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# Une revue de la littérature des facteurs qui influencent l'adoption d'un processus d'Enterprise Risk Management

# A literature review of the factors that influence the adoption of an Enterprise Risk Management's process

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**Résumé**

L'objectif de cet article est de dresser les facteurs qui conduisent les organisations à intégrer une approche globale et structurée de risk management appelée : Enterprise Risk Management (ERM). Nous trouvons que l'intégration d'un ERM est positivement impactée par la présence d'un Chief Risk Officer (CRO), la cotation, l'indépendance du conseil d'administration, les demandes du management, la présence d'un auditeur des Big Four, la taille et la complexité. D'un autre côté, la diversification internationale influence négativement l'intégration d'un ERM. En outre, les variables suivantes n'exercent aucun effet significatif sur l'intégration d'un ERM dans les organisations : la diversification sectorielle, l'opacité des actifs, la liquidité, la volatilité des actions, la volatilité des résultats, les opportunités de croissance, les pertes antérieures et l'économie d'impôt. Finalement, des recherches additionnelles sont nécessaires pour certaines variables avec des résultats contradictoires, ces variables sont : le secteur d'activité, l'effet de levier financier, la volatilité des cash-flows, le chiffre d'affaires, la propriété institutionnelle et les incertitudes de l'environnement.

**Mots clés :** Risque ; Risk Management ; Enterprise Risk management ; Revue de la littérature ; Déterminants de l'ERM.

**Abstract**

The purpose of this article is to identify the factors that drive the organizations to incorporate an integrated and structured risk management approach, which is called: Enterprise Risk Management (ERM). We found that ERM's integration is positively impacted by the presence of a Chief Risk Officer (CRO), the listing on the stock exchange, the independence of the board of directors, the management requests, the presence of a Big Four auditor, the size and the complexity. In contrast, we found that the international diversification negatively influences ERM's integration within organizations. Moreover, the following variables do not exert any significant effect on ERM's integration in organizations: the industrial diversification, the asset opacity, the liquidity, the stock volatility, the earnings volatility, the growth opportunities, the previous losses and the tax savings. Lastly, further studies are needed regarding certain variables with contradictory results, these variables are: the industry, the financial leverage, the cash-flows volatility, the turnover, the institutional ownership and the environmental uncertainties.

**Keywords :** Risk ; Risk Management ; ERM ; Literature review ; ERM's determinants.

## Introduction

Risk management gained more and more attention from organizations these recent years; many of them use nowadays an ERM's process[1]. This process enables to maximize shareholder value through: reducing the costs of the financial distress (Smith and Stulz, 1985; Stulz, 1996), reducing the tax burden (Stulz, 1996), reducing funding costs (Froot et al., 1993; Berry-Stölzle and Xu, 2016), reaching strategic goals and improving the performances (Nocco and Stulz, 2006; ISO 31000, 2009).

Moreover, ERM enables reducing several problems identified in the agency theory by ensuring an efficient behavior of the managers (McNutt et al., 2010), by reducing the risks of the owner-managers (Smith and Stulz, 1985), by improving the quality of information (Liebenberg and Hoyt, 2003) and by reducing the agency costs associated with the conflicts between shareholders and creditors (Jensen and Meckling, 1976; Froot et al., 1993).

Nevertheless, in spite of these numerous contributions, we note that ERM's incorporation is still not global in all organizations.

Through a literature review of the main empirical studies on this subject, we try to determine what drives certain organizations to integrate an ERM, whereas others do not.

The research question that we try to answer in this article is as follows: which are the variables that drive organizations to integrate an ERM?

This study is very important, because it not only identifies the main empirical studies on the determinants of ERM's integration within organizations, but also provides a critical analysis of them. Moreover, it identifies the most significant variables of ERM's integration; this may motivate the organizations with these variables to integrate an ERM, which according to the literature will improve their values and performances.

The structure of this article is as follows: first, we identify the methods used to identify the organizations with an ERM. Second, we present the main statistical tests used in those studies. Third, we present all ERM's incorporation variables used in the empirical studies that we analyzed. Finally, we present the results of these studies.

[1] KERRAOUS (2018) presents a valuable literature review on ERM's definitions and contributions.

