The Support of Knowledge Management (KM) Processes to Accomplish Risk Identification (RI) in Jordanian Telecommunication Sector

[1]**Amine Nehari Talet**; [2]**Samer Alhawari;** and [3]**Louay Karadsheh**
[1]King Fahd University of Petroleum and Minerals, Kingdom of Saudi Arabia
[2]The World Islamic Sciences and Education University, Jordan
[3]ECPI University, USA

ID # (2739)
Received: 22/ 04/ 2013
In-revised: 28/11/2013
Correspondent Author:
Amine Nehari Talet
E-mail: nehari@kfupm.edu.sa
louay.karadsheh@gmail.com
samer.alhawari@yahoo.com

KEYWORDS

Risk assessment, Knowledge Based Risk, IT Project

ABSTRACT

A Project manager may execute an appropriate action if a risk assessment identifies a dwindling project. Risk identification focused on recognizing the events which might cause a negative impact on the project outcomes. The paper intended to study how Jordanian Telecommunication companies apply knowledge process to support risk identification and how they cope with and how they promote. The existing empirical study was based upon a sample of (130) respondents composed and drawn randomly from the three Jordanian Telecommunication Companies. The findings show that Jordanian Telecommunication Companies were likely to have a clear vision in how Knowledge Management (KM) processes and impact to achieve Risk Identification (RI) to contribute in Information Technology (IT) project success. They will certainly help both researchers to get a better understanding about the knowledge processes on Risk identification, several recommendations were made and certain directions for future research were highlighted.

دعم عمليات ادارة المعرفة (KM) لإنجاز تحديد المخاطر (RI) في قطاع الاتصالات الأردني

[1] **أمين نهاري تالت،** [2] **سامر الهواري،** و [3] **لؤي كرادشة**
[1]جامعة الملك فهد للبترول والمعادن، المملكة العربية السعودية
[2]جامعة العلوم الإسلامية العالمية ، الأردن
[3]جامعة ECPI الولايات المتحدة الأمريكية

المُستلخص

ينفذ مدير أي مشروع الإجراءات المناسبة إذا حددت تقييم المخاطر (RI) لتفادي حصول أي تضاؤل في المشروع. قد يرتكز تحديد المخاطر على تحديد الأحداث التي قد تسبب تأثير سلبي على نتائج المشروع. تهدف هذه الورقة البحثية إلى دراسة كيفية تطبيق شركات الاتصالات الأردنية للعمليات المعرفية (KM) لدعم تحديد المخاطر (RI) وكيفية التعامل معها، وتعزيزها. استندت هذه الدراسة الميدانية القائمة على عينة من (130) شركة شملهم الاستطلاع تم اختيارهم عشوائياً من شركات الاتصالات الأردنية الثلاث. تظهر النتائج أن شركات الاتصالات الأردنية من المرجح أن يكون لديها رؤية واضحة في كيفية عمليات الإدارة المعرفية (KM) وأثرها في تحديد المخاطر (RI) للمساهمة في نجاح مشروع تقنية المعلومات (IT) . وهذه النتائج سوف تساعد كل من الباحثين والمهنيين للحصول على فهم أفضل حول عمليات المعرفة (KM) في تحديد المخاطر (RI) ، هذا وقدمت الورقة عدة توصيات و تم تسليط الضوء على اتجاهات معينة للبحث في المستقبل.

رقم المسودة: (2739)
تاريخ استلام المسودة: 2013/04/22
تاريخ المسودة المُعَدَلة: 2013/11/28
الباحث المُرَاسِل: أمين نيهاري تاليت
بريد الكتروني:
nehari@kfupm.edu.sa
louay.karadsheh@gmail.com
samer.alhawari@yahoo.com

الكلمات الدالة

معرفة مؤسسة على تحديد المخاطر، تقنية معلومات،، مشروع تقييم المخاطر،

Introduction

The current environment is faced with growing complexity, globalization and vitality in all levels; improving and retaining the inner skills and competences, and altering both the existing knowledge within the firm and the way is being utilized to compete is vital (Singh and Sharma, 2011). Organizations depend on their different sources to meet their objectives and to better prepared for changes. By considering that, organizations can create an enhanced knowledge content in the advancement of products and services to their employees to reduce the product development's cycles, better organization learning experience (Lancioni and Chandran, 2009).

Therefore, risk management (RM) has arisen as a distinct discipline in the companies since the 1990s (Gupta, 2011). Moreover, RM can minimize the probability and impact of IT project threats and capture the opportunities that could occur throughout the IT project life cycle. Knowledge Management (KM) processes provide a strategic resource for the organizations, and great influence on reducing organizations' risks (Karadsheh *et al.,* 2009)

Many studies have focused in the past on identifying and classifying the risk factors in the software development projects; (Barki *et al.,* 1993) (Ropponen and Lyytinen, 2000) ; (Tiwana and Kei, 2004); (Wallace *et al.,* 2004); (Kappelman *et al.,* 2006); (Tesch *et al.,* 2007). Yet, there are few scholars whom paid attention to the risk assessment processes in the IT project management. They have suggested a complete theoretical framework, which considers the effect of project, personal, informational, and organizational matters on risk insight, which might impact the enthusiasm to maintain a failing project (Cule, P., Schmidt, R., Lyyttnen, K., and Keil, M., 2000). However, the need to explore empirically certain factors, which may impact the risk perception of IT project managers is justified.

The majority of the empirical literatures are based upon the risk management, which emphases the study on what value the risk management will add to the firms and how they should be involved in the activities of risk management (Aabo *et al.,* 2011). Consequently, the personnel's judgment and knowledge within the intellectual capital will affect the risk identification and response (Jafari *et al.,* 2011)

Researchers strive to study the relation between KM processes and Risk Identification by introducing Knowledge-Based Risk Identification. The purpose is to obtain the most inclusive, completed and relevant information about risks ability to react quickly to the environment surrounding the organization. Also, they are supposed to arm themselves with comprehensive knowledge to be able to face the risks with the surrounded turbulent environment, which might raise new risks.

An effective RM process model cannot be achieved without the assistance of a well-established KM process model. Therefore, a well-defined and designed integrated KM and RM framework is essential to improve decision-making in IT projects (Rodriguez-Montes and Edwards, 2008). In addressing this issue, this research focused on the challenges experienced when carries out risk Identification in information technology projects.

