People, Technology, Processes and Risk Knowledge Sharing

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Abstract: The present global economic crisis creates doubts about the good use of accumulated experience and knowledge in managing risk in financial services. Typically, risk management practice does not use knowledge management (KM) to improve and to develop new answers to the threats. A key reason is that it is not clear how to break down the "organizational silos" view of risk management (RM) that is commonly taken. As a result, there has been relatively little work on finding the relationships between RM and KM. We have been doing research for the last couple of years on the identification of relationships between these two disciplines. At ECKM 2007 we presented a general review of the literature(s) and some hypotheses for starting research on KM and its relationship to the perceived value of enterprise risk management. This article presents findings based on our preliminary analyses, concentrating on those factors affecting the perceived quality of risk knowledge sharing. These come from a questionnaire survey of RM employees in organisations in the financial services sector, which yielded 121 responses. We have included five explanatory variables for the perceived quality of risk knowledge sharing. These comprised two variables relating to people (organizational capacity for work coordination and perceived quality of communication among groups), one relating to process (perceived quality of risk control) and two related to technology (web channel functionality and RM information system functionality). Our findings so far are that four of these five variables have a significant positive association with the perceived quality of risk knowledge sharing: contrary to expectations, web channel functionality did not have a significant association. Indeed, in some of our exploratory regression studies its coefficient (although not significant) was negative. In stepwise regression, the variable organizational capacity for work coordination accounted for by far the largest part of the variation in the dependent variable perceived quality of risk knowledge sharing. The "people" variables thus appear to have the greatest influence on the perceived quality of risk knowledge sharing, even in a sector that relies heavily on technology and on quantitative approaches to decision making. We have also found similar results with the dependent variable perceived value of Enterprise Risk Management (ERM) implementation.

Keywords: knowledge management, enterprise risk management, financial services, information systems, knowledge sharing, knowledge management systems

1. Introduction

RM processes in financial institutions need to include in their continuous improvement process the lessons learned under different circumstances of the financial market (Sawyer 2008). During the last century many financial crises have occurred and the analysis of their causes has left a trace in risk knowledge management. However, the question is how much risk knowledge management processes such as risk knowledge sharing have improved.

Risk knowledge sharing is part of the people interactions in a financial institution. There are groups of people from multiple disciplines with different knowledge and experiences working together. The diversity of the interactions and knowledge imply the potential benefit of applying KM to ERM in order to achieve organizational goals.

Von Krogh et al. (2000) identified a clue that can be applied to this need for knowledge and learning capacity "beliefs, commitments, and actions cannot be captured and represented in the same manner as information". In summary, it is necessary to have a better understanding of knowledge use in a discipline such as RM and the way that risk knowledge is shared represents an important step to achieve the ERM implementation.

Previous work has hypothesized and begun to investigate KM and RM relationships. Rodriguez and Edwards (2008a) described a methodology to analyze the risk modeling process based on KM principles. Pilot results for the retail banking sector were presented by Rodriguez and Edwards (2008b), showing that the quality of risk knowledge sharing was positively associated with the perceived value of ERM implementation, as was the perceived quality of communication among

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groups, but the hypothesis that the perceived integration of information systems was associated with the perceived value of ERM implementation was rejected.
This article is based on a wider sample from the financial services sector than just retail banks, including also diversified financial institutions, investment banks, asset management organizations and insurance companies. The KM and ERM theoretical framework used was the same as Rodriguez and Edwards (2008b) based on the two conceptual pillars: "Risk Management is frequently not a problem of a lack of information, but rather a lack of knowledge with which to interpret its meaning" (Marshal and Prusak 1996) and that banking is a business based on information and knowledge (Shaw 2005), where once a new risk is identified it implies that new knowledge is required (Fourie & Shilawa 2005).

To reach the Basel II requisites, risk knowledge sharing plays an important role, particularly in consulting activities (Stein and Swass 1995). The financial services business, currently, includes consulting as a key piece in business development. Additionally, business complexity and the cost of knowledge show the need for providing more meaning to risk information and better KM (Sutcliffe and Weber 2003) in order to build actionable answers to risk threats. However, the exposure to more risks and the losses in previous years introduced doubts about the RM practice even before the recent crisis (Degagne et al. 2004).

