THE RELATIONSHIP BETWEEN KNOWLEDGE MANAGEMENT PRACTICES AND ENTERPRISE RISK MANAGEMENT IN HIGHER EDUCATION: AN ACTION RESEARCH

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Research paper

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Abstract

The central objective of this paper is to describe the action research that was conducted to investigate the relationship between Knowledge Management (KM) practices and the Enterprise Risk Management (ERM) process in higher education. The research aimed to explore KM best practices that improve ERM implementing and development. The action research was used to help two organizations, the Claremont Graduate University (CGU) and The Claremont Colleges Services (TCCS), to improve their ERM process. The intervention through the action research helped CGU and TCCS to overcome a number of obstacles with their ERM process and to evaluate how KM could facilitate their issues with the process. This paper focuses on three parts of the ERM process: risk assessment; risk monitoring, and risk communication and consultations. The analysis identified patterns and best practices of KM process that are associated with each part. The results presented in this paper confirm and explain the relationship between the ERM process and KM and build a foundation to design an Enterprise Risk Knowledge Management Framework.

Keywords: Knowledge Management, Knowledge Sharing, Enterprise Risk Management, and Risk Assessments.
1 Introduction

Until recently, Risk Management (RM) looked at productivity-related research, but then the concept of risk widened to encompass other dimensions associated with individuals and with external and internal environments. It is clear today that many of the risks are due to a lack of risk knowledge. Acquiring and managing risk knowledge is one of the main issues with managing risks in organizations (Paape & Spekle 2011). Organizations struggle to acquire and manage the risk knowledge that treats their operations.

The concept of Knowledge Management (KM) has emerged in recent years not only as an ideology but as a strategy to support institutions in all levels of operation and as an important means of avoiding and dealing with risks. Many studies have indicated that Knowledge Management is the key to achieving the competitive advantage and long-term success and survival of an organization (Kamya et al. 2010; Meihami & Meihami 2013; Jubran & Mansouri 2015; Omotayo 2015).

The higher education (HE) sector is the focus of the current paper which increases the importance of the study as these concepts usually are investigated in industrial, IT or financial institutions, in particular (Alhawari et al. 2012; Shafiq & Nasir 2010; Daud, 2011; Jalal et al. 2011). Higher education is considered one of the slowly developed fields and one of the least researched in areas like public policy and administrative development (Kohoutek 2013). In 2013, the Association of Governing Boards of Universities and Colleges (AGB) and United Educators (UE) conducted a survey to identify the maturity level of ERM practices in higher education institutions. The results indicated that universities do not attempt to apply ERM practices despite the increased risks in these educational institutions. These statistics can be a reflection of the struggle to understand and implement ERM, and the lack of practical knowledge about ERM processes in higher education. In recent years, some HE organizations have begun to implement ERM as a way to manage their risks, respond to external stakeholder demands and to take a proactive strategy to deal with risks (The Association of Governing Boards of Universities and Colleges (AGB) and United Educators (UE), 2014).

However, previous studies have shown that higher education institutions are struggling to understand and implement risk management practices (Rodriguez 2010; Jalal et al. 2011; Rodrigues and Edwards 2014; AGB & UE, 2014). RM initiatives are underutilized in most US higher education institutions, which are poorly assessed and lack effective communication channels with the community regarding new and ongoing initiatives by management (Padro et al. 2015).

1.1 Traditional Risk Management and Enterprise Risk Management (ERM)

During and after World War II, the concepts of RM emerged in the insurance industry to cover for accidents in the 1950s. In the 70s and 80s, most organizations focused on the financial sector (Dionne 2013). The driving force for the evolution process was the need to increase governance of RM through reduction of regulatory capital associated with unanticipated risks (Dionne 2013). The Risk Management process (RM) involves identification, evaluation, and mitigation of risks. Risk Management is the process of measuring and assessing risk, and developing strategies to deal with it, which include the transfer of risk outside the organization, avoidance of risk, or reduction of its negative effects (Siayor 2010). The primary role of RM is to utilize resources to control the occurrence of the threat or reduce its impact on the output of the organization (Wu & Olson 2015). Risk management is an essential part of any organization's strategic management, which an organization systematically pursues in order to address the risks associated with its activities (Ruzic-Dimitrijevic and Dakic 2014).

