคราะห์ผลกระทบที่เกิดจากความเสี่ยงได้อย่างแม่นยำสอดคล้องกับข้อมูลในอดีต					
องค์กรของท่านสามารถประเมินผลกระทบที่เกิดขึ้นจากความเสี่ยงได้อย่างแม่นยำสอดคล้องกับข้อมูลในอดีต					
องค์กรของท่านสามารถตั้งระดับความเสี่ยงที่องค์กรยอมรับได้อย่างแม่นยำ					
องค์กรของท่านสามารถหาวิธีการควบคุมความเสี่ยงที่เกิดขึ้นได้อย่างครอบคลุมกับสาเหตุและผลกระทบของความเสี่ยง					
องค์กรของท่านสามารถหาวิธีการควบคุมความเสี่ยงที่คุ้มค่ากับค่าใช้จ่ายได้อย่างเหมาะสมเมื่อเทียบกับผลกระทบที่จะเกิดต่อองค์กร					

DESCRIPTIVE STATISTICS

Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Office of NBTC	86	21.5	21.5	21.5
	Electricity Generating Authority of Thailand	73	18.3	18.3	39.8
	Ministry of Labour	61	15.3	15.3	55.0
	Ministry of Cultural	56	14.0	14.0	69.0
	Office of the Auditor General of Thailand	58	14.5	14.5	83.5
	Other	66	16.5	16.5	100.0
	Total	400	100.0	100.0	

Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Equivalent to Junior Operation Level	88	22.0	22.0	22.0
	Equivalent to Middle Operation Level	163	40.8	40.8	62.8
	Equivalent to Senior Operation Level	113	28.3	28.3	91.0
	Equivalent to Director or higher	36	9.0	9.0	100.0
	Total	400	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	189	47.3	47.3	47.3
	Female	211	52.8	52.8	100.0
	Total	400	100.0	100.0	

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19-24	58	14.5	14.5	14.5
	25-34	107	26.8	26.8	41.3
	45-54	131	32.8	32.8	74.0
	55 or more	62	15.5	15.5	89.5
	6.00	42	10.5	10.5	100.0
	Total	400	100.0	100.0	

Working experiences on Risk Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 years	50	12.5	12.5	12.5
	2 -3 years	141	35.3	35.3	47.8
	4 - 5 years	99	24.8	24.8	72.5
	more than 5 years	110	27.5	27.5	100.0
	Total	400	100.0	100.0	

Working experiences on Knowledge Management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 years	82	20.5	20.5	20.5
	2 -3 years	160	40.0	40.0	60.5
	4 - 5 years	88	22.0	22.0	82.5
	more than 5 years	70	17.5	17.5	100.0
	Total	400	100.0	100.0	

ONE-WAY ANOVA

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Risk Identification	Between Groups	14.147	3	4.716	8.067	.000
	Within Groups	231.497	396	.585		
	Total	245.644	399			
Risk Analysis	Between Groups	5.547	3	1.849	2.625	.050
	Within Groups	278.931	396	.704		
	Total	284.478	399			
Risk Evaluation	Between Groups	7.247	3	2.416	3.730	.011
	Within Groups	256.487	396	.648		
	Total	263.734	399			
Risk Treatment	Between Groups	10.595	3	3.532	5.985	.001
	Within Groups	233.691	396	.590		
	Total	244.286	399			

ONEWAY RI RA RE RT BY Gender

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Risk Identification	Between Groups	.302	1	.302	.491	.484
	Within Groups	245.342	398	.616		
	Total	245.644	399			
Risk Analysis	Between Groups	.028	1	.028	.039	.844
	Within Groups	284.450	398	.715		
	Total	284.478	399			
Risk Evaluation	Between Groups	.170	1	.170	.257	.613
	Within Groups	263.564	398	.662		
	Total	263.734	399			
Risk Treatment	Between Groups	.230	1	.230	.375	.541
	Within Groups	244.056	398	.613		
	Total	244.286	399			

ONEWAY RI RA RE RT BY Age

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Risk Identification	Between Groups	5.939	4	1.485	2.447	.046
	Within Groups	239.705	395	.607		
	Total	245.644	399			
Risk Analysis	Between Groups	.954	4	.238	.332	.856
	Within Groups	283.524	395	.718		
	Total	284.478	399			
Risk Evaluation	Between Groups	5.177	4	1.294	1.977	.097
	Within Groups	258.557	395	.655		
	Total	263.734	399			
Risk Treatment	Between Groups	3.892	4	.973	1.599	.174
	Within Groups	240.394	395	.609		
	Total	244.286	399			

