ABSTRACT

The analysis developed in this paper has been dedicated to the deep study of the founded papers about the risk management in SMEs and especially the comparison inside the same risk stream for evidencing the percentage of interest paid for each different risk type and the considered phase of the risk management process. At the same time have been mentioned the new practical instruments devised for SMEs for helping them in individuating the risks inside their firms by the use of simple and efficient tools.

Key words: RM, SMEs, Risk Stream, Risk Type, Risk Management Process.

INTRODUCTION

As evidenced in some literature the studies about the risk management is SMEs are still few even if the percentage of small and medium firms around the world are greater than 97% (OECD, 2002) and in particular in these last years as consequence of the great increase of China economy where SMEs cover the 99% of the total amount of enterprises present on the territory.

This paper follows a previous presentation at 16th Nordic Conference on Small Business Research and is part of a doctoral research in which was constructed a multi-objective classification to highlight the different aspects of the literature and from which resulted the quantitative evidence of the interest paid to this topic that confirmed what affirmed in other studies that the interest is still rare if compared with that given for the big firms about the risk management.

To proceed with an in-depth analysis has been decided to develop the process following these steps:

• At first, basing on the risk streams categorisation, to highlight in each of them the percentage presents in the different Risk Type categories;
• At second, to enhance in what phase of the Risk Management Process they have committed themselves;
• At last to mention who have developed practical instruments for aiding SMEs in their risk total management.

THEORETICAL BACKGROUND

Risk Management Concepts

One of the main concepts associated with risk is the probability that it is incurred (Daniel Bernoulli, 1700 – 1782). In mathematics handbooks, risk is defined as the combination of two variables:

• The frequency of the occurrence (probability) of the risk event, that is to say the number of times that it happens during a set period of time,
• The magnitude of the event, which is the set of consequences that can result if the event happens.

Considering risk as a part of managing an enterprise and knowing the difficulties in including it as an operationalisation it is worth highlighting that in all the literature definitions there are three common dimensions (Verbano and Turra, 2007):

• Future event that could happen, or not, in an undefined moment. It could be caused by external or internal factor;
• Probability range superior to 0% but inferior to 100% (even if we have the certainty that there is a problem to solve);
Consequences of the future event must be unexpected and unforeseen. They could be positive (opportunities) or negative (damages).

Traditionally, two categories of risks have been identified (Mowbray and Blanchard, 1979):

a. **Pure or static risks**, which are the ones that cause only damages without the opportunity of earning from their occurrence. They are always negative and have the characteristic of being unexpected because they are determined by accidental events. These risks fall perfectly under the insurance policy.

b. **Speculative or dynamic risks** are those that can cause either damages or earning opportunities. These are the typical entrepreneurial risks, consequences, for example, of an investment that has not generated a profit. They are normally related to the planning and managing of the different businesses and functions of the enterprise such as production, product, marketing and sales.

Furthermore, the events that can cause a risk can be divided into (COSO, 2004):

a. **External factors**: Economic factors (capital, credits, insolvency, liquidity, financial markets, unemployment, competition, joint-venture); Environmental factors (pollution, energy, natural disasters, sustainable development); Political factors (law, public policy, rules, political changes); Social factors (demographics, consumer behaviour, firm nationality, privacy, terrorism); and Technological factors (interruption, e-commerce, external data, emerging technologies)

b. **Internal factors**: Infrastructure (material resources’ availability, material resources potentiality, capital access, complexity); Human (human potentiality, fraud, health and safety); Process (sources, design, execution, suppliers); Technology (data integrity, data and systems availability, system choice, development, diffusion, maintenance)

Deriving from the concept of risk some definitions of RM have subsequently arisen, such as:

“Risk management is a methodological approach to continuous identification, analysis, control and monitoring of risky situations and events, by proactively using adequate processes, methods and tools in order to balance the effort of managing events and the impact of these events” (IFRIMA, 1994).