## 1. Methods

Researchers use several methods to identify the organizations that adopted an ERM. There are those that identify the presence of an ERM through surveys that allow a direct communication with organizations (Colquitt et al., 1999; Kleffner et al., 2003; Beasley et al., 2005; Gates, 2006; Daud et al., 2011; Manab et al., 2010; Daud et al., 2010; Paape and Speklé, 2012; Waweru and Kisaka, 2013).

Other researchers prefer to scan the public data (financial statements, annual reports, etc.) to search for some key words that can indicate the presence of an ERM. Some researchers use as a keyword the "CRO"[2] (Liebenberg and Hoyt, 2003; Pagach and Warr, 2011). This method is easy to use since the data are available. Nevertheless, it presents several limits. First, the presence of the keyword CRO does not automatically mean that the organization has just integrated an ERM. Indeed, that can also mean that a new CRO has just replaced another that was already present before in the organization, or it can quite simply be a change in the title of a manager that already exerted activities related to ERM, but under another title than a CRO (Beasley et al., 2008). Second, a CRO can be present in the organization without communicating it in the annual reports or the other documents (Grace et al., 2015). Consequently, the results of the researchers that use this method can be biased, by considering wrongly the presence (or the absence) of an ERM in certain surveyed companies.

There are also researchers who try to improve the precedent method by searching other key words[3] in addition to the CRO (Hoyt and Liebenberg, 2008, 2011; Golshan et al., 2012; Lin et al., 2012; Vo, 2016). On the one hand, this method offers more chances to identify the organizations with an ERM than the other method. On the other hand, the researchers face the same limits of that method.

In the same vein, Razali et al. (2011) use the OSIRIS database to determine ERM's presence within organizations. This database is for the organizations listed on the stock exchange and contains summarized information, detailed financial information, ratings, scanned reports, etc.

Other researchers use certain ERM's ratings and models established by other institutions. For Baxter et al. (2013) it is the ERM's rating of Standard & Poor's between 2006 and 2008. This rating gives relevant information concerning the quality of the ERM of certain organizations.

[2] The Chief risk officer (CRO) is An ERM's specialist. For Dickinson (2001), he has a strategic position within organizations and he is responsible for the ERM's process.

[3] This key words are: ERM, senior risk management, risk management director, vice-president risk management and vice-president ERM, risk committee, strategic risk management, consolidated risk management, holistic risk management, integrated risk management, etc.

Nevertheless, it presents several limits. First, this rating does not identify the exact year of ERM's integration. Second, the number of organizations that have this rating is limited (Eastman and Xu, 2015). Third, the reliability of this rating is questionable after the subprime crisis. These limits can negatively impact the validity of the studies that uses this rating. Farrell and Gallagher (2015) use the ERM's maturity model of the Risk and Insurance Management Society (RIMS)[4]. This model integrates several key components of an ERM, namely: the level of executive support for ERM, the integration of this process into everyday practice, the risk appetite, the understanding of the organizations' risk exposures, the risks' identification, the performance management, the business resilience and the sustainability. RIMS uses these components to score and classify organizations according to the maturity of their ERM. This scoring produces five ERM levels: ad hoc, initial, repeatable, managed and leadership.

Finally, Desender (2007) creates his own ERM index based on the seven components of the COSO (2004) framework: internal environment, objectives setting, event identification, risk assessment, risk response, control activities, information and communication and monitoring.

Regarding the methods used to test the most significant determinants of ERM's incorporation, we note that the majority of the researchers use logistic regression (Liebenberg and Hoyt, 2003; Beasley et al., 2005; Daud et al., 2010; Daud et al., 2011; Razali et al., 2011; Golshan et al., 2012; Paape and Speklé, 2012; Baxter et al., 2013). This method enables to analyze the influence of one or more independent variables (the determinants of ERM's incorporation) on the dependent variable (ERM's integration) measured on a binary scale.

There are researchers who used other forms of regression like the linear regression (Desender, 2007; Baxter et al., 2013; Waweru and Kisaka, 2013), the COX proportional hazard model (Pagach and Warr, 2011) and the probit regression (Lin et al., 2012; Farrell and Gallagher, 2015; Vo, 2016).

Golshan et al. (2012) used the parametric test of Student for the comparison of the means of the determinants of ERM's integration for two independent samples; the first sample consists of organizations that integrated an ERM; the second sample is composed of organizations that did not integrate it.