This paper explains the identification of five hypotheses based on the literatures on KM and RM, and presents a preliminary analysis of the results of administering a survey to RM practitioners in financial services.

2. Theoretical framing

This section presents the main concepts that are used in this article regarding to KM: more detail may be found in Rodriguez and Edwards (2008a and 2008b).

2.1 KM, KM strategy and KMS as an enabler of RM

KM and knowledge management systems are based on the interactions among people, which correspond to the movements from tacit and explicit knowledge to tacit and explicit knowledge on the individual and organizational level (Nonaka and Takeuchi, 1995). In RM this interaction is expressed through:

- Socialization: social interaction among the RM employees and shared risk modeling experience
- Combination: merging, categorizing, reclassifying and synthesizing the risk modeling process
- Externalization: articulation of best practices and lessons learned in the risk modeling process
- Internalization: learning and understanding from discussions and mathematical modeling review.

These movements of knowledge are related to knowledge exchange. Cress and Martin (2006) expressed that there is a difference in knowledge exchange between small and large groups. They identified that in large groups knowledge exchange using questions is not very efficient because of similar questions coming from different people. This means it is probably better to create repositories of experience, data and collaboration tools in order to enhance the knowledge exchange.

In the context of RM the KM processes listed below (Alavi and Leidner 2001) play an important role as potential enablers of working skills and to improve the capacity of the teams to enhance the ways they share knowledge and the tools that they use (Wang et al. 2006).

- Knowledge creation: in RM new risk implies new ways to measure it and to identify the potential effects that it could have. Acquisition, synthesis, fusion and adaptation of existing risk knowledge are all part of the way to understand new and current risks.
- Knowledge storage and retrieval: RM actions and methods require codification, organization and representation of risk knowledge. They include the activities of preserve, maintain and index risk knowledge.
- Knowledge transfer: ERM is a multidisciplinary work, interdepartmental development and an holistic view of risk across the organization, that requires knowledge dissemination and distribution in order to support individuals, groups, organizations and inter-organizations to develop RM capacity.

- Knowledge application: Risk knowledge can be converted into competitive advantage for financial institutions adopting best practices, developing products and methods for risk control.

There is a basis for knowledge transfer in the culture and trust of the organization in order to develop an informal learning process (Singh and Premarajan 2007). From these processes knowledge sharing has an important influence in KM implementation because it provides connection between people and organization, producing dissemination, collaboration, innovation and acquisition of knowledge (Ipe 2003).

Small and Sage (2006) carried out a review on KM and knowledge sharing. They regarded knowledge sharing as critical in knowledge creation and found that factors influencing knowledge sharing included: business context, organizational structure and roles, business processes, motivation, means, ability etc. The study also found that many factors enabled knowledge sharing such as the strategy link with knowledge sharing and the proper adjustment to leadership, human networks, organizational culture and learning processes.

3. Research model and hypotheses

One common way to look at KM is in terms of people, processes and technology (Edwards, 2009). Processes are implicit in all the people and technology variables considered here, and in virtually any other such variables that we can conceive of.

On the basis of the literature review (Rodriguez and Edwards 2008a), we identified five variables that might be expected to influence the perceived quality of risk knowledge sharing in a financial institution. Our research model thus sets up five hypotheses for the five independent variables, with perceived quality of risk knowledge sharing as the dependent variable (Figure 1).