“Risk management is the process of planning, organizing, directing, and controlling resources to achieve given objectives when surprisingly good or bad events are possible” (Head L.G., 2009)

The International Organisation of Standardisation (ISO 31000, Risk Management 2009) identifies the following principles of risk management that should:

- Create value
- Be an integral part of the organisational processes
- Be part of decision making that explicitly addresses uncertainty
- Be systematic and structured
- Be based on the best available information
- Be tailored
- Take into account human factors
- Be transparent and inclusive
- Be dynamic, iterative and responsive to change
- Be capable of continual improvement and enhancement

These definitions and others lead to another important aspect of risk management, namely what kind of objectives an enterprise wants to achieve by applying it. Most certainly these include having better control of enterprise management with less uncertainty, avoiding interruptions in productivity so that the enterprise is always present on the markets, from the financial point of view to avoid bankruptcy and finally, though by no means less important, promoting the enterprise’s external image. Control of all these factors leads consequently to greater internal and external security (Fig.1).

Figure 1. Main objectives in applying RM

Once the enterprise has decided to initiate a policy of risk management, it must apply a process that is developed following some steps (IFRIMA, 1994; Henschel, 2009). First, the internal context analysis is carried out regarding the organisation’s main identity, how people within the enterprise act, the risk management philosophy (fixing also the degree of risk acceptance), integrity and ethical values and the
work environment in general. In a second phase, the risk analysis is developed which highlights and measures the incumbent risks, their source, the variability of the risk factors, and the risk consequences creating also a risk registers and risk mapping along with both quantitative and qualitative analysis of the exposures. The next step is the risk treatment i.e. the mitigation and the transfer of the risks, when all risk mitigation strategies have been evaluated and implemented as appropriate, through a combination of insurance, hedging and other alternative techniques applying the minimum transfer cost. The last phase is the continuous monitoring and control of the highlighted risks based on an internal report for verifying the effectiveness and relevance of policies and procedures relating to risk management. This process must be periodically completely reviewed because new risks can occur while old ones could have been eliminated (Fig.2).

![Risk Management Process](image)

**Figure 2. The Risk Management Process.**

**Development Paths of Risk Management**

Risk Management has been developed over time in theoretical and empirical contexts that are very different from each other and independent. Risk Management has been classified, after an in-depth study of the literature (Verbano and Turra, 2007), into nine different streams. Below are the definitions, fields of application and considered risks of each stream.

- **Strategic Risk Management (SRM):** “The implementation of an integrated and continuous process of identification and assessment of strategic risks that are considered to be obstacles to reach the financial and operational goals of an organization” (Chatterjee et al. 2003; Miller 1992).

  This kind of RM has a wide application because it is useful as support to the strategic policies and decisions at corporate and business level and the risks considered are “speculative” risks, namely sector, human, technological, brand, competition, project and stagnation risks.

- **Financial Risk Management (FRM):** “The practice of creating economic value in a firm by using financial techniques and methodologies to manage exposure to risk” (Crockford 1986).

  Born as instrument for credit institutions and the financial sector it treats “financial risks” such as, for example, credit, exchange rate, inflation, interest rates, prices and liquidity.

- **Enterprise Risk Management (ERM):** “A process, effected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives” (COSO 2004).

  What has emerged from a study of various ERM definitions (IBM Institute for Business Value, 2005) is that all have highlighted three main characteristics that must be included in the concept of ERM:

  - **Integrated:** ERM must span all lines of business.
**Comprehensive**: ERM must include all types of risks.

**Strategic**: ERM must be aligned with overall business strategy.

This is the most complete RM approach because it can be applied to all industrial and service enterprises processes and at each level considering the “global risks” as well as the strategic, market, financial, human, technological and operational risks.

- **Insurance Risk Management** (IRM): “The process of management of pure risk (understood as a risk that can be insured) in a firm, based on the observation of damaging events that have already occurred, the application of a premium and the subjective assessment based on the experiences and competences of the assessor” (Gahin, 1967; Petroni 1996).
  