The paper is structured as follows. Firstly, a discussion of the theoretical background; the next section examines the development on the research model and hypothesis, and introduces the research methodology (i.e., the design of the questionnaire, sample and data collection). Centered on the research's result, the discussion and analysis unit presents a conclusion, limitations of the study, and areas for additional research.

Materials and Methods

(1) Literature Review

(1.1) Knowledge Management (KM)

To obtain a new knowledge economy and business; many establishments are facing key challenges because of the external pressures and the type of the workplace. This increases the need to enhance the strategic, holistic, and comprehensive and adoption of Knowledge Management (KM) to improve processes and to gain the competitive advantage (Nehari-Talet et al, 2010). Thus, Knowledge Management (KM) has instigated to

be proactively presented in the strategy, policy, and application processes of corporations and governments (Malhotra, 2005).

Since the early 1990s Knowledge management is one of the main driving forces of organizational change and value formation. As with several growing managerial conception, knowledge management has permanently and gradually becomes more and more complex. There is a junction of associated concepts that link with knowledge management such as: academic capital, organizational learning and numerous learning concepts, insubstantial assets, neural network, social network, market or competitive intelligence, community of practice, change management, creativity, corporate culture, competitive strategy, information technologies (such as decision support system, and expert system) and finally performance management.

Knowledge Management (KM) has been defined as a systematic approach, which incorporates people, technology, content and processes to empower knowledge and information to be formed and flow to the right people, at the right time, so that their decisions and work will add value to the organization's mission (APQC, 2002). (KM) focuses mainly on discovering the appropriate solution to the problem which necessitates a thorough understanding, by finding the appropriate expert at the right time, or safeguarding the proposed solution to a difficult problem which can be applied several times.

Furthermore, there are many structured frameworks available to support the execution of Knowledge Management (KM) approaches in organizations. In order for (KM) practitioner to seriously reflect on the practice and manage (KM) risks, this individual needs both a conceptual framework and tools (Zyngier, 2008). Technology facilitates knowledge distributions and storage, but it has small or no part in producing a new knowledge, enhancing its use or in supporting a culture of learning (Singh and Sharma, 2011). To improve the organization's capacity to produce a new knowledge and to expand the knowledge base requires a discipline in operating knowledge to develop an organization's learning capability. (KM) focuses on the process about knowledge, which includes four processes (Alryalat and Alhawari, 2008):

(i) The 1st stage is the need for knowledge. This process drives many people and organizations to seek knowledge anywhere and anytime,

(ii) The 2nd stage is identifying the source of knowledge. Knowledge can be expressed either in form of ideas or experiences taken from numerous resources such as reports, books, documents, artifacts and the Internet,

(iii) The 3rd stage is verifying the source of Customer Knowledge. Verification of the sources is essential to verify the reliability and correctness of either the tacit or explicit knowledge for further processing.

(iv) The 4th stage is knowledge capture, which is concerned with capturing the tacit and the explicit knowledge within people. Knowledge Acquisition is a process used to find and acquire the knowledge from its various sources.

(1.2) Risk Management (RM)

Organizational change is rapidly affecting all different sectors across the economies. The raison d'être of an organization is moving from pure support to focus more strategically on innovation and development. The availability of appropriate Information technology (IT) made such transformation conceivable. Information systems take a long time to develop, with high cost to execute and maintain, and often not perceived to provide the benefit that were originally planned by business (Love, *et al.,* 2004).Currently, (IT) system is being implemented by organizations to run their information to deliver an improved support of their missions, while risk management plays an essential role in safeguarding an organization's assets and mission from risks. (RM) is the process of recognizing risk, evaluating risk, and taking the appropriate steps to mitigate the risk to a satisfactory level it's a vital element of a fruitful (IT) security program. (RM) is the process of recognizing risk, evaluating risk, and taking the appropriate steps to mitigate the risk to a satisfactory level it's a vital element of a fruitful (IT) security program. (Stoneburner *et al.,* 2002)

Risk Management (RM) process goal is to protect the organization and its aptitude to execute

the mission, but not only its Information technology (IT) assets. Therefore, the (RM) processes would not be considered as a technical means executed by the (IT) experts managing the (IT) system, but as an indispensable management function within the organization (Stoneburner *et al.,* 2002)

The purpose of implementing Risk Management (RM) is to permit the organization to achieve its mission/ s by:

(a) Enhance the security of Information technology (IT) system, which used to store, execute, or transmit information.

(b) Allow management to make an educated risk management conclusion to defend the expense during Information technology (IT) budgeting.

(c) Supporting management in accrediting the Information technology (IT) systems based on the result of supported documentation obtained from the risk management's performance (Bruckner *et al.,* 2001).

Risk Management (RM) is a separate discipline, which incorporates knowledge and practices from several other business fields to accept on a specific problem. RM permits Information technology (IT) managers to balance the functional and monetary costs of control measures and attain improvements by securing the (IT) systems and data which support the organizations' missions (Stonebumber *et al.,* 2002).

In a study by Standish Group, (Johnson, 2009) claimed that 32% of all projects succeeded and delivered within the time, cost and requirements, which reflect a noticeable decrease in project accomplishment rates. Furthermore, around 44% of projects were late, over budget, with less than the compulsory features and functions, and 24% failed prior to completion and never been approved. Also, these numbers signify a downtick in the success rates from the previous study, as well as a significant upsurge in the quantity of failures. Additionally, this year's outcomes characterize the uppermost failure rate in over a decade. However, (Tesch, *et al.,* 2007) indicated that the failures of Information technology (IT) projects are related to cost, time and performance or quality issues. The authors indicated that there are ninety two risk factors were presented to followers of the PMI for classification. This resulted in the categorization and importance of each risk applicable to systems development. According to (Doughty, 2005) (IT) projects' failure in UK continues to occur and these failures are not exclusive to Government, but when public sectors' projects fail; citizens lose out both as taxpayers and as customers, because extra expenses are necessary to correct problems and the attainment of expected benefits is delayed.