In the 1990s, ERM became a critical process because of increased losses due to the complex and dynamic environment that institutions operated in (Setapa et al. 2015). Enterprise Risk Management (ERM) is an approach that developed to improve on the challenges and failures of Traditional RM (TRM), which is considered silo-based (McShane et al. 2011). The ERM builds on the TRM limitations by approaching RM as a comprehensive approach to managing risk from the top (Lundqvist 2015). Board and personnel at the top-level positions of a company are responsible for creating a committee, which spearheads a holistic analysis and interpretation of the threats that affect
the performance of the firm (Layton 2007). ERM is a systematic approach that is applied across an organization (Rodriguez 2010). ERM aims to support an organization in achieving its strategic objectives by developing a particular approach to identify, assess, prioritize and monitor risks in the organization as a whole (Dickinson 2001). ERM is a way to ensure the sustainability of an organization's work, enabling it to achieve its organizational objectives (Lam 2003). ERM contributes to reduce sudden risks, identifying opportunities and sustaining its services (Abrams et al. 2007).

Enterprise Risk Management (ERM) is a control measure to manage the threats facing businesses through an integrated and systematic approach involving board supervisions and identification, evaluation, and responding to corporate risks (Wu & Olson 2015). Boards contribute to the strategic objectives that enhance oversight responsibilities of the management of an organization, appointment of personnel, and performance of the organization within ERM (Wu & Olson 2015). ERM processes aim at creating a risk portfolio designed to improve internal, operational, strategic, and capital structure decisions, as well as efficiency in the allocation of resources to risky investments (Grace et al. 2014). A holistic approach to the management of threats that face an enterprise rather than those that face a unit improves the decision effectiveness and performance of the firm.

ERM focuses on capturing the full range of risks and the various interdependencies between them. Lam (2006) defined Enterprise Risk Management (ERM) as an organization's process for risk assessment, risk control, and risk management to raise the institutional value of the organization. ERM aims to enhance an organization’s ability to reach its overall objectives through the implementation of senior leadership practices to manage risk (Committee of Sponsoring Organizations COSO 2004). According to Archaryya (2008), academic researchers need to develop ERM theories, however, the development of a grand theory of ERM is a very distant goal. There is an urgent need for more practical research that develops an overall understanding of the factors and theories associated with ERM. Jalal et al.’s (2011) study concluded that institutions are aware of the importance of ERM but do not have the appropriate knowledge to use and employ ERM practices. Several studies have indicated that the application of ERM in organizations and institutions, especially educational ones, remains a recent issue that has not yet reached the required level (Shafiq and Nasir 2010; Jalal et al. 2011; Setapa et al. 2015).

The most widely used frameworks for ERM are NIST risk management Framework, COSO: 2004 – Risk Management Integrated Framework and ISO 31000 Risk Management - Principles and Guidelines. NIST risk management Framework is designed for public organizations to provide guidance to information security, risk management standards and federal regulation compliance (CESG, 2015). Both the COSO ERM and ISO 3100 are holistic approaches that enable organizations to apply generic risk management practices (Gjerdrum & Peter 2011). However, ISO 31000 focuses on the application and the administrative parts of the process. ISO 31000 is a simpler and easier framework than the COSO model, which is more complex and multilayered (Padro 2015). Whereas COSO focuses on the effectiveness of procedures and processes, ISO 31000 enhances the achievement of set goals through the application of specific standards of the sector (Dali & Lajtha 2012; COSO 2012). The ISO 31000 ERM process was chosen in this study to be the baseline to understated the connection between ERM and Knowledge Management.

1.2 Knowledge management (KM)

Knowledge Management (KM) is defined as a set of processes that control, create, disseminate and use knowledge by practitioners to provide them with the cognitive theory background needed to improve the quality of decisions (Dhamdhere 2015). According Deng & Wright (2001), “A KM system is not equivalent to a database system. A KM system should provide the ability to foster ongoing learning, collaborative problem solving, and knowledge sharing for people in an organization.” KM is a collection, creation, or transferring of information by systematic approaches which enhances the flow of communication among individuals and improves the effectiveness of operations in the workplace (Alavi & Leidner 2001).

KM has been seen as the cornerstone of all organizations, as it is the factor that creates the value of an enterprise. Institutions, which can develop best practices for KM, are those that will have a
competitive advantage (Shukla, 2012). Past studies have emphasized that the adoption of knowledge management in organizations leads to many benefits (Levine 2004; Abrams et al. 2007; Dalkir 2009; Al-Zatma 2011) such as: KM increases the efficiency and effectiveness, improves performance, increases productivity, improves creativity, and responds rapidly to surrounding changes. The use of IT to enhance knowledge management practices results in effective knowledge sharing (Choi, Lee & Yoo 2010). Knowledge application is the process involving the individual abilities to trace, gain access to and utilize content saved either in formal or informal storage systems (Alavi & Leidner, 2001). Even though challenges often arise in the application of knowledge in daily routines, IT has a positive influence on the process through integration of information (Choi, Lee & Yoo, 2010).