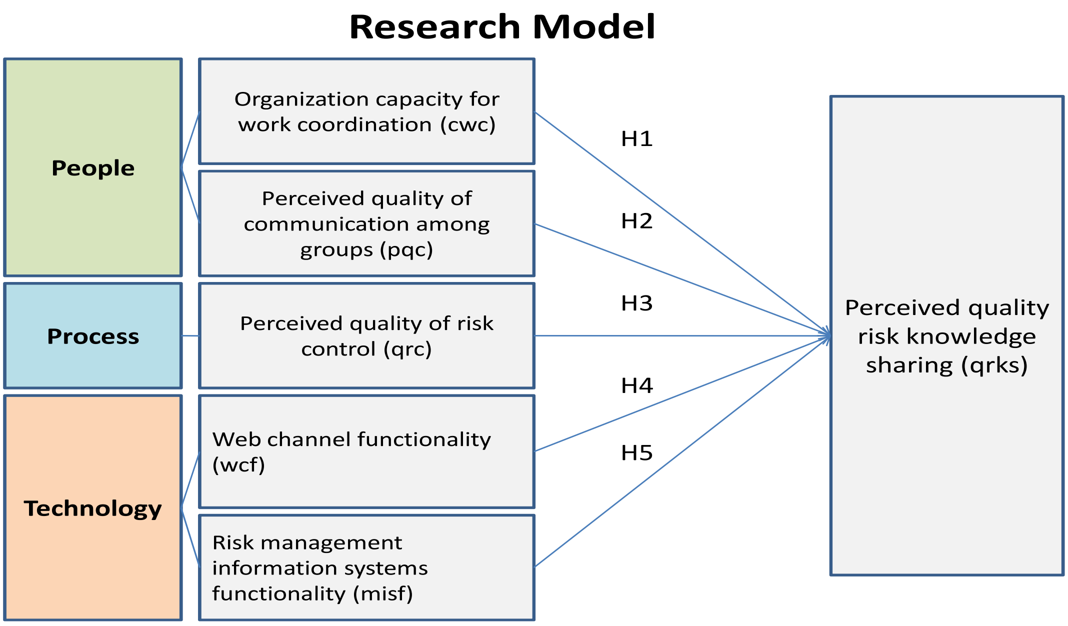

Figure 1: Research model

Each variable was measured by a number of items, again derived from previous studies reported in the literature. The following sub-sections introduce the bases of the hypotheses.

3.1 Quality of risk knowledge sharing

Knowledge sharing is a KM process. Improvement in knowledge sharing develops capacities inside the organization. Equally, knowledge (Dickinson 2001) is a factor to reduce risk and contributes to control, business strategy and underwriting processes because they depend on human actions.

Another point that Dickinson (2001) made is that RM can be influenced by the knowledge transfer attributes and signs, such as work satisfaction (Liao, 2003), and the capacity to share knowledge without increasing the number of people sharing (Alavi and Leidner, 2001). Knowledge intensive services such as financial institutions are organized by projects, and trust and professional rules are fundamental for the development of these projects (Schamp et al., 2004).

Risk knowledge sharing can be negatively influenced by business silos and the business units can need to be told how to transfer experiences (Horton-Bentley, 2006), taking into consideration that the speed of change can reduce the value of experience in some specific fields (Barnett et al., 1994; Hayward, 2002). However, it seems that independent intranets, an emphasis on IT for knowledge sharing and reduced flow of KM processes through network systems reduce knowledge sharing (Swan, 1999). Additionally, it has to be taken into consideration that explicit knowledge is easier to share than tacit and that knowledge transfer is more internal than external (Alavi and Leidner, 2001). Various methods for sharing knowledge have been used (Wenger, 2000;Samoff and Stromquist, 2001;McClernon, 2003;Samiotis et al., 2003;Lamb, 2001;Kubo et al., 2004;Uzzi and Lancaster, 2001).

Thus, perceived quality of risk knowledge sharing (variable qrks) is constructed from the following five items:

- People are willing to share risk knowledge
- The availability of documentation is good
- The access to experience is good
- There is an appropriate environment to discuss results interdepartmentally
- There is an appropriate environment for the creation of shared solutions

3.2 People

3.2.1 Organizational capacity for work coordination

Organization activities, project development and management practice place a great emphasis on the capacity for work coordination and it is becoming ever more complex to coordinate groups working on projects (Meredith and Mantel 2003). There are more people involved in projects with different backgrounds and specialties, the skills and points of view of people are different and all these factors are part of the multidisciplinary and multi-group structures of projects. Managers have to deal with tangible and intangible resources; they have to manage the capacity to add value to different stakeholders. In general, managers have to deal with the coordination of employees in many different ways and to improve organization capacity to transfer and use risk knowledge when employees are working in projects.