[4] RIMS is a non-profit association representing more than 3500 organizations around the world.

Other researchers used methods allowing them to reduce the endogeneity bias related to ERM's incorporation; it is the maximum likelihood for Hoyt and Liebenberg (2008) and the Heckman selection model for Baxter et al. (2013).

Finally, there are researchers that only used descriptive statistics to identify the determinants that influences ERM's incorporation within organizations (Colquitt et al., 1999; Kleffner et al., 2003; Gates, 2006; Manab et al., 2010).

## 2. Variables and hypotheses

We identified in our literature review the main following variables: the presence of a CRO, the listing on the stock exchange, the board of directors' requests, the management's requests, the type of auditors, the size, the complexity, the diversification, the industry, the financial leverage, the asset opacity, the liquidity, the stock volatility, the earnings volatility, the cash-flows volatility, the turnover, the institutional ownership, the growth opportunities, the environmental uncertainty, the previous losses and the tax savings.

We present in what follows the theoretical basis of each identified variable.

### 2.1. The presence of a CRO

The COSO (2004) framework considers that a good CRO must have:

- the capacity to advise the Executive Officer;
- a thorough knowledge and experience in the industry;
- the integrity and the credibility to communicate with: the persons in charge of the activities, the regulators and the other stakeholders;
- an excellent expertise and previous experiences in risk management;
- an excellent managerial capacity;
- the capacity to motivate and to manage various groups of professionals with different backgrounds;
- the capacity to think quickly and strategically;
- a good negotiating competence;
- and the capacity to formulate effectively the risk management's policy in order to respect the strategic objectives.

The CRO is responsible for ERM's integration, its coordination and the communication of its objectives and its results to the board of directors, as well as the communication of the organization's risk profile to stakeholders (Liebenberg and Hoyt, 2003).

*H1: the presence of a CRO influences positively ERM's integration.*

### 2.2. The listing on the stock exchange

The organizations listed on the stock exchange must comply with several good governance rules and several guidelines (Kleffner et al., 2003). The New York Stock Exchange, for example, imposes the supervision of risks by the audit committees of the organizations that are listed on the stock exchange. Therefore, the organizations listed on the stock exchange are more likely to incorporate an ERM.

*H2: the listing on the stock exchange influences positively ERM's integration.*

### 2.3. The Board of Directors' requests

The board of directors plays a big role in ERM's integration within organizations (Kleffner et al., 2003). The latter has the ultimate responsibility of this process (Stulz, 2009). Moreover, the board members will seek to protect their reputation as experts in the control.
Consequently, an effective board of directors will make sure that the organization has an effective ERM (Daud et al., 2011). For the COSO (2004), the effectiveness of the board of directors requires that each of its members is effective, impartial, qualified and curious. They must know very well the organization's activities and its environment. Finally, they will have to devote their time to fill their responsibilities and their resources to analyze the important matters of the organization.
The independence of the board of directors is likely to influence ERM's integration within organizations. An independent board of directors is more impartial in the evaluation of the actions of the managers of an organization than a board of directors composed of few independent directors (Beasley et al., 2005).
The separation between the functions of the president of the board of directors and the executive officer can positively influence ERM's integration within organizations (Desender, 2007). Giving the powers of decision-making and control to one person can reduce the effectiveness of the control of managers' actions (Fama and Jensen, 1983). Indeed, managers will not want to integrate an ERM in their organizations since they will be more controlled and that they will not be able to fulfill their interests and to increase their personal remuneration.
Finally, the board tenure can exert a positive influence on ERM's integration within organizations. A longer tenure will improve the quality of reporting and risk management (Baxter et al., 2013).

*H3: the board of directors' requests influences positively ERM's integration.*

### 2.4. The management requests

An important management support to the CRO is essential to guarantee the acceptance of ERM by all the organization's stakeholders and to ensure the success of this process (Walker et al., 2002; Jokung Nguéna, 2008).

When the leaders of the organization, are also shareholders within this one the agency problems are reduced, since their interests will be aligned with those of the other shareholders (Paape and Speklé, 2012). Following this reasoning, organizations with owner-managers will not integrate an ERM to prevent wasting their resources.