1.3 KM and ERM

The few studies that have attempted to investigate the relationship between knowledge management and ERM were conducted in financial institutions or IT projects (Alhawari et al. 2012; Rodrigues & Edwards 2014). However, the use of KM to enhance the efficiency of RM processes is a very recent and important research area. The research efforts that evaluate and address the issues related to the use of KM in the RM process are insignificant and present (Talet & Talet 2014).

The literature defined three causes for unsuccessful RM in organizations which include ineffective controls of systems, a dysfunctional culture and lack of managing risk information within the entity (Marshall et al. 1996). Knowledge minimizes risk by providing control measures through effective business strategies (Dickinson 2001). The development of risk information sharing culture relies on the capability of employees to share information and the presence of an environment to create and share solutions (McDermott & O’Dell 2001). Risk knowledge sharing provides organizations with the required information and the techniques for risk identification and monitoring (Rodriguez & Edwards 2010). However, little research indicates that the relationship between RM and KM especially changes organizational silos, or departments, regarding their perspectives on managing threats (Rodriguez & Edwards 2010). Marshall et al. (1996) indicate that KM is a critical and structured approach to decision makers because it enables the access and transfer, as well as the generation and testing of new information/knowledge to address changes in a firm’s RM (Marshall et al. 1996).

Auditors can increase business value by embracing knowledge to support the successful implementation of enterprise risk management program. The increasing role of ERM in the environment has forced auditors to utilize a more risk-focused approach to daily transactions and decisions (Alhawari et al. 2012). Information technology is seen as a critical tool in giving timely data, which helps in the identification, analysis, and response to risks (Rodriguez & Edwards 2008). Also, information technology creates speed in the operations by ensuring that information is transferred to relevant operational units efficiently (Alhawari et al. 2012). Effective organizational risk management requires input from all parties about risk knowledge, activities and procedures, and this process is achieved through information sharing (Rodriguez & Edwards 2010).

2 Methodology

The practical and theoretical information about the KM role and requirements to advance ERM capabilities are limited, which was the main motive to select current methodology. This research used the Action Research (AR) approach because it represents an ideal research method for identifying the relationship between KM and ERM and practically validating and refining the KM role and requirements. The action research approach has been used recently in the field of information systems (IS). AR indicates that the organization can be understood if the researcher was a part of the operation of the problem and the solution. The researcher could participate in achieving the changes that contribute to improving the organization’s performance (Davison, Martinsons & Kock, 2004).

The research used a particular type of action research called canonical action research (CAR). The sole focus of the CAR method is solving current organizational issues by applying research from scholarly work to improve an organization’s systems performance. CAR is vital for evaluating an organization’s information systems because it utilizes practical intervention strategies. Before
applying change to organizational systems, CAR is used for assessing, diagnosing and planning all the important company activities (Davison et al. 2012). Kemmis and McTaggart (1987) stated that CAR is a systematic process that follows the Cyclical Process Model (CPM). CAR is cycled to allow a continuous structure of professional development. CPM consists of five main phases, including; the diagnosis phase, the planning phase, the action phase (observation), the evaluation phase and the reflection phase. The CAR method contains four different principles as follows: The Researcher–Client Agreement (RCA), The Cyclical Process Model (CPM), The Principle of Theory, Change through Action, and Learning through Reflection (Davison et al., 2012).

2.1 Research Objectives

This Action Research has four main objectives. First, to study and understand the ERM process in higher education and how KM might play a role to advance ERM practices. Second, to customize and implement KM systems based on CGU’s and TCCS’s needs. Third, to apply ERM and KM theories to guide the decision making process during the action research. Lastly, to evaluate the effectiveness of the customized systems and to determine whether, and if so, how the KM practices associated with ERM improved CGU’s and TCCS’s ERM process.

2.2 The research clients and tool

The research was conducted at two organizations: The Claremont Graduate University (CGU) and The Claremont Colleges Services (TCCS). The organizations in this study both seek to develop their ERM practices and integrate tools and techniques to achieve that goal. The two organizations have very different ERM practices and different maturity levels. These differences provided a comparative case study to clarify the effect of KM/IT on the development of the ERM process. I obtained access to both organizations to conduct action research to evaluate the changes and developments that KM might introduce to ERM process. CGU offered a Risk management assistant position with full responsibility to assess, modify and perform the current ERM tasks. On the other hand, TCCS offered access with limited power and control over the ERM process. I worked and communicated directly with TCCS’s risk manager.