H1: Organizational capacity for work coordination is positively associated with the perceived quality of risk knowledge sharing

For the organizational capacity for work coordination (variable cwc) the items considered were:

- The organization encourages interdisciplinary work
- • The organization encourages interdepartmental work
- • There are good web based collaboration tools
- • People are willing to work with multiple groups
- • There are guiding principles for working with different groups
- • There are standards for using collaboration tools

3.2.2 Perceived quality of communication among groups

Knowledge sharing and effective communication depend on the overlap and amalgamation of knowledge bases among people. Knowledge sharing requires more than IT; it requires the creation of a mechanism to share. This means that it takes into account the differentiation of knowledge sharing within and between groups, for example the knowledge adapted to be communicated among individuals and groups (Alavi and Leidner 2001). Uzzi and Lancaster (2003) presented that internal relationships affect the knowledge transfer and its benefits. Additionally, Waldvogel and Whelan (2008) indicate that collaboration and communication support RM learning.

The assumptions behind the decisions in hedging or investment are several. The lack of risk knowledge sharing can create issues in the RM processes and the controls may not be enough. Lack of knowledge access, communication, can create failures or as Peterson (2006) said, financial institutions have to create the culture that everyone is responsible for managing risk. Weak means for transferring knowledge can provide insufficient knowledge of the operation, poor assessments of the lessons learned and poor understanding of the present and forecasts through risk knowledge.

H2: The perceived quality of communication among groups is positively associated with perceived quality of risk knowledge sharing

For perceived quality of communication (variable label pqc) the items considered were:

- The communication between the RM groups is good
- The communication within my RM group is good
- The communication environment fosters the interchange of different points of view
- There is a good capacity to get conclusions easily during meetings
- The communication environment promotes team work

3.3 Process

3.3.1 Perceived quality of risk control

Risk control is the RM process that puts organizational actions to address risk policies into practice. Risk control includes actions to mitigate risks, assess processes, to review what is happening in an innovation process and to analyze risk itself (Kimball 2000). Financial institutions are continuously striving to modify the loss distribution. Factors such as special or uncommon cases influence loss distributions. These affect the decisions of capital allocation, risk mitigation strategies, risk control under environmental issues.

There are different regulations and frameworks for RM practice: not one generally accepted best practice. There is a dynamic of adjustment and improvement. Regulations in RM evolve to prevent or recover from the most recent corporate disasters. These regulations currently focus on supervision regulatory capital and enforcement standards (Ong 2006) and there is not a clear review of the risk knowledge sharing from different members of a financial conglomerate. The question that emerges is if risk control is positively associated with collaboration, knowledge sharing and better people interactions.

H3: The perceived quality of the risk control process is positively associated with the perceived quality of risk knowledge sharing.

For perceived quality of risk control (variable qrc), the items considered were:

- The risk mitigation tools are good
- The risk assessment process is good
- The risk transfer process is good
- The risk product evaluation is good
- The risk aggregation analysis is good

3.4 Technology

3.4.1 Web channel functionality

The KM processes and KM implementation require a KMS, where IT supports the integration of knowledge to directives, organizational routines and self contained task teams. The KMS (Alavi and Leidner 2001) is based on the subsystems of technology and organization. The KMS is not just technology oriented; it has to include the social and cultural components of KM (Davenport and Prusak 1998; Malhotra 1999).

One potential knowledge sharing channel is the web channel (intranet) in order to improve the communication capacity. In this study the web channel is identified with the RM intranet because the users and respondents of the study are RM employees. The influence of the web channel functionality could affect the risk knowledge sharing dynamic, for example if the search tools are not providing good results when knowledge volume is high (Alavi and Leidner 2001;Simoneou 2006).