*H4: the management requests influences positively ERM's integration.*

### 2.5. The types of auditors

The Big Four auditors (KPMG, Ernst & Young, PricewaterhouseCoopers and Deloitte) are generally more demanding in terms of the transparency and the absence of errors in the financial statements of the organizations that they audit, since they have a reputation to maintain (Golshan et al., 2012). Therefore, the will encourage their clients to adopt an ERM (Paape and Speklé, 2012).

*H5: the presence of a Big Four auditor influences positively ERM's integration.*

### 2.6. The size

Generally, the risks of an organization increase proportionally with its size (Beasley et al., 2005; Waweru and Kisaka, 2013). Larger organizations face more financial distress and face higher cash-flows volatility (Pagach and Warr, 2011). Consequently, these organizations are more likely to integrate an ERM. Moreover, the cost of the integration of this process will be low for these organizations since they can profit from important economies of scale (Beasley et al., 2008).

On another side, even if smaller organizations are also confronted with several risks, they generally do not have sufficient resources to incorporate an ERM (Véret and Mekouar, 2005).

*H6: large organizations are more likely to integrate an ERM.*

### 2.7. The complexity

The control of the organizations that have complex organizational structures is often very difficult, since there is an important dispersion of information in those organizations. This can

cause opportunist behaviors from the managers of these organizations (Lin et al., 2012). Therefore, organizations with complex activities are more likely to integrate an ERM.

*H7: the complexity of the organization influences positively ERM's integration.*

### 2.8. The diversification

Generally, we distinguish between industrial diversification for the organizations that have various activities and international diversification for the organizations that have other activities abroad (Hoyt and Liebenberg, 2008).

Diversification can in certain cases generate benefits for the organization, or generate certain costs in others. Indeed, diversification enables the organization to take different risks, which reduces its total exposure to risks and can improve its performance (Jokung Nguéna, 2008). Moreover, diversified organizations are generally more complex than other organizations, which expose them at the additional costs/risks (Hoyt and Liebenberg, 2008).

*H8: the industrial and international diversification influences positively ERM's integration.*

### 2.9. The industry

The financial organizations were the first to integrate an ERM, due to the risky nature of their activities and the legal requirements which they must comply to (Beasley et al., 2005; McShane et al., 2011; Pagach and Warr, 2011; Waweru and Kisaka, 2013; Grace et al., 2015).

Insurers must be solvent in order to respect their engagements towards their creditors, but also towards their policyholders to compensate them when the insured incident occurs (Véret and Mekouar, 2005). They must also face risks of bad investments, since they must invest the premiums collected from their clients in order to be able to compensate them (Lin et al., 2012). They are also confronted with currency risks related to the globalization of their activity (Cumming and Hirtle, 2001). Insurers must conform to Solvency II. This directive requires a better adequacy between the insurers' equities and their risks. Moreover, it obliges them to have internal systems of risk management and of measuring their solvency.

Regarding banks, they must conform to the prudential regulations of Basel. They fix constraining rules regarding the minimum equity requirements considering the risks that the banks incur, but also regarding the integration of a process that control risks (Bessis, 1995).

ERM's incorporation will also enable the banks to better communicate their risks' exposures, which will reduce their funding costs (Paape and Speklé, 2012).

*H9: financial organizations are more likely to integrate an ERM*

### 2.10. The financial leverage

The organizations that have financial leverage are more likely to integrate an ERM. These organizations have more debts in their financial structures and are riskier (Golshan et al., 2012). Moreover, they are confronted with more financial distress, which will negatively impact their rating and will increase their financing costs (Aabo et al., 2005; Pagach and Warr, 2011).

ERM will enable organizations to use more equity in their financial structures. Indeed, ERM improves the communication on risks between organizations and their stakeholders, which will improve investments in these organizations and will reduce their debts (Liebenberg and Hoyt, 2003). That will provide an important financial flexibility and a better protection against the unforeseeable risks (Meulbroek, 2002).

*H10: the financial leverage influences positively ERM's integration.*

### 2.11. The asset opacity

Opaque assets are difficult to sell with their real value, since they face more information asymmetry and that they are often undervalued (Smith and Stulz, 1985). Consequently, the organizations that have these assets are more likely to integrate an ERM (Pagach and Warr, 2011).