CGU and TCCS jointly evaluated and purchased a web-based KM/RM system that was used as part of the research intervention. The tool has many features that could allow it to work as data warehousing, content management system, decision Support Systems and document management system. This tool functions like a KM System that manages risk knowledge and links the risk owners and the organization to different sources of risk information. The tool enables risk information to be accessed quickly, easily and securely; and helps organizations share, transfer, store and utilize the risk knowledge to serve ERM objectives. The tool was ideal for this research as it has a range of flexibility and could be customized based on each organization’s needs and requirements. The researcher communicated directly with tool developer to customize it to the research needs and the organizations requirements. The design of the tool follows the International Risk Management Standard ISO 31000:2009 that provides general guidelines for the design, implementation, and maintenance of risk management processes throughout an organization.

2.3 The data collection approach

In order to achieve the study objectives, the researcher used a qualitative approach to collect the research data. There are some data collection methods commonly used by action researchers to acquire an in-depth understanding of changes such as surveys, interviews, observations, participation, documents and focus groups (Kemmis and McTaggart, 1988). This research utilized a mix of data collection methods based on the need of every stage of the AR. As part of the study, the researcher participated and observed all ERM activities and the changes within the process in both organizations. The researcher, as well, conducted face-to-face semi-structured interviews with the majority of the individual’s involved or exposed to ERM process in both organizations. Two inquiry cycles in the form of semi-structured interviews were conducted for the purpose of this action research. The first one was to diagnose the problems with ERM process, suggest solutions and collect information about
the relationship between KM and ERM. This inquiry was the baseline to identify the KMS requirements and practices and to design the research KM intervention.

The second inquiry cycles was used to evaluate the KM intervention, refine the identified relationship between KM and ERM and validate the information from the first cycle after practically using a KM system to manage and facilitate the ERM process. Table 1. Summarizes the overall data collection strategies used in this study. The same interviewer, using identical data collection protocols, conducted all the interviews for this study. The interviewer transcribed the interviews and the scripts have been coded. I summarized all coding results on a large spreadsheet and looked for shared patterns across each of the categories emerging from the coding, but whenever a deviation emerged, I investigated it further (Myers 1997). The interview analysis branched the relationship between the ERM and KM to different themes.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Diagnosis</th>
<th>Action Planning</th>
<th>Intervention</th>
<th>Evaluation</th>
<th>Reflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Collecting</td>
<td>Interviews Documents analysis Meetings Participation Observations</td>
<td>Participation Observations Literature review</td>
<td>Consultation Participation Observations</td>
<td>Interviews Participation Observations</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Summary of the research data collection methods

3 The action research overview:

3.1 The Research at CGU

The research at CGU consisted of two action research cycles and passed through the five phases of canonical action research (CAR) twice. In the first cycle, the researcher conducted interviews with the ERM team at that time and two ERM experts.

After the first diagnosis stage, a decision was made to change the ERM process at CGU before any KM intervention. The first cycle focused on modification of the ERM process. The problem diagnosis phase resulted in a proposal to change ERM practices first and customize them based on the suggested ERM best practices in higher education. The first cycle was needed for the research purposes as it was used to prepare the ERM process at CGU for the KM intervention. The researcher proposed the new plan to the Vice President of Finance and Administration and one of CGU’s board members. The plan was approved, and the researcher was hired to execute the new plan and run the ERM process for CGU. During and after the implementation of the new ERM process, the researcher met regularly with CGU’s top management to evaluate the intervention. After the approval of the new ERM process structures and outcomes, a decision was made to move to the second CAR cycle.

In the second CAR cycle, the researcher conducted 28 interviews with the main risks owners identified as part first action research cycle in order to explore their experiences and issues with the ERM process. The interviews, as well, were used to examine the nature of the relationship between ERM and KM practices from their perspective. The information gained from the qualitative investigation helped the researcher to understand the nature of the relationship between KM and ERM and plan for the action phase. The action plan results helped the researcher customize the methodology to automatically perform ERM activities using the KM practices and system. The Risk Wizard tool was customized based on the interview results and feedback. The action phase included the implementation of the tool and the participants training. The researcher restructured the risk owner’s list to include the directors, deans, and heads of the departments and used them as KMS users who act as informers to reflect the risks Knowledge under their area. In this phase, the researcher observed the changes and events resulting from the implementation of the KM practices and tools.
To further examine the perceived value of the implemented tool and confirm the findings from the first two stages, the researcher conducted another inquiry in the form of semi-structured interviews with the system users as part of the evaluation stage. The primary goal of these interviews was to explore how the KM systems, which are the research intervention, changed, fixed, or addressed ERM issues discussed in the first phase. In addition, the evaluation stage practically confirmed the assumptions about the relationship between ERM and KM during the diagnosis and action planning stages. The action research clearly reduced the time and resources required to perform the ERM activities.