H4: The web channel functionality is positively associated with the perceived quality of risk knowledge sharing

For web channel functionality (variable wcf), the items considered were:

- The RM Intranet provides access to collaboration tools
- The RM Intranet provides access to all applications used in RM
- The RM Intranet provides access to the proper data
- The RM Intranet facilitates interaction in problem solving process
- The RM Intranet supports communication among RM people
- The RM Intranet supports RM controls

3.4.2 RM information system functionality

Functionality of information systems is an attribute that organizations as a whole and users look for in order to perform their activities. Support to the risk modelling process, development of experience in risk analysis, management support, improvement of work flow, capacity to work with multiple groups in a project are some of the new requirements for designing information systems (Dinner and Kolber 2005) according to the demands of regulatory frameworks in RM and bases for the IT strategy in the financial institutions.

In general, the information systems design needs to deal with integration of information systems and how to achieve goals of compliance with new market conditions. There are many difficult and complex tasks to perform in order to follow regulations and technology should support them. These include transformation of processes, data; control, maintenance, design of the information and technology architecture, reports and the ways to adapt the organization to new conditions. Changes and modifications in some of the processes and the need for integration are related to the demand for activities oriented to providing transparency, governance, accuracy, accountability and integral reports.

Peterson (2006) stated that “Implementing an ERM program can change the way everyone does their jobs”. Compliance means to review everything that the organization is doing to achieve the goals under the regulatory constraints. This is to review how all the steps are affecting risk control, learning process for new work conditions, operational risks, actions and decisions based on the outcomes of the changes and information systems results.

The systems provide capacity to work with multiple groups on a project (Smith and McKeen 2006). A RM system is much more than just another accounting system. The system should provide reporting capacity under accounting principles, help to manage, understand operations and products, and create capacity to review potential losses, causes of risk, measure of risk related to different exposures. In summary, Chrouhy et al (2001) pointed that “An effective risk management system needs to be able to generate the necessary RM information on all risks, perform specific analytical functions, and permit multitasking”.

The design of the RMIS, its architecture, technology and modelling developments contribute to ERM implementation (Klefner et al., 2003). However, there are some barriers to implementing the RMIS. One is the cost. RMIS spending is high (Levine, 2004) and there are competing priorities with similar costs to cover. The technological attributes required, such as a flexible architecture, data model and risk measurement capability, are a barrier. Another is that the current IT solutions are concentrated in sections of risk, reducing the overall view of different factors and controls required in ERM.

H5: The RM information system functionality is positively associated with the perceived quality of risk knowledge sharing

For RM information systems functionality (variable misf), the items considered were:

- The systems provide support to the risk modelling process
- The systems provide access to experience in risk analysis
- The systems provide adequate data management support
- The systems provide capacity to improve work flow
- The systems provide capacity to work with multiple groups on a project

4. Research methodology and analysis

A survey comprising the items explained above was distributed to approximately 620 full-time employees in the RM area in the financial services sector (most of them members of the Professional Risk Managers Association). A total of 121 answers were received and analyzed: 102 via the web and 19 face-to-face. This is approximately a response rate of 22%.The population was based all around the world, although more than 50% were from North America. The unit of analysis is the RM employee who is involved in RM activities in any of the RM processes in the sector. The random sampling method is appropriate because those involved in activities in the field of RM in financial institutions represent a homogeneous population. This project only intends to investigate RM employees as whole, not any sub-divisions within the financial services industry.

Although a web-based survey can have its limitations as a general survey method, all RM employees in the financial sector need to be computer-literate and all have web access at work. It was therefore thought unlikely that responses would be biased as a result. The survey was pilot tested by RM professionals and academics: only minor modifications were made as a result of the pilot. The initial questions in the survey covered demographic information such as number of years in RM work, followed by the actual item questions.