  This is the instrument most used by all the enterprises to transfer risks. In this case, we speak about “pure risks” that is to say natural, social, personal, and technological risks that cause only damages. It is relevant to emphasise the recent development in IRM, namely using the best combination of protection/prevention and insurance with the aim of achieving an economic and efficient management of risks.

- **Project Risk Management** (PRM): “A formal, systematic process integrated into the life cycle of any project that involves defining objectives, identifying sources of uncertainty, analyzing these uncertainties and formulating managerial responses to them in order to develop an acceptable balance between risks and opportunities”. (Thevendran and Mawdesley, 2004; Jaafari, 2001)
  
  The analysis of this kind of risk is applied to all the enterprises that work by project (such as for example: building, naval, construction, etc). The risks that are considered are “project risks” which can be technical, operational, organisational, contractual, financial, economic and political risks.

- **Engineering Risk Management** (EnRM): “A complex and continuous process that involves managing the planning, design, operation and evolution of an engineering system in order to identify and choose appropriate responses to problems related to different risk factors through the adoption of a systemic and proactive approach” (Patè-Cornell 1990; Regan and Patè-Cornell 1997).
  
  It is applied as support to the management of complex socio-technical systems (aerospace, nuclear, chemical, etc) and considers the “technical/operational risks” which are those associated with human and organisational errors and those that regard the environment.

- **Supply Chain Risk Management** (ScRM): “The collaboration with the partners in the entire supply chain with the aim of developing a shared RM process in order to deal with the risks and uncertainties resulting from logistic activities and resources” (Norman and Lindroth 2002).
  
  The field of application regards firms with important relationships with other enterprises in a supply chain (extended firms, virtual enterprises, etc) and treats “supply chain risks” which can be logistics, financial, information, relationships and innovation risks.

- **Disaster Risk Management** (DRM): “A holistic and flexible approach, and an integral part of the governing of any community, involving a series of actions (programs, projects and measures) and tools expressly aimed at reducing disaster risks in regions at risk and mitigating the spread of disasters, maintaining the processes, structures and rigor typical of RM” (Garatwa and Bollin 2002; Tatano and Major 2003).
  
  These kinds of risks are monitored at government level because they treat safety in a geographical area and are defined as “systemic risks” such as for example: natural phenomena, terrorism, epidemics, and industrial accidents with environmental impact.

- **Clinical Risk Management** (CRM): “An approach to improving quality in healthcare which places special emphasis on identifying circumstances which put patients at risk of harm, and then acting to prevent or control those risks. The aim is both to improve safety and quality of care for patients as to reduce the costs of this kind of risks for health care providers” (Walshe and Dineen 1998).
  
  It is applied specifically in healthcare companies and institutions and considers “clinical risks” related to human and organisational factors (diagnostic, therapeutic, surgical etc, delays or errors) or with technological aspects that can affect patient safety.

**RESEARCH OBJECTIVES AND METHODOLOGY**

The main objective of this study is that of evidencing if the studies till now developed about the RM for SMEs have created useful and easy to use instruments for the firms for checking, evaluating and handling the risks (mitigating, eliminating or accepting them) at an integrated level. This aspect is very
important because in the majority of the case in a small or medium enterprise often is very rare that exist the risk manager, instead almost always present in a corporate, and so the opportunity of having at disposal a practical instrument for evidencing the risks in all the sector of the firm could be a less expensive way of avoiding the occurrence of the risks.