3.2 The Research at TCCS

The research at TCCS consisted of one action research cycle and passed through the five phases of canonical action research (CAR). The researcher performed eight interviews as part of the diagnosis and planning stages. The research participants are the main members of the ERM committee at TCCS and represent TCCS’s different departments. The information gained from the data analysis helped the researcher to understand the ideal IT/KM practices that contribute to empowering ERM in similar organizations. The research results and the suggested plan about how to implement the IT/KM system were discussed with the client. The client implemented the tool with minimum control from the researcher. In this phase, the researcher participated in every aspect of the process and observed the changes resulting from the implementation of the RM/KM tool. The client used the tool for three months before conducting the evaluation phase to assess the effect of the different KM functionalities. The evaluation phase included three interviewees, representing the major users of the system. The evaluation showed that the KMS intervention eased and facilitated the complicated, as well as time-consuming administrative process and data entry tasks performed by the ERM team. The system helped TCCS to acquire a real transparent ERM process for the first time. The KMS enabled TCCS’s transparency approach to produce a number of the anticipated benefits like establishing collaborative efforts and improving the risk culture.

This phase marked the end of the research at TCCS. Table 2. Summarize the Action Research results at both organizations.

<table>
<thead>
<tr>
<th></th>
<th>CGU</th>
<th>TCCS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of ERM process</strong></td>
<td>Interview based ERM process</td>
<td>Committee-based ERM process</td>
</tr>
<tr>
<td></td>
<td>Confidential</td>
<td>Semi-transparent</td>
</tr>
<tr>
<td></td>
<td>Centralized</td>
<td>Centralized</td>
</tr>
<tr>
<td><strong>Researcher role</strong></td>
<td>Full access to CGU</td>
<td>Limited access to TCCS</td>
</tr>
<tr>
<td></td>
<td>Full responsibility to assess, modify and perform the current ERM tasks and the Risk Wizard implementation.</td>
<td>Limited control over the process of transitioning to the new KM tool.</td>
</tr>
<tr>
<td><strong>Main Issues</strong></td>
<td>Lack of communicating about risks and risk mitigating plans.</td>
<td>Lack of communication within the committee members about risks beyond the meetings.</td>
</tr>
<tr>
<td></td>
<td>Lack of collaborative risks assessment and risk-mitigating.</td>
<td>The ERM process is centralized.</td>
</tr>
<tr>
<td></td>
<td>Lack of sense of agency and ownership over the risks.</td>
<td>Lack of collaboration efforts outside the physical committee meeting.</td>
</tr>
<tr>
<td></td>
<td>The ERM process is very confidential and centralized.</td>
<td>Lack of the routine risk assessments.</td>
</tr>
<tr>
<td></td>
<td>The absence of risk monitoring activities.</td>
<td>The absence of risk monitoring activities.</td>
</tr>
<tr>
<td></td>
<td>ERM is very time consuming and resources consuming.</td>
<td>- Automating parts of ERM activities like the routine risk assessment activities</td>
</tr>
<tr>
<td><strong>Proposed actions</strong></td>
<td>Implementing a semitransparent approach to ERM.</td>
<td>Encouraging the use of KMS in between meetings to perform risk</td>
</tr>
<tr>
<td></td>
<td>Adopting a hybrid approach to perform ERM activities between face-to-face interviews, meetings and KMS.</td>
<td>activities.</td>
</tr>
</tbody>
</table>
Table 2. Summary of the action research at CGU and TCCS