In a Western Australia, several interviews were conducted with Information technology (IT) professionals to determine how IT risks being accomplished in their projects. The respondents categorized 27 (IT) risks. The top five classified risks were personnel deficits; perverse project schedule and budget; impractical hopes and incomplete requirements. Furthermore, the respondents tremendously used the treatment strategy of risk reduction to manage these risks. Additionally, these strategies were mainly project management processes and not technical processes. This indicated that the project management is a Risk Management (RM) strategy with focus on managing stakeholders' expectation is a precise risk conduct which supports managing several key IT risks (Baccarini *et al.,* 2004).

In conclusion, (Na, 2007) claimed that the National Defense Projects suffer from risks in technical challenges, unstable system requirements, missing schedule milestones, unpredictable funding and cost overruns. National Defense Project Risk Management System (NDPRMS) is a risk information-centric system that is used to benefit the National Defense project manager. The (NDPRMS) was defined as a risk information-centric system by the author. The (NDPRMS) contains five essential components: database, knowledge-base, method base, model base, case-database, and above all the bases, nine diverse functions designed to help users making the decisions. Based on the national defense project experts' risk analysis process, the authors developed a design guideline which can be used by Risk Management (RM) engineers, domain specialists, and related (NDPRMS) operational mechanism to user's workflow.

(1.3) Knowledge Management and Risk Identification

Risk is the net negative impacts on the exercise of vulnerability by considering both the probability and the impact of occurrence. Project managers can take appropriate action if proper risk assessment leads to early identification of a failing project.

Risk Identification is the process of identifying probable effective risk factors in relation to project goals, determining their features, and finally documentation of findings. Furthermore, (Holm, 2001) defined it as obtaining the right information, for the right people at the right time to help them in problem-solving. The threat of losing the organizational memory is one of the main reasons why Knowledge Management (KM) is part of management practices. The literature of Risk Management (RM) recognizes the importance of two concepts: relating (KM) to business goals, and analyzing existing knowledge and information management practices to identify gaps. Like other business processes, (KM) needs to address the business needs within an organization and to encompass set goals and priorities for delivering benefits (Jones, 2005). Risk identification covers the identification within the established context of uncertain events that could cause harm or benefits, associated causes and the potential consequences (Williams *et al.,* 2006).

Organizational Risk Management (RM) is a complex and important task for managers; particularly, as the consequence of poor (RM) is becomingly observable through financial loss. Managers must be aware of the risks related with their organization's activities and have in place ways to manage unwanted events. The new field of knowledge risk management (KRM) offers managers ways to use knowledge to make sure decision makers is informed and can anticipate and respond to risk events (Massingham, 2010).

(Zyngier, 2008) conducted a case study research to strengthen Knowledge Management (KM) strategies by using Risk Management (RM) as a function of governance. This can make sure through developing (RM) reporting templates and procedures to guarantee appropriate feedback into (KM) system. In other words, (RM) can be used as an organized feedback to deal with cultural and structural risk factors to KM policy. Additionally, the knowledge risk management (KRM) is an emerging field which offers a solution to the problems related with conventional (RM) methods. The problem of environmental complexity is manifested by individuals not knowing enough about the risk to anticipate its likelihood and consequences. Environmental complexity creates uncertainty (Massingham, 2010).

The globalization and the technological development in the business sector forced business organizations to cooperate on a broader scale. The knowledge of cooperation and the risks into cooperation have become fundamental to business success (Ehrengren, 2011). In addition, correct risk identification ensured Risk Management (RM) effectiveness. (RM) has become the main part of the organization activity to help all other activities to reach the organizations aim directly and efficiently. (RM) is a continuous process that depends directly on the change in the internal and external environment require continuous attention for identification and control of risk (Tchankova, 2002).

According to (Neef, 2005), a company cannot manage its risks effectively if it cannot manage its knowledge. Many projects failed due to lack of knowledge among the project team or lack of knowledge sharing during project progress. A project failure can be the result of capturing the appropriate knowledge at an inappropriate time of the project (Fuller, *et al.,* 2008). In fact, without Risk Management (RM) as a tool to communicate risks among members of a project team, (RM) might suffer from ineffectiveness and inefficiencies (Schwalbe, 2007).

Certainly, a complex organizational process tends to rely on both explicit and tacit knowledge of various individuals and networks of experts. Therefore, understanding the full spectrum of risks associated with a particular process extends considerably beyond individuals and information assets alone. This line of thought suggests that if we wish to consider knowledge as a possible source of risk, the asset-based risk identification approach is likely to be insufficient (Shedden *et*

al., 2009). Information security is the dominant to organizations, so Information security risk assessments (ISRAs) enable organizations to identify their key information assets and risks in order to develop effective and economically-viable control strategies (Braber *et al.,* 2007). So risk intelligence is the alignment of information governance and information risk management to business priorities. Not only does this alignment help mitigate the risks to business goals, but it also leads to direct savings in legal and compliance costs, especially when knowledge Management (KM) principles are applied. Three core (KM) principles related to RM have been noted. These are: business focus, accountability and operational support. The three (KM) principles can be applied to information Risk Management (RM) in order to generate risk intelligence and to maximize the return on value from information (KM) (investments. Business focus includes five steps:

(i) Start with key business risks,
(ii) Prioritize the business risks based on their importance to the business strategy,
(iii) Identify information sources for the high-business risk areas,
(iv) Identify at-risk information sources through establishing what information is critical to the business process,
(v) Establish risk-mitigation strategies (Caldwell, 2008).

According to (Sommerville, 2006) Risk Management (RM) involves the following stages:

(a) Risk Identification: used to identify project, product and business risks.
(b) Risk Analysis: to assess the likelihood and consequences of these risks.
(c) Risk planning: to draw up plans to avoid or minimize the effects of the risk.
(d) Risk Monitoring: to guarantee the effectiveness of the methods followed and to monitor the risks throughout the project.

Also, in Risk Management (RM) process, the team shares their knowledge on selecting the best alternative for risk treatment in risk action requests. Whenever a risk treatment alternative is recommended in a risk action request, an evaluation shall be made by the stakeholders to determine if the risk is acceptable. If the stakeholders determine that actions should be taken to make a risk acceptable, then a risk treatment alternative shall be implemented, supported by the necessary resources, monitored and coordinated with other project activities.