**Literature classification and analysis**

The papers obtained from the research and selection of the literature have been classified, following the procedure suggested by Williams and Oumlil (1987) and adapted for the scope by considering different perspectives:

1. **The Risk Stream** classification has followed the different approaches listed in the previous paragraph
2. **The Risks type.** The “type” is based on the classification of the Casualty Actuarial Society (2003)
   a. “Hazard risks” that include: fire and other property damages, windstorm and other natural perils, theft and other crime, personal injury, business interruption, disease and disability (including work-related injuries and diseases), liability claims
   b. “Financial risks” that include: price (e.g. asset value, interest rate, foreign exchange, commodity), liquidity (e.g. cash flow, call risk, opportunity cost), credit (e.g. default, downgrade), inflation/purchasing power, hedging/basis risk
   c. “Operational risks” that include: business operations (e.g. human resources, product development, capacity, efficiency, product/service failure, channel management, supply chain management, business cyclicality), empowerment (e.g. leadership, change readiness), information technology (e.g. relevance, availability), information/business reporting (e.g. budgeting and planning, accounting information, pension fund, investment evaluation, taxation)
   d. “Strategic risks” such as: reputational damage (e.g. trademark/brand erosion, fraud, and unfavourable publicity), competition, customer wants, demographic and social/cultural trends, technological innovation, capital availability, regulatory and political trends
3. **The Risk Management Process** namely the context analysis, the risk identification and evaluation, the risk treatment or handling and the risk monitoring and control:
   a. “Total” in which all the steps are applied
   b. “Single” where one or more steps are applied

**RESULTS**

Among the 44 papers the big percentage is shared between two risk streams and precisely 20 deal with Enterprise Risk Management and 14 with Financial Risk Management then follows 5 about Supply Chain Risk Management, 3 on Project Risk Management and 2 on Strategic Risk Management (Fig.3). What is strongly emerged inside the ERM stream, and in particular in the operational risk type, are the studies more recently developed about the Information Technology Risk Management that ones was considered only as a technological problem inside this stream but nowadays with the increase of the e-commerce and all the firm activity controlled by a software system could surely become a self standing stream. There are no evidence about Disaster Risk Management because no pertinent with the treated topic since this kind of risk is more related with governmental decision and not with the management politics of a Small and Medium firm. The Clinical Risk Management emerge only in the case of big institution that could be public or private.

![Figure 3. The percentage of the Risk Streams considered.](image-url)
The Enterprise Risk Management Stream

Inside the Enterprise RM stream the majority of the study, about the 63%, concern the operational risks type that can occur inside a firm, follows the strategic risks (18.51%), the financial risks (11.11%) and at last the hazard (7.4%) as is shown in the figure 4.

Figure 4. Main risks type components inside the Enterprise Risk Management Stream.

Other subcategories has been evidenced for avoiding a simple generalisation of the risk type in four groups, so in the Operational type, always considering the Casualty Actuarial Society (2003), have been highlighted six groups where the IT risk problem cover the majority of the studies (about 52.38%) followed with the same level of interest for the Business Operation and Suppliers risks (14.28%), then with a 9.52% there are the Organisation risks and in the last position the Process and Empowerment risks (4.76% for each one). (Fig.5).

Figure 5. Operational Risks Types – Subcategories in ERM stream.

In the Strategic type, four more categories have emerged namely the Technological Innovation with 37.5%, followed by Competition and Policy with the same value of 25% and at the end the Reputation aspect (12.5%)(Fig.6).
In the *Financial Type* the kind of subcategories are equally shared between Loans, Invoicing, Equity, Liquidity and Credit with 14.28% for each one meanwhile there is a little bit more interest for the Interest Rate risk with 28.57%. (Fig. 7).

At last in the *Hazard Type* the interest have been developed for the Natural Perils (66.7%) and for the Health and Safety risks (33.3%). (Fig. 8).

Analysing what part of the *Risk Management Process* have been considered in the ERM stream is emerged that the Evaluation phase was studied by the highest percentage with 32.56%, follows the Identification (30.23), the Treatment (16.28%), the Context Analysis (11.63%) and last the Monitoring (9.3%) (Fig. 9). Only in four cases have been considered all the five phases (Total process).
The Financial Risk Management Stream

The FRM stream at difference with the ERM cover less type of risks, namely only two the Financial Risks Type in which are distributed with this kind of percentage: Credit Risks (47.09%), Loans Risks (29.41%), Revenue Risks (11.76%), Price and Liquidity Risks both with 5.88% and the Strategic type that consider only the Competition aspect by the financial point of view (Fig.10).