*H11: the asset opacity influences positively ERM's integration.*

### 2.12. The liquidity

The insufficiency of the available liquidity increases the probability of financial distress in the indebted organizations (Smith and Stulz, 1985). Indeed, the organizations can use their liquid assets in case of insufficient cash-flows (Pagach and Warr, 2011). Therefore, the organizations that do not have sufficient liquidity are those that will profit the most from ERM's integration.

*H12: the liquidity influences positively ERM's integration.*

### 2.13. The stock volatility

Managers that has participation in their organizations will set up strategies that reduce their specific risks. In contrast, managers that have remuneration based on stock-options will try to maximize it by adopting strategies that will increase the volatility of the organization's stocks.

The boards of directors can choose to incorporate an ERM in order to reduce excessive risk taking by managers (Smith and Stulz, 1985; Tufano, 1996; Pagach and Warr, 2011). Consequently, the organizations that have high stock volatility are more likely to integrate an ERM.

*H13: the stock volatility influences positively ERM's integration.*

### 2.14. The earnings volatility

Earnings volatility increases the organization's possible risks (Bartov, 1993; Gordon et al., 2009). ERM enables the organization to reduce its risks, which will result in a reduction of the earnings volatility (Liebenberg and Hoyt, 2003; Pagach and Warr, 2010). Therefore, the organizations that have higher earnings volatility are more likely to integrate an ERM (Pagach and Warr, 2011).

*H14: the earnings volatility influences positively ERM's integration.*

### 2.15. The cash-flows volatility

Organizations with a high cash-flows volatility are more likely to face financial distress.

ERM reduces cash-flows volatility, which increases the organization's internal resources and reduces its financing costs (Meulbroek, 2002).

Consequently, the organizations that have high cash-flows volatility are those that will profit the most from ERM's integration (Pagach and Warr, 2011).

*H15: the cash-flows volatility influences positively ERM's integration.*

### 2.16. The turnover

The more the annual sales of an organization are, and that they exceed the possible costs, the more it is susceptible to make profits. This organization is more likely to integrate an ERM since it will have enough resources to do so (Razali et al., 2011).

*H16: the turnover influences positively ERM's integration.*

### 2.17. The institutional ownership

Shareholders ask for more and more communication on risks. These requests are generally more important when they are institutional shareholders (Liebenberg and Hoyt, 2003; Chen et al., 2008; Golshan et al., 2012); these shareholders generally have a higher percentage of stocks in organizations, they can thus exert their voting power to encourage organizations to integrate an ERM. They also exert a considerable influence on the financing cost of

organizations. Therefore, organizations will consider their requests to integrate an ERM (Paape and Speklé, 2012).

The organizations with a high percentage of institutional ownership are more likely to integrate an ERM.

*H17: the institutional ownership influences positively ERM's integration.*

### 2.18. The growth opportunities

The organizations with high growth opportunities face more risks. Indeed, the value of these organizations will depend on future events. Moreover, they will be financed at a higher cost, because they face more information asymmetry (Myers, 1984; Froot et al., 1993).

Therefore, these organizations are more likely to integrate an ERM to reduce their risks and to control their growth (Liebenberg and Hoyt, 2003; Pagach and Warr, 2011).

*H18: the presence of growth opportunities influences positively ERM's integration.*

### 2.19. The environmental uncertainty

Environmental uncertainty is all the changes in the external environment of organizations, which can increase their risks, and the probability of the possible financial distress that they can face. ERM helps to identify these changes and to control them, which will reduce the risks and the financial distress and will improve performances (Gordon et al., 2009).

*H19: the presence of the environmental uncertainty influences positively ERM's integration.*

### 2.20. The previous losses

Organizations that faced several losses in the past are confronted with more financial distress. Consequently, they must integrate an ERM to reduce the probability of their future losses (Baxter et al., 2013).