(Shao and Wu, 2010) propose an integrated risk management model for financial banks with knowledge management. The purpose of this integrated model is to consider the risks before a project or an investment, assesses and calculates the risks using all kinds of ways, adjusts the operation according to the changeable environment and feeds back timely. They recommend that the financial banks should set up the incentive mechanism to urge the staffs to learn more knowledge, and at the same time, banks should train knowledgeable staffs to construct a whole system to assess and calculate the potential risks and counter-measures to reduce risks and feedback. With the integrated risk management model and knowledge management, banks can take out systemic measures to manage risks to gain sustainable rewards.

(Bing-hua and Guo-fang, 2009) developed a framework of the knowledge-based supply chain risk management system which includes four modules: basic database, knowledge database management, and supply chain risk early warning and risk management strategies module. The research focuses on utilizing knowledge management theories and data mining methods to supply chain risk management and set up framework of the knowledge-based supply chain risk management system. To achieve the process concerning risk Identification, five sub stages have to be taken into account as shown in Table 1.

Conceptually, the knowledge process and Risk Identification has been widely embraced by businesses. Many organizations have initiated models to improve on Risk Identification. As mentioned, knowledge process has become a number one focus within today's competitive markets. Thus, the processes of knowledge are of prime value for organizations. Many organizations fail because there is no clear strategy for dealing with risk, and specifically the process of Risk Identification.

Table 1: Processes of Risk Identification

Main Dimension/ Risk Analysis Process	Sub Dimension/ Parts of Process	References
Risk Identification	Knowledge-Based Risk Identify Source	(Sun Z; and Gang G, 2006) (Karadsheh L; Alhawari S; El-Bathy N; and Hadi W, 2008) (Alryalat H; and Alhawari S, 2008)
	Knowledge-Based Risk Verify Source	(Bouthillier, F; and Shearer K, 2002) (Karadsheh L; Alhawari S; El-Bathy N; and Hadi W, 2008) (Alryalat H; and Alhawari S, 2008)
	Knowledge-Based Risk Capture	(Sun Z; and Gang G, 2006) (Karadsheh L; Alhawari S; El-Bathy N; and Hadi W, 2008) (Alryalat H; and Alhawari S, 2008)
	Knowledge-Based Risk Discovery	(Sun Z; and Gang G, 2006) (Karadsheh L; Alhawari S; El-Bathy N; and Hadi W, 2008) (Alryalat H; and Alhawari S, 2008)
	Knowledge-Based Risk Education	(Lai H; and Chu TH, 2000) (Karadsheh L; Alhawari S; El-Bathy N; and Hadi W, 2008) (Alryalat H; and Alhawari S, 2008)

Risk Identification is as important as the risk process itself, since the organization's success will depend upon the risk Identification as the way to ensure their survival in today's knowledge savvy and competitive marketplace environment. It is Identification is often described as a strategy or a set of activities the organizations employ to minimize risk. Conceptually, KM process and risk Identification has been widely embraced by businesses. Many organizations have initiated models to improve on risk Identification. As mentioned, risk Identification has become a number one focus within today's competitive markets.

(2) Research Model

Based on the process about knowledge by (Alryalat and Alhawari, 2008) and theoretical background and literature review, we have developed a conceptual model to examine the role of the knowledge process (Knowledge-Based Risk Identify Source, Knowledge-Based Risk Verify Source, Knowledge-Based Risk Capture, Knowledge-Based Risk Discovery, and Knowledge-Based Risk Education) on Risk Identification. The research model is based on independent variables (Knowledge-Based Risk Identify Source, Knowledge-Based Risk Verify Source, Knowledge-Based Risk Capture, Knowledge-Based Risk Discovery, and Knowledge-Based Risk Education) and Risk Identification as dependant variable as presented in figure 1.

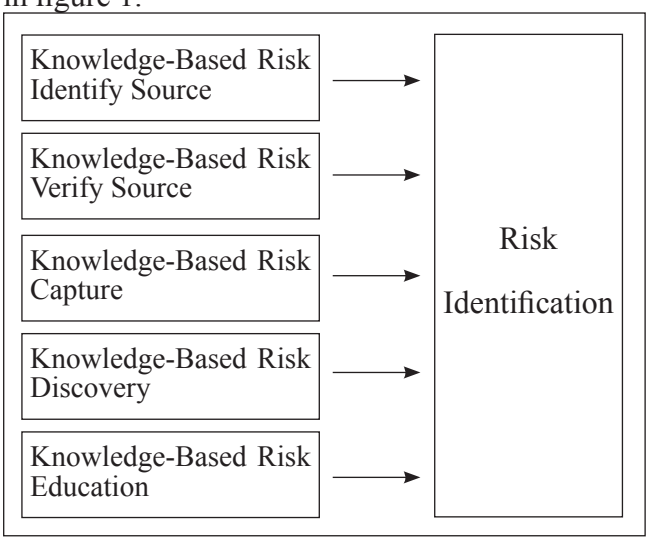

Figure 1: Research Model

(3) Research Hypotheses

Five hypotheses address the associations between Independent variables related to Knowledge processes (Knowledge-Based Risk Identify Source, Knowledge-Based Risk Verify Source, Knowledge-Based Risk Capture, Knowledge-Based Risk Discovery, and Knowledge-Based

Risk Education) and Dependent variable related to (Risk Identification) as follows:

(3.1) 1st Hypothesis

(3.1.1) H0.1: There is no significant relationship between independent variables (Knowledge-Based Risk Identify Source) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.1.2) H1.1: There is significant relationship between independent variables (Knowledge-Based Risk Identify Source) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.2) 2nd Hypothesis

(3.2.1) H0.2: There is no significant relationship between independent variables (Knowledge-Based Risk Verify Source) and dependent variable (Risk Identification) at level) at level ($\alpha \leq 0.05$).

(3.2.2) H1.2: There is significant relationship between independent variables (Knowledge-Based Risk Verify Source) and dependent variable (Risk Identification) at level) at level ($\alpha \leq 0.05$).

(3.3) 3rd Hypothesis

(3.3.1) H0.3: There is no significant relationship between independent variables (Knowledge-Based Risk Capture) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.3.2) H1.3: There is significant relationship between independent variables (Knowledge-Based Risk Capture) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.4) 4th Hypothesis

(3.4.1) H0.4: There is no significant relationship between independent variables (Knowledge-Based Risk Discovery) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.4.2) H1.4: There is significant relationship between independent variables (Knowledge-Based Risk Discovery) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.5) 5th Hypothesis

(3.5.1) H0.5: There is no significant relationship between independent variables (Knowledge-Based Risk Education) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(3.5.2) H1.5: There is significant relationship between independent variables (Knowledge-Based Risk Education) and dependent variable (Risk Identification) at level ($\alpha \leq 0.05$).