About the Risk Management Process phase inside this stream they are distributed among three of them: Identification (38.09%), Evaluation (47.62%) and Treatment (14.29%) (Fig.11).
**The Supply Chain Risk Management Stream**

In the ScRM stream only the *Operational Risk* type is considered and inside it the 60% has dealt with the Business Operations problem and the remaining 40% with the IT aspect for a better management of the suppliers (Fig.12).

![Figure 12. The ScRM Stream and its Risk Type component.](image)

By the point of view of the RM Process phase considered half has studied the Identification Problem and at the same percentage of 16,67% have been treated the Context Analysis, the Treatment and the Monitoring (Fig.13).

![Figure 13. Percentage in the ScRM stream of the phase of the RM Process](image)

**The Project Risk Management Stream**

Considering the Project RM Stream the risk type are equally divided between the *Operational Type* and the *Strategic* one. Inside the first type the Business Operation has the 50%, while with 25% each one are the IT and the Empowerment. In the Strategic type with 50% for each one has been studied the Customer Wants and the Technical Innovation (Fig.14).

![Figure 14. The PRM Stream and its Risk Type components.](image)
About the phase of the RM process the Identification hold the 27.27% and Context Analysis, Evaluation, Treatment and Monitoring with 18.18% each one (Fig. 15).

**RM Process Phase**

Figure 15. Percentage in the PRM stream of the phase of the RM Process

**The Strategic Risk Management Stream**

At last in the Strategic RM stream only the Strategic Risk type is considered and the subclasses analysed are the Competition and the Technical Innovation (16).

Figure 16. The SRM Stream and its Risk Type component.

For the RM Process the Evaluation have 33%, while the other four phases 16.67 each one (fig.17).

**RM Process Phase**

Figure 17. Percentage in the SRM stream of the phase of the RM Process
The work developed in the previous paragraph can be synthesised in some tables for having an immediate glance and evidence to the obtained results regarding the relationship between the different risk streams and the risk types (Table 1).

<table>
<thead>
<tr>
<th>Stream Type</th>
<th>ERM</th>
<th>FRM</th>
<th>ScRM</th>
<th>PRM</th>
<th>SRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational</td>
<td>62.96%</td>
<td></td>
<td>100%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Strategic</td>
<td>18.51%</td>
<td>50%</td>
<td></td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>11.11%</td>
<td>50%</td>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Hazard</td>
<td>7.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(Total of the paper for each Risk Stream in comparison with each Risk Type).*

Table 1. Crossed values expressed in percentage between the Risk Streams and the Risk Types

What is clear looking at the results is that there are some evident lack about the risk type study especially in three categories, namely Supply Chain RM, Project RM and Strategic RM where only the risk type strictly pertinent with their field of interest have been considered. Surely the results are also conditioned by the fact that till now there is not a great amount of study about the RM for SMEs despite the high percentage of this kind of enterprise all around the world. Analysing then in the Operational Risk Type its subcategories, always considering the belonging Risk Stream, is enhanced that the majority of the study are concentrated on the IT problem, followed by the Business Operations and the Empowerment as shown in Table 2.

<table>
<thead>
<tr>
<th>Operational Type Subc.</th>
<th>ERM</th>
<th>ScRM</th>
<th>PRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT</td>
<td>52.38%</td>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>Suppliers</td>
<td>14.28%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Operations</td>
<td>14.28%</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Organisation</td>
<td>9.52%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empowerment</td>
<td>4.76%</td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Process</td>
<td>4.76%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Crossed values expressed in percentage between the Risk Streams present in the Operational Risk Type subcategories.