<table>
<thead>
<tr>
<th>Intervention Goals</th>
<th>Proposed KMS</th>
<th>Evaluation of Goals Achievement</th>
</tr>
</thead>
</table>
| - Assigning specific risks to specific employees and giving them the full responsibility for maintaining the risk statuses.  
  - Implement KM practices to encourage them to participate in the risk-sharing activities.  
  - Decentralizing the ERM process.  
  - Automating major parts of ERM activities.  
  - Giving shared ownership and access to the risks that fall under multiple departments. | Data warehousing, Content management system and Document management system | - The system achieved a high level of efficacy in terms of providing up-to-date risks communication and access to the assigned users.  
  - The system helped CGU’s risk owners communicate and identify the common issues, and the common treatment plan that crosses functions between their risks.  
  - The system activated collaborative strategies, plans and conversations about risks.  
  - This system empowers the sense of responsibility over risks and encouraged the mitigating actions.  
  - The KMS provides a convenient way to track the risk historical data to explore multiple angles of every problem.  
  - The access to risk information enabled the monitoring activities for the first time.  
  - The KMS allowed CGU to conduct a comprehensive risk assessment round in a very short time. | - Enable full transparency and provide ongoing access to risk information.  
  - Improve communications about risks and risk mitigating plans.  
  - Enable automated and collaborative risk assessment.  
  - Enable and automate risk-monitoring activities.  
  - Improve the sense of agency and ownership over the risks.  
  - Promote a risk-sharing culture | - Enable fully automated risk monitoring activities through the KM system.  
  - Assigning shared risk ownership to risk owners inside and outside the committee.  
  - Adopting a hybrid approach to perform the ERM activities between committee meetings and the KMS. | - There is an overall satisfaction in regard to helping TCCS obtain a centralized risk register and acquire clean and simple historical tracking of the risks.  
  - Improved the communication among the committee members.  
  - The other communication channels were not activated formally.  
  - The intervention reduced the level of pressure on the meeting time.  
  - The use of the tool helped identify the different connections between departments  
  - The tool allows everyone to be exposed to what others know and who knows what.  
  - The system helped TCCS to sustain the ERM program while lowering the recourses, efforts, and cost. |
4 The Research outcomes

4.1 Qualitative analysis of the interviews:

The interview guidelines were identified according to the goal of the research, which is to gain insights about the relationship between ERM and KM in practice. As motioned previously, the research involved two inquiry stages in the form of semi-structures interviews. As mentioned above, the interviews in the problems diagnosis stage were used to draw the patterns and relationships between ERM and the KM practices, while interviews in the evaluation stage were used to reconfirm and refine these relationships. During the interviews, participants were questioned about their individual experience and involvement and understanding of the ERM risk management process within their organization. In addition, the research continuously observed the ERM process before, during and after the research interventions to identify the positive and negative incidents, and the encountered barriers and missed opportunities for further improvements. The data analysis of the results confirmed saturation, which allowed the researcher to stop the research cycles at both organizations and conclude the finding of this research. The themes drawn from the analysis were divided to the three categories each represent one of the main components of the ERM process: Risk Assessment, Risk Monitoring and Communication and consultation. Figure 1. Summarizes the themes identified in this research.

![Diagram of Enterprise Risk Management]

**Figure 1.** The themes and patterns that identify the relationship between KM and ERM.

4.1.1 Risk Assessments

The analysis showed different influences and interactions between the KM processes and the various components of the ERM process. Knowledge transfer was one of the critical KM processes in terms of empowering risk assessment and monitoring. Knowledge transfer was seen to provide a holistic view of risks across the organization that extends the efforts to enhance the understanding of the ERM implementation (Spies et al., 2005). The results showed that the ERM process in the early stages of implementation required more concentration on human-based risk identification, analysis, and evaluation techniques. Human interaction is expected to help the organization become more aware of the ERM goals, build trust in the ERM process, and define the baseline for the risk assessment process.

However, the results showed that the use of a KMS is essential to the reduction of costs and resources needed to conduct the RA activities. Thus, technology-based access to the risks register is essential for all identified themes and considered as the primary factor that improves the quality of risk assessments and transfers the risk assessment from a local level to an enterprise level. The results confirm that continuous access to risks significantly enhances the RM culture and enables collaborative risks assessments.
The research analysis divided the relationship between KM practices and risk assessment process into three different themes: the initial rounds of risk assessments, the rounds after establishing an ERM culture, and the routine risk assessment conducted voluntarily by individuals within the organization whenever they felt the need to report the new risks.

First, the vast majority of the participants from both CGU and TCCS agreed that human interaction, represented by one-on-one interviews, focus groups, and committee meetings are essential in the initial rounds of risk assessment in every department within the organization. The participants from TCCS indicated that the organization needs to gain some understanding of risk assessment practices and trust in the ERM process, which mainly requires human-based data collection, sharing and, transfer. The participants emphasized the significance of the collaborative human-based practices for the evaluation and analysis phases more than with risk identification.