(4) Research Instrument

According to the International Organization for Standardization (Systems and Software Engineering and IEEE Computer Society, 2006) the probability of occurrence and consequences of each risk identified shall be estimated. The estimates can be quantitative or qualitative depending on the organization. The stakeholders should share their knowledge in determining which risks will be analyzed using a qualitative scale or quantitative scale.

To confirm the consistency and robustness survey of the questionnaire, numerous decisive factors have been respected when designing a questionnaire survey. The questionnaire started with a brief description of the meaning of the main concepts, and it gave instructions on how to answer each section of the questionnaire. An initial draft was developed based on an extensive literature review. It includes many questions, which are in line with the research aims. Therefore, the research survey could be described as being comprehensive.

The structural questionnaire design was applied to develop the survey instrument. Each was operationalized on a five points Likert-type scale where 1 = "strongly agree", and 5 = "strongly disagree". In order to ensure the variables selected for this study were relevant to the respondents; a pilot study was conducted to increase the validity and reliability of the questionnaire. Experts were invited to review the questionnaire and pilot tests were administered before designing the final questionnaire.

The survey questionnaire is divided into two parts. The first part includes the personal information of the respondents such as gender, area of specialization, years of experience and company size. The second part includes the questions related to Independent variables related to knowledge processes (Knowledge-Based Risk Identify Source, Knowledge-Based Risk Verify Source, Knowledge-Based Risk Capture, Knowledge-Based Risk Discovery, and Knowledge-Based Risk Education) and Dependent variable related to (Risk Identification). Tables 2 describe all research instrument and elements of the questionnaire.

Table 2: Research Instrument and Elements of the Questionnaire

Research Instrument	Elements of the Questionnaire
Independent Variable (Knowledge-Based Risk Identify Source)	(1) Tacit knowledge is considered as a more reliable source of risk than explicit knowledge
	(2) Does interviewing key personnel facilitate identifying the precise source of identified risk
	(3) Do you consider common sense as a reliable source of risk identification?
	(4) Can case studies may be considered as a reliable source for risk identification
Independent Variable (Knowledge-Based Risk Verify Source)	(1) Data authenticity verification is an important method of verifying the source
	(2) Utilizing available explicit knowledge of risk requires verifying the original source
	(3) Should the result of experiments or tests from previous literature be verified before adapting?
	(4) Should expert opinions be considered as a verification process of identified risks?
Independent Variable (Knowledge-Based Risk Capture)	(1) Knowledge Capture stage focuses on capturing both the explicit and tacit knowledge exists within the employees.
	(2) Does capturing previous project information play an important role in enriching the project?
	(3) Capturing risk information from previous reports, helps in identifying risks more efficiently?
	(4) Risk Identification and Knowledge Capture are iterative processes.
Independent Variable (Knowledge-Based Risk Discovery)	(1) The purpose of Knowledge Discovery is to obtain a tacit or explicit knowledge
	(2) Knowledge Discovery attempts to identify IT project information by sharing of tacit knowledge,
	(3) Knowledge Discovery uses data mining techniques and tools to access stored IT projects in the repository.
	(4) Techniques such as brainstorming team dialog and checklists can be used for Knowledge Discovery that can be used to unleash hidden risks.
Independent variable (Knowledge-Based Risk Education)	(1) The stored collection of knowledge of risks in the repository can serve as training, education and awareness tool to current and future employees.
	(2) Knowledge Education is aimed on providing a list of previous encountered risk cases or projects stored in the repository to teach existing and/or new employees.
	(3) Training and education help employee to deal with any risk that might occur in future project.
	(4) Training and education is a process of identifying the threats on the business.
Dependent variable (Risk Identification)	(1) Risk identification purpose is to develop a list of risks that can adversely impact the project outcome
	(2) Risk Identification identifies the risks and then determines the strategy to address them.
	(3) Risk Identification determines which risks might affect the project and determine their characteristics.
	(4) Risk Identification is studying a situation to realize what could go wrong in the product design.

(5) Sample

This study relied on a quantitative approach of collecting information from the respondents. The research focused on how the organizations understand and view the purpose and importance of the knowledge process for the enhancement of risk Identification based on their experience and/or understanding. The quantitative approach supplied a suitable research data collection strategy, allowing the collection of a large amount of data from a sizeable population in a highly economical way. The factor analysis was adopted to test construct validity to determine the relationships between variables.

Sample of the survey was divided into three existing Jordanian Telecommunication Companies. A total of 155 copies of the questionnaire were sent. A total of 137 copies of the questionnaire were returned, of which of 130 copies were completed and 7 copies were uncompleted, and 18 copies of the questionnaire were not returned. To increase the return rate, each company was assigned a contact person to collect and return the questionnaires. Table 3 shows the summary of the sample size.

Table 3: Summary of Sample Size

Category		No. (A)	No. (B)	No. (C)	No. (D)
Jordanian Telecommunication Companies	1st	60	52	02	06
	2nd	40	38	03	03
	3rd	55	40	02	09
Total		155	130	07	18

No. (A) Questionnaire Distributed
No. (B) Completed Questionnaires Returned
No. (C) Uncompleted Questionnaires Returned
No. (D) Questionnaires Unreturned

The construct was subjected to the scale reliability procedure of SPSS 16.0, using the Cronbach's Alpha (Cronbach, 1951) criterion to assess the internal consistency of the studied construct. The Cronbach's Alpha coefficient is in all construct above 0.80 the value exceeds the accepted cut-off value of 0.70, as suggested by (Nunnally, 1978). This indicates that each individual item is internally consistent and highly reliable.

Data Analysis and Result

This study consists of (87) males with a percentage of (64.4%), and (48) females with a percentage of (35.6%). The aim is to expose gender distinctions, not to explain or theorize why these distinctions have arisen and continue to exist. Examples of this include investigations of women's vs. men's use (adoption, acceptance, ...*etc*) of Information Technology (IT) (Gefen, and Straub, 1997) and women's participation rate in the (IT) (Yin, 2013) The reason for the substantial percentage difference of respondents' gender is due to the male dominance of managerial and executive positions generally found throughout telecommunication companies in Jordan.