*H20: the previous losses influences positively ERM's integration.*

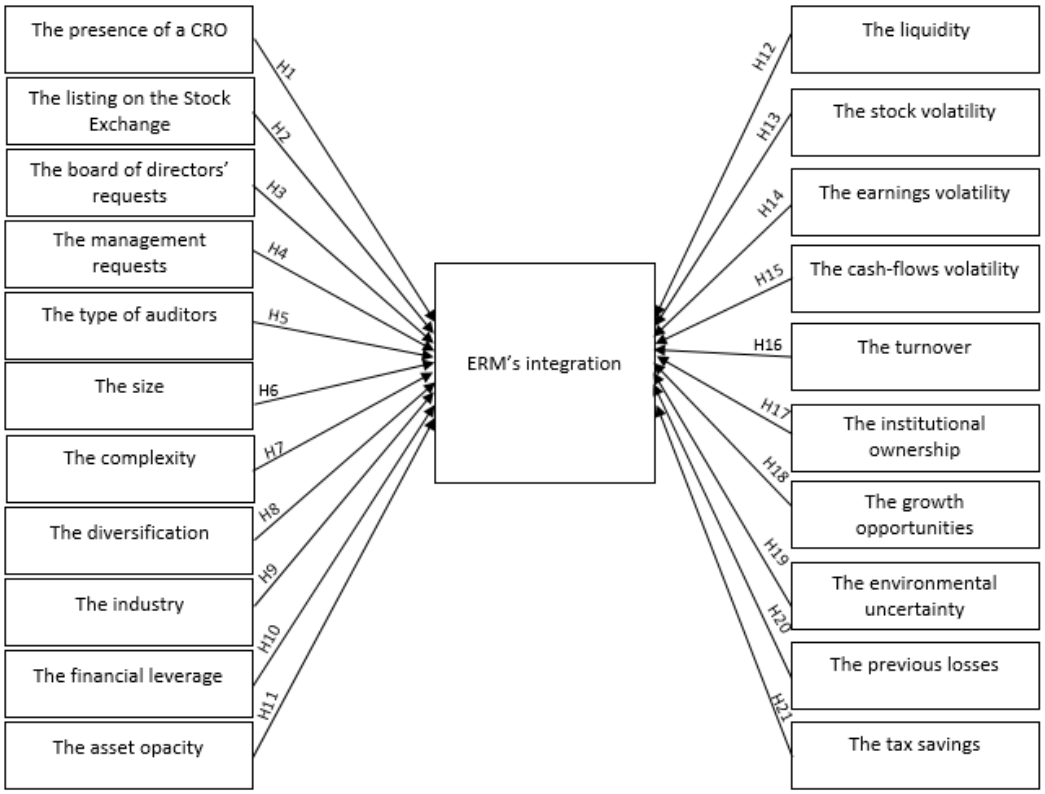
### 2.21. The tax savings

ERM reduces earnings volatility and consequently the taxes that the organization will pay (Pagach and Warr, 2011). Moreover, an organization that integrates an ERM will reduce its risks, which will help the organization to get more credits and to benefit from the tax deductibility of the interests' payments (Stulz, 1996).

*H21: the tax savings influences positively ERM's integration.*

The figure N°1 represents our research model, where the dependent variable is ERM's integration in organizations and the remaining variables are the independent variables.

**Figure N°1 :** Research model




**Source :** Prepared by the author

## 3. Results

We classify hereafter the results of the studies that we analyzed in our literature review by each variable used by the researchers:

### 3.1. The presence of a CRO

The results of the analyzed empirical studies show that the presence of a CRO positively influences ERM's integration (Kleffner et al., 2003; Beasley et al., 2005; Razali et al., 2011; Paape and Speklé, 2012; Baxter et al., 2013; Waweru and Kisaka, 2013).

The quality of the CRO also positively influences ERM's integration (Colquitt et al., 1999; Daud et al., 2010). In the same vein, the results of Baxter et al. (2013) show that the presence of a risk committee (or an audit committee) positively influences ERM's integration.

### 3.2. The listing on the Stock Exchange

The results of Kleffner et al. (2003) show that the organizations listed on the stock exchange use more derivative and captives to manage their risks than the organizations that are not. Moreover, they show that the organizations that are listed on the stock exchange have more direct interactions with their boards of directors.

The results of Paape and Speklé (2012) show that the organizations that are listed on the stock exchange are more likely to incorporate an ERM.

In contrast, Baxter et al. (2013) do not find any statistically significant relation between the listing on the stock exchange and ERM's integration.