Second, the participants elaborated the same ideas within the second theme identified in this research. The majority of participants agreed that a web-based KM system could be employed to perform risk assessment activities after establishing a shared culture, building trust in the ERM process, and gaining a general understanding of risk management. Without a doubt, they agreed that a hybrid process between human interaction and an IT system is the ideal approach to employ KM management activities within the risk assessment practices. However, the participants at CGU further indicated that human interaction must be used on an ad-hoc basis while web-based risk knowledge sharing, transfer, and storage should be the dominant risk assessment practice. Interviewees mentioned that a web-based KM system eases the risk assessment process by saving time and resources, as every individual would be responsible for part of the process compared with the human interaction that is conducted by the ERM team only in the organization.

The third theme identified by the participants in the voluntary risk assessment conducted by individuals within the organization whenever they feel the need to report new risks. Here there is an agreement among the participants to view the risk assessment process as an on-going process where the risk owner must keep exploring, processing, and evaluating the risks. At this level, a web-based risk sharing, real-time processing of risk data, and a shared database are what were seen by the participants as vital practices.

However, participants at both organizations agreed that real-time risk Knowledge sharing within departments and areas with similar interests is an essential element for a successful risk assessment process in the long run. The participants agreed the Knowledge sharing through KMS is essential for creating RM culture, understanding the RM process and minimizing the resistance to participate in Risk Assessments and use the KMS.

4.1.2 Risk monitoring

The results show that there is a strong association between access to the organization risk register and the quality and existence of risk monitoring activities. They revealed that organizations are facing difficulties in performing risk monitoring through human-based communication, because risk monitoring practices demand a lot of time and resources. Risk monitoring activities were correlated to all KM processes. Moreover, in both organizations, the risk monitoring activities did not formally exist before enabling decentralized risk monitoring through the use of the KMS. Transparency allowed them to recognize their local needs concerning risks. KMS is seen as an essential practice that empowers the organizational ability to monitor risks at both department and enterprise levels. Access to risk knowledge and enabling transparency opened different levels of communication channels both top-down and bottom-up. As suggested by Gjerdrum and Peter (2011), the KMS facilitated the identification of the appropriate internal and external risk stakeholders throughout the organization. The transparency, through KMS, increased the accountability of the risk stakeholders and permitted shared ownership for cross-functional risks.

The data analysis placed risk monitoring into two different practices with different relationships and with KM activities. The first practice is the routine risk monitoring, where all risk information and
mitigating plan are updated and re-evaluated on a regular basis. The frequency of risk re-evaluation is determined by the nature of the risk. The second practice is the ad-hoc risk monitoring process, contingent upon emerging risks, significant changes to risk, or management requests. Ad-hoc risk monitoring occurs in-between routine risk monitoring. The results emphasized the importance of the historical tracking of every risk. They agreed that access to this information, especially from in-relation risk owners, would significantly motivate and elevate the quality and the response rate of the risk monitoring as well as proactive decision-making. They think that employing a web-based KM to monitor activities outside the meetings would produce a more resourceful and efficient process. Overall, KM practices are viewed as an invaluable motivation for the risk management culture.

4.1.3 Communication and Consultation

The results show that higher education institutes, more than any other type of organization, need to build a learning environment where the related risk best practices are shared throughout the organization. The results showed that the Communication and consultation side of the Enterprise Risk Management is very dependent on the type of organization and contain high level of customization based on the type of organization. The result of the interviews showed that all the themes identified within this Communication and consultation are highly associated with the KM system and the KM practices in general. The results identified three different themes whereby KM plays a role in risk communication and consultation. The three themes are lines of communication, collaboration, and transparency.

Lines of communication: the participants believed that KM activities can be used to better the lines of communication between top management, the RM team, and the different departments. The top and bottom levels within the higher education organization need to be aware of and informed about the risks and updates regarding emerging risks in one area, the risk treatments in place and the changes in risk levels. Therefore, the KMS is seen as essence for ERM as it create mechanism where that type of information flows continuously between all levels.

Collaboration: The participants recognized that real-time risk sharing and access to a risk database allow top management and other involved employees to integrate with the risks from a risk treatment standpoint. They offer suggestions on how to mitigate the risks and fix them. These KM practices are seen as an excellent way to integrate the whole organization into the solution and the progress. Most of the participants at CGU confirmed that seeing other peoples’ risk information would help them see parts of their colleagues’ risk information that they did not think about or they failed to know they could contribute to their solution. The participants generally confirmed that risk sharing would make people recognize that similar issues being addressed in different departments, and create a community of interests and practice. They believed that access to risk knowledge will help them develop to become a learning organization and enrich the worth of their resources. This would influence individuals to understand that they are all working toward the same goals and enhance the organization collaborative culture.