4.1 Measurement and data transformation

All 32 items in the survey were rated on the same Likert scale, 1 strongly disagree, 2 disagree, 3 neutral, 4 agree and 5 strongly agree. Values for the six variables (perceived risk knowledge sharing quality, RM information system functionality, perceived quality of communication among groups, quality of work coordination capacity, quality of risk control and web channel functionality) were then derived from the item scores associated with each variable.

Missing values for item scores were dealt with by replacing the missing value with the mean score for that item, as recommended by Han and Kamber (2006). A total of 45 of the responses contained one or more missing values.

An important issue in aggregating item scores was not to assume that simple addition of the item scores (i.e. equal weight) would be accurate (Alfares and Duffuaa 2008). The chosen method uses the transformation of the original data to a new scale given by the z-score $(x-\mu)/\sigma$, where μ is the mean and σ the standard deviation. This transformation allowed the comparison of items with different mean and standard deviation because they were converted to a same scale, so that all the results are comparable. The z-scores do not change the skewness and kurtosis of the distribution, or the correlations between items.

The items used to construct each of the variables were tested according the Cronbach Alpha test. The cut off value considered to be acceptable is 0.7(Cortina 1993). The Cronbach Alpha coefficients (Table 1) show that the items for each variable are consistent and the scale reliable. The transformed z-scores for the items may therefore be added together to give the value to be assigned to the variable.

Table 1: Reliability measure of the items in each variable

Variable	Cronbach
Perceived quality risk knowledge sharing (qrks)	Score index of five items, each measured on a 5-point scale (Cronbach's alpha 0.79)
Organization capacity for work coordination (cwc)	Score index of six items, each measured on a 5-point scale (Cronbach's alpha 0.80)
Perceived quality of communication among groups (pqc)	Score index of five items, each measured on a 5-point scale (Cronbach's alpha 0.88)
Perceived quality of risk control (qrc)	Score index of five items, each measured on a 5-point scale (Cronbach's alpha 0.86)
Web channel functionality (wcf)	Score index of six items, each measured on a 5-point scale (Cronbach's alpha 0.92)
Risk Management Information systems functionality (misf)	Score index of five items, each measured on a 5-point scale (Cronbach's alpha 0.88)

4.2 Findings

Statistical software (SAS® version 9.1) was used to manage the data, to test the hypotheses and to search for relationships between the variables. Each hypothesis was first tested in the form of a null hypothesis that there was no association (correlation ρ=0) and a one-tailed test carried out. The correlation results are shown in Table 2.

Table 2: Correlations between independent and dependent variables one by one

Correlated Variable: Perceived quality of risk knowledge sharing qrks	Correlation	p-value
People		
Organizational capacity for work coordination cwc	0.65362	<.0001
Perceived quality of communication pqc	0.56898	<.0001
Process		
Perceived quality of risk control qrc	0.64633	<.0001
Technology		
Web channel functionality wcf	0.40319	<.0001
Risk management information system functionality misf	0.60198	<.0001

Table 3: Multiple regression results

Multiple Regression

Dependent Variable: qrks qrks

Root MSE 2.41669 R-Square 0.5855
Dependent Mean 3.67016E-18 Adj R-Sq 0.5674
Coeff Var [illegible]

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Int	Intercept	1	4.29015E-16	0.21970	0.00	1.0000
qrc	qrc	1	0.22262	0.08483	2.52	0.0099
cwc	cwc	1	0.26358	0.07656	3.44	0.0008
misf	misf	1	0.25992	0.07218	3.60	0.0005
pcc	pqc	1	0.16471	0.06921	2.38	0.0190
wcf	wcf	1	-0.09129	0.09822	-1.57	0.1196

Multiple regression and stepwise regression were then performed, using the same dependent and independent variables and a p-value of 0.05. results are shown in Tables 3 and 4 respectively. The multiple and stepwise regression models each have an R-squared of 0.58 and all the independent variables are significant except for web channel functionality.