There is not any study for the suppliers in two important categories as the Supply Chain and the Strategic RM while for a small and medium enterprise is really important to create a sure and trust net of suppliers for avoiding unforeseen stop of the production especially when we speak about project by order. Also the organisation voice seems to be not important at all, perhaps because its wrongly thought that in a little firm it is not so decisive to have a structured organisation as in the corporate. More justified the lack of study about the process risk in the supply chain RM but not in the project RM because the damage in case of problem during the process phase for arriving to the final product could arise economic damages very high, as the lack in the organisational and business operations categories.

Also crossing the data between the RM streams and the strategic Risk Type subcategories some lack are enhanced that is difficult to explain why but that can give opportunity for future studies(Table 3).

<table>
<thead>
<tr>
<th>Strategic Type Subc.</th>
<th>ERM</th>
<th>FRM</th>
<th>PRM</th>
<th>SRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech. Innovation</td>
<td>37.5%</td>
<td>50%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td>25.0%</td>
<td>50%</td>
<td></td>
<td>50%</td>
</tr>
<tr>
<td>Policy</td>
<td>25.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reputuation</td>
<td>12.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer wants</td>
<td>12.5%</td>
<td></td>
<td></td>
<td>50%</td>
</tr>
</tbody>
</table>

Table 3. Crossed values expressed in percentage between the Risk Streams and the Strategic Risk Type subcategories

The last comparison is for the Financial Type sub categories where only two risk streams are involved the Enterprise RM and the Financial RM (Table 4)
Another important aspect that emerges from the literature analysis is that about the comparison between the risk streams and the different phases of the risk management process (Table 5).

<table>
<thead>
<tr>
<th>Stream</th>
<th>ERM</th>
<th>FRM</th>
<th>ScRM</th>
<th>PRM</th>
<th>SRM</th>
<th>Percentage of interest paid for each phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context Analysis</td>
<td>11.63%</td>
<td>16.67%</td>
<td>18.18%</td>
<td>16.67%</td>
<td>12.63%</td>
<td></td>
</tr>
<tr>
<td>Identification</td>
<td>30.23%</td>
<td>38.09%</td>
<td>50%</td>
<td>27.27%</td>
<td>16.67%</td>
<td>32.45%</td>
</tr>
<tr>
<td>Evaluation</td>
<td>32.56%</td>
<td>47.62%</td>
<td>18.18%</td>
<td>33.33%</td>
<td>26.34%</td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>16.28%</td>
<td>14.29%</td>
<td>16.67%</td>
<td>18.18%</td>
<td>16.67%</td>
<td>16.42%</td>
</tr>
<tr>
<td>Monitoring</td>
<td>9.3%</td>
<td>16.67%</td>
<td>18.18%</td>
<td>16.67%</td>
<td>12.16%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Crossed values expressed in percentage between the Risk Streams and the RM Process Phase.

Analysing the data it is interesting to note that the two phases that are more studied are those of the identification and evaluation while less importance is given to the context analysis, probably because request the assumption of knowing very well all the firm sector, and the monitoring of the risk after that a treatment have been applied, and also this phase seems to be an hard passage to face.

**CONCLUSION**

In this phase of my study I have argued that there are big opportunity for developing new research in the field of the risk management for SMEs, and it is enhanced both in the gap showed in the tables but also by the degree of percentage derived crossing the different items considered as means of comparison.

Another important aspect that I have found analysing the references of each paper is that even though they have been collected under the some risk stream, expect for really rare common source, each author have a completely different literature list. This could demonstrate that the field of the risk management is so transversal with a lot of disciplines that is really difficult to establish which could be the basic study to consider as pillar for each risk stream; instead for the risk management process phases the basic theory is common for all.

About the practical instruments developed, only in a paper presented in 2003 by Mikkonen & Uusitalo that are researchers in the Finnish Research Centre (VTT), starting from original concepts have been created a practical toolkit for the holistic individuation of risks for SMEs that than have been developed and amended for the UK by the Institution of Occupational Safety and Health (IOSH).
REFERENCES