ONEWAY RI RA RE RT BY POSITION

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Risk Identification	Between Groups	13.164	3	4.388	7.474	.000
	Within Groups	232.480	396	.587		
	Total	245.644	399			
Risk Analysis	Between Groups	9.062	3	3.021	4.343	.005
	Within Groups	275.416	396	.695		
	Total	284.478	399			
Risk Evaluation	Between Groups	4.698	3	1.566	2.394	.068
	Within Groups	259.036	396	.654		
	Total	263.734	399			
Risk Treatment	Between Groups	6.793	3	2.264	3.776	.011
	Within Groups	237.493	396	.600		
	Total	244.286	399			

ONEWAY RI RA RE RT BY WORKING EXPERIENCES ON RISK MANAGEMENT

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Risk Identification	Between Groups	3.487	3	1.162	1.901	.129
	Within Groups	242.157	396	.612		
	Total	245.644	399			
Risk Analysis	Between Groups	6.133	3	2.044	2.908	.034
	Within Groups	278.345	396	.703		
	Total	284.478	399			
Risk Evaluation	Between Groups	7.333	3	2.444	3.775	.011
	Within Groups	256.402	396	.647		
	Total	263.734	399			
Risk Treatment	Between Groups	3.352	3	1.117	1.836	.140
	Within Groups	240.935	396	.608		
	Total	244.286	399			

ONEWAY RI RA RE RT BY WORKING EXPERIENCES ON KNOWLEDGE MANAGEMENT

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Timeliness	Between Groups	8.073	3	2.691	5.652	.001
	Within Groups	188.537	396	.476		
	Total	196.610	399			
Accuracy	Between Groups	4.278	3	1.426	1.962	.119
	Within Groups	287.720	396	.727		
	Total	291.998	399			
Completeness	Between Groups	6.635	3	2.212	3.114	.026
	Within Groups	281.305	396	.710		
	Total	287.940	399			
Relevancy	Between Groups	7.437	3	2.479	3.473	.016
	Within Groups	282.660	396	.714		
	Total	290.098	399			
Consistency of Presentation	Between Groups	5.319	3	1.773	2.638	.049
	Within Groups	266.119	396	.672		
	Total	271.438	399			

ONEWAY Timeliness Accuracy Completeness Relevancy Consistency BY Gender

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Timeliness	Between Groups	.220	1	.220	.446	.505
	Within Groups	196.390	398	.493		
	Total	196.610	399			
Accuracy	Between Groups	.541	1	.541	.739	.390
	Within Groups	291.456	398	.732		
	Total	291.998	399			
Completeness	Between Groups	.056	1	.056	.078	.780
	Within Groups	287.884	398	.723		
	Total	287.940	399			
Relevancy	Between Groups	.000	1	.000	.000	.990
	Within Groups	290.097	398	.729		
	Total	290.097	399			
Consistency of Presentation	Between Groups	.049	1	.049	.072	.789
	Within Groups	271.388	398	.682		
	Total	271.438	399			

ONEWAY Timeliness Accuracy Completeness Relevancy Consistency BY Age

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Timeliness	Between Groups	3.028	4	.757	1.545	.188
	Within Groups	193.582	395	.490		
	Total	196.610	399			
Accuracy	Between Groups	3.574	4	.894	1.224	.300
	Within Groups	288.423	395	.730		
	Total	291.998	399			
Completeness	Between Groups	5.000	4	1.250	1.745	.139
	Within Groups	282.940	395	.716		
	Total	287.940	399			
Relevancy	Between Groups	5.817	4	1.454	2.021	.091
	Within Groups	284.280	395	.720		
	Total	290.098	399			
Consistency of Presentation	Between Groups	1.974	4	.493	.723	.576
	Within Groups	269.464	395	.682		
	Total	271.438	399			

ONEWAY Timeliness Accuracy Completeness Relevancy Consistency BY WORKING EXPERIENCES ON RISK MANAGEMENT

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Timeliness	Between Groups	9.356	3	3.119	6.595	.000
	Within Groups	187.254	396	.473		
	Total	196.610	399			
Accuracy	Between Groups	27.724	3	9.241	13.848	.000
	Within Groups	264.274	396	.667		
	Total	291.998	399			
Completeness	Between Groups	26.760	3	8.920	13.524	.000
	Within Groups	261.180	396	.660		
	Total	287.940	399			
Relevancy	Between Groups	26.930	3	8.977	13.507	.000
	Within Groups	263.168	396	.665		
	Total	290.098	399			
Consistency of Presentation	Between Groups	22.611	3	7.537	11.995	.000
	Within Groups	248.827	396	.628		
	Total	271.438	399			

ONEWAY Timeliness Accuracy Completeness Relevancy Consistency BY WORKING EXPERIENCES ON KNOWLEDGE MANAGEMENT