(1) Data Analysis

The largest group of respondents (70 or 51.9%) indicates that their area of specialization was Information Technology (IT). The smallest group area of specialization of respondents was Business Management (11 or 8.1%). Additionally, the largest group of respondents (48 or 35.6 %) indicates that their years of experience range from (1-2 years). Finally, the smallest group of respondents (17.8 %) points out that their years of experience are less than (1 year) and the highest rate is (35.6%) have (1-2 years) experience. This demographic data is detailed in Table 4

Table 4: Demographic Data

Description	Variable	Result	Percentage (%)
Gender	Male	87	64.4
	Female	48	35.6
Area of Specialization	Information Technology	70	51.9
	Business Management	11	08.1
	Engineering	19	14.1
	Other	35	25.9
Experience	Less than 1years	24	17.8
	1-2 years	48	35.6
	3-5 years	26	19.3
	6 years or more	37	27.4

(2) Result

The results of regression analysis based on independent variables (Knowledge-Based Risk Identify Source, Knowledge-Based Risk Verify Source, Knowledge-Based Risk Capture, Knowledge-Based Risk Discovery, and Knowledge-Based Risk Education) and Risk Identification are reflected in Table 4; based on the objectives and hypotheses of the study, ANOVA was used to analyze the data. Tables 5 represent the test of the hypotheses by using analysis of variance (ANOVA), based on the significant level of (0.05).

Referring to table 5, (08%) of the variance in Risk Identification accounted by Knowledge-

Based Risk Identify Source, the (F) value is (11.98) with a significance equal (0.00), which is less than (0.05). In this case, the first hypothesis is accepted which indicates that there is a Knowledge-Based Risk Identify Source on Risk Identification.

Table 5: ANOVA Test for Knowledge Processes Based Risk and Risk Analysis

Dependent Variable	Independent Variable	Risk	Risk %	Adjusted Risk %	(F)	(Sig.)
Risk Identification	Knowledge-Based Risk Identify Source	0.28	0.08	0.07	11.98	0.00
	Knowledge-Based Risk Verify Source	0.38	0.15	0.14	23.39	0.00
	Knowledge-Based Risk Capture	0.199	0.04	0.03	5.42	0.02
	Knowledge-Based Risk Discovery	0.18	0.03	0.02	4.51	0.03
	Knowledge-Based Risk Education	0.07	0.00	0.00	0.83	0.36

((F)= *value*, (Sig.)= *significance*)

Additionally, from table 5, (15%) of the variance in Risk Identification accounted by Knowledge-Based Risk Verify Source, the (F) value is (23.39) with significance equal (0.000), which is less than (0.05). In this case, the second hypothesis is accepted) which indicates that there is an effect of Knowledge-Based Risk Verify Source on Risk Identification.

Also, from table 5, (04%) of the variance in Risk Identification accounted by Knowledge-Based Risk Capture, the (F) value is (5.42) with significance equal (0.02), which is less than (0.05). In this case, the third hypothesis is accepted) which indicates that there is an effect of Knowledge-Based Risk Capture on Risk Identification.

Moreover, from table 5, (3%) of the variance in Risk Identification accounted by Knowledge-Based Risk Discovery, the (F) value is (4.51) with significance equal (0.03), which is less than (0.05). In this case, the fourth hypothesis is accepted) which indicates that there is an effect of Knowledge-Based Risk Discovery on Risk Identification.

Finally, from table 5, (0.00%) of the variance in Risk Identification accounted by Knowledge-Based Risk Education, the (F) value is (0.83) with significance equal (0.36), which is greater than (0.05). In this case, we reject the hypothesis, which indicates that there is an effect of Knowledge-Based Risk Education on Risk Identification.

Based on the previous analysis, this paper contributes to understanding of influence of Knowledge Management (KM) process on Risk Identification in Jordanian Telecommunication Companies. Additionally, the relation between the Knowledge processes based Risk and the Risk Identification was confirmed in this study and the findings are summarized as follows:

(i) Knowledge-Based Risk Identify Source had a positive impact on the Risk Identification,
(ii) Knowledge-Based Risk Verify Source had a positive impact on the Risk Identification,
(iii) Knowledge-Based Risk Capture had a positive impact on the Risk Identification,
(iv) Knowledge-Based Risk Discovery had a positive impact on the Risk Identification.

On the other hand, the relation between the Knowledge-Based Risk Education and the Risk Identification (RI) was not confirmed in this study and the findings show that Knowledge-Based Risk Education does not have a considerable effect on Risk Identification.

Conclusion

Risk Identification (RI) has become vital for today's competitive markets. The Jordanian Telecommunication Companies indicated that they are integrating the knowledge process practices in organizational strategy to improve Risk Identification (RI) to remain competitive. The study recommends considering Risk Management (RM) and Knowledge Management (KM) to take out systemic measures to manage risks to gain sustainable rewards. Certainly, these findings will guide policy makers to incorporate knowledge processes to enhance Risk Identification (RI) in Jordanian companies. Additionally, management should understand the importance of knowledge process as a strategic input in making decision

making to develop Risk Identification (RI). They should attract and retain talents and leverage them to achieve the competitive advantage through a proactive knowledge process related Risk Identification (RI). It is imperative for managers to fully understand the strategic payoff from the investment made in training and development of Risk Identification (RI). This investment should always improve competencies levels of the workforce that have positive effects on performance that need to be capitalized by management. However, there are limitations in this study and therefore the results cannot be generalized because it considered only one sector in a developing country. In order to get a better understanding about the knowledge processes on Risk Identification (RI), future research accomplishments should focus on a broader range of other types of organizations. Additionally, one major direction to further research would be geared towards reproducing this study across in several other countries for comparative purposes.