Transparency: Overall, interviewees criticized ERM processes that tend to be more confidential than transparent. They indicated that some of the risks require organizational awareness and collaboration to be mitigated; making transparency essential to allow communication and learning throughout the organization. Countenancing agency over risks by sharing them across the organization is seen as essential to ERM. The research showed that transparency motivates collaboration actions that weren’t planed originally and encourages departments and individuals, who own cross-functional risks to voluntarily claim the ownership over the risks that are not assigned to them and participate in the treatment. However, the level of transparency is determined by the organization specific needs and readiness. The research involved two different organizations each with different transparency readiness level.

5 Conclusion and Recommendations

The literature review showed a weak view of KM supporting the ERM process, which was the primary motive to conduct action research that investigates the gap (Marshall et al., 1996). The
A project was guided by the action research methodology. Although the research followed the structure and the steps of the CAR method, there is a lot still to be done by TCCS and CGU to achieve optimum results from the KMS intervention and maximize the value of the system. TCCS and CGU still need to conduct on-going training, reconsidering the channels of communication and continuously assessing the ideal fit between the KMS and the ERM practices. This could be done through another AR cycle.

Studying two different organizations allowed the researcher to examine the effect of the same KMS and practices on two unique ERM processes in terms of maturity level, size, and type of ERM practices. The researcher now has a better understanding of how to integrate the KMS during the implementation of the ERM process or with already existing ERM process. The researcher was exposed to different conditions and situations that impact the ERM process; the research results examined how the KMS deals with them and becomes part of the solution.

The research showcased Knowledge management as a solution to the lack of knowledge that explains the meaning, reasoning and effect of risks. The research examined the dynamics and improvement of the ERM process when knowledge is seen as a process, an object, a state of mind, a capability, and an access to information. The research established a structure for organizations to find a balance between the face-to-face and KMS communication. From practical lens, the use of KMS clearly reduced the time and resources required to perform the ERM activities. The research proved the important of transforming the ERM process from a fully confidential to a semi-transparent or full-transparent process that are supported with a KM tool that permits continuous access to in-relation risk knowledge. The KMS allowed employees to be aware of the current risks and risk treatments around them. The KMS promoted risk accountability within departments and generated more action regarding risks in a short time. The KMS improved the risk management culture all over the university and made risk tasks everyone’s responsibility.

In addition, the analysis identifies a direct connection between up-to-date access to the risks registry and organizational ability to communicate about risks. These communication channels are opening consultation networks and enabling the organization to maximize the value of the existing resources to mitigate risks. The results showed that KMS open communication and consultation channels ease top management involvement, and enhance internal and external collaboration.

The analysis produced extended information about this relationship beyond the summarized information in this paper. The research identified patterns and best practices of the KM process that are associated with risk assessments, risk monitoring and risk communication and consultations. The Identified patterns range from human-based knowledge management practices, Technology based KM systems, change resistance remedies and KM culture enforcement activities. The results of this research helped to identify the strategies and perspectives to integrate the KM system into specific managerial operations like the ERM process and will be used as a foundation to design an Enterprise Risk Knowledge Management Framework.

### 6 The research limitation and Future Research

This action research faced several limitations. One of the main limitations of conduction action research like this was that is was not achievable to generalize the results to all higher education organizations. There is a need to further examine the results of this research to understand how the results gained from the organizations within this research can represent the reality of the broader population. There is a need to conduct quantitative research that aims to support the generalization of the current action research.

In addition, time was another limitation that affected the results of this research. Monitoring the organizations for a more extended period or conducting additional action research cycles that implement different KM practices might introduce additional findings and insights about how KMS changed the ERM practices in the two organizations. Additionally, One of the challenges that faced the full implementation of the research is the resistance to conduct risk assessments through the KMS. The organizations must focus on enhancing the RM culture and remind the people continuously about the value of risk assessments as CGU is still at a low RM culture maturity.
Findings from this study contribute to the growing body of knowledge about IS action research, KM, and the ERM process. However, the researcher suggests investigating other organizational and technological factors that might facilitate the success of the ERM process. Further studies should examine whether additional factors such as management structure, organization size, financial situation, and organization type and level of risk culture could impact the integration of KM into the ERM process. Other future research could build on the findings of this research by further investigating how KMS transforms the isolated approach to risk management into a collaborative approach. Research efforts can extend to examine how collaborative approaches to risk management are affecting ERM performance and risk owners’ value creation. This study did not directly explore the role of KM intervention on the risk mitigation rate but illustrates the potential value.
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