Table 4: Stepwise regression results

```
Dependent Variable: qrks qrks
            Number of Observations Read     121
            Number of Observations Used     121
              Stepwise Selection: Step 1
              Variable cwc Entered: R-Square = 0.4272 and C(p) =
41.8956
                 Analysis of Variance
                    Sum of       Mean
    Source          DF   Squares     Square  F Value  Pr > F

    Model            1  692.16927  692.16927   88.76  <.0001
    Error          119  928.01302    7.79843
    Corrected Total 120 1620.18229
            Parameter  Standard
      Variable  Estimate   Error  Type II SS F Value Pr > F

      Intercept 5.38079E-16  0.25387 3.50331E-29  0.00 1.0000
      cwc       0.56823   0.06031  692.16927  88.76 <.0001
              Stepwise Selection: Step 2
        Variable misf Entered: R-Square = 0.5177 and C(p) = 18.7844
                 Analysis of Variance
                    Sum of       Mean
    Source          DF   Squares     Square  F Value  Pr > F

    Model            2  838.82837  419.41418   63.34  <.0001
    Error          118  781.35392    6.62164
    Corrected Total 120 1620.18229
            Parameter  Standard
      Variable  Estimate   Error  Type II SS F Value Pr > F

      Intercept 3.19289E-16  0.23393 1.23354E-29  0.00 1.0000
      cwc       0.40436   0.06558  251.70691  38.01 <.0001
      misf      0.31607   0.06716  146.65910  22.15 <.0001
              Stepwise Selection: Step 2

           Bounds on condition number: 1.3925, 5.5701
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```
Stepwise Selection: Step 3
        Variable pqc Entered: R-Square = 0.5574 and C(p) = 9.7702
                 Analysis of Variance
                    Sum of       Mean
    Source          DF   Squares     Square  F Value  Pr > F

    Model            3  903.15589  301.05196   49.12  <.0001
    Error          117  717.02641    6.12843
    Corrected Total 120 1620.18229
            Parameter  Standard
      Variable  Estimate   Error  Type II SS F Value Pr > F

      Intercept  2.504E-16  0.22505 7.58673E-30  0.00 1.0000
      cwc       0.29172   0.07204  100.49097  16.40 <.0001
      misf      0.29248   0.06502  124.00875  20.23 <.0001
      pqc       0.21948   0.06774   64.32752  10.50 0.0016

          Bounds on condition number: 1.8153, 14.274
              Stepwise Selection: Step 4
        Variable qrc Entered: R-Square = 0.5756 and C(p) = 6.4588
                 Analysis of Variance
                    Sum of       Mean
    Source          DF   Squares     Square  F Value  Pr > F

    Model            4  934.17609  233.54402   39.49  <.0001
    Error          116  686.00620    5.91385
    Corrected Total 120 1620.18229
                 Stepwise Selection: Step 4 Final
            Parameter  Standard
      Variable  Estimate   Error  Type II SS    F Value Pr > F
    Intercept 3.48731E-16  0.22108 1.47152E-29   0.00 1.0000
      cwc       0.23551   0.07490   58.46604     9.89 0.0021
      qrc       0.18943   0.08271   31.02021     5.25 0.0238
      misf      0.22831   0.06975   63.36499    10.71 0.0014
      pqc       0.17486   0.06934   37.60954     6.36 0.0130
            Bounds on condition number: 2.2225, 30.406
All variables left in the model are significant at the 0.0500 level.
No other variable met the 0.0500 significance level for entry into the
model.
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Table 5 presents the summary of the hypothesis test results, based on the correlations and the two regression models.

Table 5: Summary of hypothesis test results

Hypotheses	Results
People	
H1: Organizational capacity for work coordination is positively associated with the perceived quality of risk knowledge sharing	Supported
H2: The perceived quality of communication among groups is positively associated with perceived quality of risk knowledge sharing	Supported
Process	
H3: The perceived quality of the risk control process is positively associated with the perceived quality of risk knowledge sharing	Supported
Technology	
H4: The web channel functionality is positively associated with the perceived quality of risk knowledge sharing	Not Supported
H5: The risk management information system functionality is positively associated with the perceived quality of risk knowledge sharing	Supported

5. Discussion

Risk knowledge sharing is significantly associated with the two people variables and the one process variable but only one of the two technology variables. This confirms previous work by the Rodriguez and Edwards where the RM information system functionality had a positive relationship with perceived value of enterprise risk management implementation but another technology variable did not. This suggests that in holistic or enterprise-wide programs human factors – particularly those about relationships and communication - can be more important than technological ones.