References

Aabo T; Kuhn J; and **Zanotti G** (2011) Founder Family Influence and Foreign Exchange Risk Management. *International Journal of Managerial Finance,* **7** (1): 38-67.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1906988

Alryalat H; and **Alhawari S** (2008) Towards Customer Knowledge Relationship Management: Integrating Knowledge Management and Customer Relationship Management process. *Journal of Information and Knowledge Management (JIKM) ,* **7** (3): 145-157.
Available at: http://www.worldscientific.com/doi/abs/10.1142/

APQC (2002) *Retaining Valuable Knowledge: Proactive Strategies to Deal with a Shifting Workforce.* the American Productivity and Quality Council , USA, pp1-182.
Available at: http://www.researchandmarkets.com/reports/42777/retaining_

Baccarini D; Salm G; and **Love P** (2004) Management of Risks in Information Technology Projects. *Industrial Management and Data Systems*, **104** (4): 286-295.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=850195

Barki H; Rivard S; and **Talbot J** (1993) Toward an Assessment of Software Development Risk. *Journal of Management Information Systems ,* **10** (2): 203.225.
Available at: http://www.dl.acm.org/citation.cfm?id=1189679

Bing-hua H; and **Guo-fang S** (2009) Knowledge Management and Data Mining for Supply Chain Risk Management. *In*: *International Conference on Management and Service Science 2009, MASS09, 20-22 Sept. 2009,* Wuhan University, Wuhan, China, pp1-4.
Available at: http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5303128&

Bourque B; and **Fielder P** (1995) *How to Conduct Self Administered and Mail Surveys*. Sage Publications Ltd, Amazon, pp1-223.
Available at: http://books.google.com.bh/books/about/How_to_conduct_self_

Bouthillier F; and **Shearer K** (2002) Understanding Knowledge Management and Information Management: the Need for an Empirical Perspective. *Information Research*, **8** (1): 1-39.
Available at: http://www.informationr.net/ir/8-1/paper141.html

Braber DF; Hogganvik I; Lund S; Stolen K; and **Vrallsen F** (2007) Model Based Security Analysis in Seven Steps: A Guided Tour to the CORAS Method. *BT Technology Journal ,* **25** (1): 101-17.
Available at: http://www.home.ifi.uio.no/ketils/kst/Articles/2007.BT.pdf

Bruckner M; List B; and **Schiefer J** (2001) Risk-Management for Data Warehouse Systems. *Lecture Notes in Computer Science*, **2114:**219-229.
Available at: http://www.bibsonomy.org/bibtex/13cce6d8ab5ea5043910d028a

Caldwell F (2008) Risk Intelligence: Applying KM to Information Risk Management. *Journal of VINE ,* **38** (2): 163-166.
Available at: http://www.emeraldinsight.com/journals.htm?issn=0305- =abstract

Cronbach LJ (1951) Coefficient Alpha and the Internal Structure of Tests. *Psychometrika ,* **16** (3): 297-333.
Available at: www.http://link.springer.com/article/10.1007/BF02310555

Cule P; Schmidt R; Lyyttnen K; and **Keil M** (2000) Strategies for Leading off is Project Failure. *Information Systems Management ,* **14** (2), 68-73.
Available at: http://www.tandfonline.com/loi/uism20

Doughty S (2005) *Why IT Projects Fail*. *IT Business Edge*,
Available at: http://www.intosaiitaudit.org/intoit26.pdf

Ehrengren L A (2011) Performance and Risk Management in Strategic Cooperation A Comparative Study of Business and Military Sectors. *International Journal of Productivity and Performance Management ,* **60** (4): 387-403.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1921846

Fuller A; Valacich S; and **George F** (2008) *Information Systems Project Management: A Process and Team Approach* . Prentice Hall, New Jersey, USA, pp1-528.
Available at: http://www.pearson.ch/Higher Education/

Gupta P (2011) Risk Management in Indian Companies: Enterprise-Wide Risk Management (EWRM) Concerns and Issues. *The Journal of Risk Finance ,* **12** (2): 121-139.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1906995

Holm J (2001) Capturing the Spirit of Knowledge Management. *In: The American Conference on Information Systems* Boston, USA.
Available at: http://www.aisel.aisnet.org/amcis2001/438/

Jafari M; Rezaeenour J; Mazdeh, M; and **Hooshmandi A** (2011) Development and Evaluation of a Knowledge Risk Management Model for Project-Based Organizations A Multi-Stage Study. *Management Decision*, **49** (3): 309-329.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1913466

Johnson J (2009) *Chaos Sumary.* The Standish Group Inc, Boston: Massachusetts, USA.
Available at: http://www.scribd.com/doc/36877347/CHAOS-Summary-2009

Jones H (2005) Risking Knowledge Management an Information Audit of Risk Management Activities within the Hobart City Council. *Library Management,* **26** (6/7): 397-407.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1510075

Kappelman LA; McKeeman R; and **Zhang L** (2006) Early Warning Signs of IT Project Failure: The Dominant Dozen. *Information Systems Management,* **23** (4): 31-36.
Available at: http://www.scholar.google.com/citations?view_op=view_

Karadsheh L; Alhawari S; El-Bathy N; and **Hadi W** (2008) Incorporating Knowledge Management and Risk Management as a Single Process, *In: Proceedings of 10th International Conference on Global Business Development Institute (GBDI*), October 12-15,Las Vegas, Nevada, USA, pp207-214.

Karadsheh L; Mansour E; Alhawari S; Azar G; and **El-Bathy N** (2009) A Theoretical Framework for Knowledge Management Process: Towards Improving Knowledge Performance. *Journal of Communications of the IBIMA ,* **7** (7): 67-79.
Available at: http://www.ibimapublishing.com/journals/CIBIMA/volume7

Lai H; and **Chu TH** (2000) Knowledge Management: A Review of Theoretical Frameworks and Industrial Cases,. *In:System Sciences, 2000. Proceedings of the 33rd Hawaii International Conference on System Sciences, IEEE,* 4-7 Jan. 2000, Hawaii.
Available at: http://www.ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=.

Lancioni RA; and **Chandran R** (2009) Managing Knowledge in Industrial Markets: New Dimensions and Challenges. *Industrial Marketing Management*, **38** (2): 148-151.
Available at: http://www.researchgate.net/publication/238291102_Managing_

Love PE; Ghoneim A; and **Irani Z** (2004) Information Technology Evaluation: Classifying Indirect Costs using the Structured Case Method.

Journal of Enterprise Information Management, **17** (4): 312-325.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1509223

Malhotra Y (2005) Integrating Knowledge Management Technologies in Organizational Business Processes: Getting Real Time Enterprises to Deliver Real Business Performance. *Journal of Knowledge Management,* **9** (1): 7-28.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1464743

Massingham P (2010) Knowledge Risk Management: A Framework. *Journal of Knowledge Management,* **14** (3): 464-485.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1864142

Na Y; and (2007) The Research to the Framework of National Defense Project Risk Management System. *In proceedings of IEEE International Conference on Grey Systems and Intelligent Services 2007 GSIS 2007, 18-20 Nov 2007, Nanjing, china.*
Available at: http://www.ieeexplore.ieee.org/xpl/articleDetails.jsp?

Neef D (2005) Managing Corporate Risk through Better Knowledge Management. *Journal of the Learning Organization,* **12** (2): 112-124.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1464390

Nehari-Talet A; Alhawari S; and **Alryalat H** (2010) The Effect Knowledge Process on Customer Knowledge Expansion. *The International Journal of Knowledge, Culture and Change Management* , **10** (2): 181-200.
Available at: http://www.ijm.cgpublisher.com/product/pub.28/prod.1211

Nunnally JC (1978) *Psychometric Theory (2nd ed.)*. McGraw-Hill, New York, USA, pp1-701.
Available at: http://www.books.google.com.bh/books/about/Psychometric_

Padayachee K (2002) An Interpretive Study of Software Risk Management Perspectives. *In: Proceedings of the 2002 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists (SAICSIT) on Enablement through Technology,* South African Institute for Computer Scientists and Information Technologists , Republic of South Africa,pp118-127.
Available at: http://www.dl.acm.org/citation.cfm?id=581524&CFID=

Rodriguez-Montes A; and **Edwards J** (2008) Before and After Modeling: Risk Knowledge Management is Required. *In: Proceedings of the 6th Annual Premier Global Event on ERM 2008 ER Management Sympoisum,14-16/4/2008,* Chicago, USA.pp1-23.
Available at: *http://www.ermsymposium.org/2008/pdf/papers/Rodriquez.pdf*

Ropponen J; and **Lyytinen K** (2000) Components of Software Development Risk: How to Address Them? A Project Manager Survey. *IEEE Transactions on Software Engineering* , **26** (2): 98-112.
Available at: http://www.dl.acm.org/citation.cfm?id=334450

Schwalbe K (2007) *Information Technology Project Management* (5 ed.). Course Technology, Thomson Learning. Stamford, USA, pp1-650.
Available at: http://www.amazon.ca/ Information-Technology-Project-

Shao B; and **Wu K** (2010) An Integrated Risk Management Model for Financial Banks with Knowledge Management. *In: the 3rd International Symposium on Knowledge Acquisition and Modeling, IEEE, 20-21 Oct.2010,* Waban, China, Pp20-23.
Available at: http://www.ieeexplore.ieee.org/xpl/login.jsp?tp=&

Shedden P; Scheepers R; Smith W; and **Ahmad A** (2009) Towards a Knowledge Perspective in Information Security Risk Assessments: An Illustrative Case Study. *In: Proceedings of the 20th Australasian Conference on Information Systems ACIS, 2-4 Dec. 2009,* Monash University, Melbourne, Australia, pp1-96.
Available at: http://www.aisel.aisnet.org/acis2009

Singh A; and **Sharma V** (2011) Knowledge Management Antecedents and its Impact on Employee Satisfaction A Study on Indian Telecommunication Industries. *The Learning Organization*, **18** (2):115-130.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=1911843

Software and Systems Engineering Standards Committee (2006) *Life Cycle Processes: Risk Management.* C/S2ESC, Software and Systems Engineering Standards Committee, IEEE Computer Society, IEEE Standard association.
Available at: http://www.standards.ieee.org/findstds/standard/16085-2004.html

Sommerville I (2006) *Software Engineering* (8th ed.). University of St. Andrews, Addison-Wesley Limited, London, UK. pp1-824.
Available at: http://www.amazon.ca/Software-Engineering-Update-Ian-

Stonebumber G; Oguen A; and **Feringa A** (2002) *Risk Management Guide for Information Technology Systems: Recommendations of the National Institute of Standards and Technology*. Computer Security Division, Information Technology Laboratory, National Institute of Standards and Technology, Gaitherburg MD, USA, pp1-55.
Available at: http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf
Available at: http://www.hhs.gov/ocr/privacy/hipaa/administrative/ pdf

Sun Z; and **Gang G** (2006) HSM: A Hierarchical Spiral Model for Knowledge Management. *In*: *Proceedings of the 2nd International Conference on Information Management and Business IMB2006, 13-16 Feb. 2006,* Sydney, Australia, pp542-551.
Available at: http://www.ro.uow.edu.au/cgi/viewcontent.cgi?article=

Tchankova (2002) Risk Identification: Basic Stage in Risk Management. *Environmental Management and Health,* **13** (3): 290-297.
Available at: http://www.emeraldinsight.com/journals.htm?articleid=871393

Tesch D; Kloppenborg TJ; and **Frolick MN** (2007) IT Project Risk Factors: The Project Management Professional's Perspective. *Journal of Computer Information Systems ,* **47** (4): 61–69.
Available at: http://www.iacis.org/jcis/jcis_toc.php?volume=47&issue=4

Tiwana A; and **Keil M** (2004) The One Minute Risk Assessment Tool. *Communications of the ACM ,* **47** (11): 73-77.
Available at: http://www.researchgate.net/public

Wallace L; Keil M; and **Rai A** (2004) How Software Project Risk Affects Projectout Comes: an Investigation of the Dimensions of Risk and an Exploratory Model. . *Decision Sciences ,* **35** (2): 289-321.
Available at: http://www.paul-hadrien.info/backup/LSE/IS%20470

Williams R; Bertsch B; Dale B; Wiele T; Iwaarden J; Smith M; and **Visser R** (2006) Quality and Risk Management: What are the Key Issues? *The TQM Magazine,* **18** (1): 67-86.
Available at: http://www.emeraldinsight.com/bibliographic_

Yin K (2013) *Case Study Research: Design and Methods (Applied Social Research Methods*, 5th ed., SAGE Publications Inc, London, UK, pp1-265.
Available at: http://www.amazon.com/Case-Study-Research-Methods-

Zyngier S (2008) Risk Management: Strengthening Knowledge Management. *International Journal of Knowledge Management ,* **4** (3): 19-32.
Available at: http://www.academia.edu/179884/Risk_management_