The most influential variable in our study was found to be the organizational capacity for work coordination, followed by RM information system functionality. Together with the previous Rodriguez and Edwards' study, in which perceived quality of communication among groups was found to be the most important influence on perceived value of enterprise risk management implementation, this suggests that respondents mainly see knowledge sharing as an issue of communication between groups of people.

Risk knowledge sharing is influenced by people, process and technology; however, it appears, therefore that respondents regard ERM implementation as an issue of people rather than technology, although possibly they take the latter for granted.

6. Conclusions, implications and limitations

Financial services, as a knowledge and risk based business sector requires the coordination and alignment of actions in order to achieve the expected strategic results. We believe that considering risk and KM together gives a much stronger basis for the organization to implement ERM. The KMS and RMIS can then be defined and structured in order to connect people and to develop the capacity of sharing risk knowledge.

For many years there have been economical crises in different levels from organizations to society as a whole. But what about our capacity to manage the learning and knowledge gained from these crises, is this enough? The society have had crises in countries with 2 and 3 digit inflation and the countries have recovered, Organizations have had difficulties for years some of them have recovered others not. Financial services have dealt with some issues: growth in American Express, Bankers Trust because of communication, Barings because of controls etc, or in general because there were not good early warning systems or prediction models or probably the most important a weak coordination of work across the organization.

When the crisis is around the world an idea that is coming up is that possibly an organization that is suffering some difficulties internally might be a common denominator for many so the effect of a failure can create higher difficulties at a higher scale. It is easy to blame models or many resources that are simply mute. This is not a good way to practice risk knowledge management; organizations should have a systematic approach to review what has been good and what has been wrong not from the perspective of criticizing but from the perspective of building better capabilities for the organization. The issue is that possibly the "management "is what really is failing. For instance, how good and evolved is the preparation of the organization for integration of information systems, how good is the organization to encourage and to support interdisciplinary and interdepartmental work and (probably more difficult) inter-industrial or inter-society work.

There are points of reflection related to the capacity for work coordination, communication with stakeholders, capacity to discuss and to analyze assumptions, capacity to develop means to accept that truth is not coming from a single person but it could be more important to use collective intelligence. How good is the preparation of management to analyze the difficult truths, how difficult is it for management to be conscious and accept that we need to deal with the danger of what Pfeffer and Sutton (2006) called Hard Facts, and Half-Truths. Finally, to take into considerations that Operational Risk is mainly related to humans and technology interaction. This interaction requires everyday more attention from management to use more scope economies based on using in a better way technology for creating capabilities, and not just accumulate technology by itself without a good application by people.

Five hypotheses were tested in order to relate KM concepts to risk knowledge sharing. A survey obtained responses from 121 RM staff in financial services. Four of the five hypotheses were accepted. Multiple regression and stepwise regression suggest that only the web channel functionality was not significantly associated with risk knowledge sharing.

There are some limitations to the research process. Validated scales were not available for most of the items and variables analyzed, so we cannot be certain that the construct definition was totally clear to all of the participants in the research, given the wide spectrum of risk to analyze and backgrounds that people have working in different RM processes. Also, the web-based nature of the survey may have reduced the response rate from older (and perhaps more senior) RM staff.

The results at this stage remain preliminary. Other variables from the survey are yet to be analyzed, and techniques such as structural equation modelling may shed more light on the relationships. Nevertheless, this study already points to a set of questions for new research in order to find more and clearer relationships between ERM and KM. There may be a difference between top-down business needs and bottom-up user perceptions here. On the other hand, there is scope to identify value in ERM that is related to risk control, communication channels and communication with stakeholders, means used to transfer and to share risk knowledge***.***

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