### 3.3. The Board of Directors requests

The relation between the independence of the board of directors and ERM's integration is ambiguous. Indeed, whereas certain researchers significantly find a positive relation between these two variables (Kleffner et al., 2003; Beasley et al., 2005; Gates, 2006; Desender, 2007), other researchers do not find any significant relation between them (Golshan et al., 2012; Baxter et al., 2013; Waweru and Kisaka, 2013).

Daud et al. (2011) find that the quality of the board of directors positively influences ERM's integration.

Regarding the relation between ERM's integration and the separation between the function of a chief executive officer and the chairman of the board of directors, Desender (2007) finds that the organizations with this separation have more developed ERM than the other organizations without this separation. In contrast, Baxter et al. (2013) do not find any significant relation between these variables.

Finally, Baxter et al. (2013) find that the board tenure positively influences ERM's integration.

### 3.4. The management requests

Beasley et al. (2005), as well as Pagach and Warr (2011) find that the management requests positively influence ERM's integration within organizations.However, Paape and Speklé (2012) find that owner managers oppose ERM's integration in their organizations.

### 3.5. The types of auditors

Whereas some studies find that the presence of a Big Four auditor positively influences ERM's incorporation within organizations (Beasley et al., 2005; Golshan et al., 2012), others do not find any significant relation between these two variables (Paape and Speklé, 2012).

### 3.6. The size

The majority of the studies which analyzed the link between the size of the organization and ERM's integration find a significant positive relation between these two variables (Colquitt et al., 1999; Beasley et al., 2005; Hoyt and Liebenberg, 2008, 2011; Pagach and Warr, 2011; Lin et al., 2012; Paape and Speklé, 2012; Baxter et al., 2013; Farrell and Gallagher, 2015; Vo, 2016). In contrast, Liebenberg and Hoyt (2003) find that the size negatively influences ERM's integration.

Regarding the results of the other studies, they show that the size does not exert any significant influence on ERM's integration within organizations (Razali et al., 2011; Golshan et al., 2012; Waweru and Kisaka, 2013).

### 3.7. The complexity

Whereas Baxter et al. (2013) and Lin et al. (2012) find that the complexity of the organizations positively influences ERM's integration, Golshan et al. (2012) do not find any relation significant link between these two variables.

### 3.8. The diversification

First of all, regarding international diversification, the majority of the studies find that it exerts a negative influence on ERM's integration (Hoyt and Liebenberg, 2011; Razali et al., 2011; Farrell and Gallagher, 2015). Only Lin et al. (2012) find a positive link between these two variables. Finally, Hoyt and Liebenberg (2008) do not find any significant statistical relation between these two variables.

Regarding industrial diversification, all the studies that we analyzed find that there is no significant influence between this variable and ERM's integration (Hoyt and Liebenberg, 2008, 2011; Lin et al., 2012; Farrell and Gallagher, 2015; Vo, 2016).

### 3.9. The industry

The relation between the industry and ERM's integration is unclear. Indeed, Colquitt et al. (1999) find that this variable is significant in ERM's integration within organizations. Moreover, Beasley et al. (2005) find that the organizations in the banking, education and

insurance industries have more advanced ERM's processes. Similarly, the results of Paape and Speklé (2012) show that the organizations in the financial industry are more likely to incorporate an ERM.

Nevertheless, the results of the other studies show that the industry does not exert any significant influence on ERM's integration (Liebenberg and Hoyt, 2003; Golshan et al., 2012; Waweru and Kisaka, 2013).

### 3.10. The financial leverage

The results of the empirical studies that we analyzed show that certain researchers find that the financial leverage is positively correlated to ERM's integration within organizations (Liebenberg and Hoyt, 2003; Golshan et al., 2012; Vo, 2016), whereas it is negatively correlated with this variable in the other studies (Hoyt and Liebenberg, 2008, 2011; Baxter et al., 2013).

Furthermore, other studies find that the financial leverage does not exert any significant influence on ERM's integration (Pagach and Warr, 2011; Razali et al., 2011; Lin et al., 2012; Farrell and Gallagher, 2015).

### 3.11. The asset opacity

The totality of the empirical studies find that asset opacity does not exert any significant influence on ERM's integration (Liebenberg and Hoyt, 2003; Hoyt and Liebenberg, 2011; Pagach and Warr, 2011; Golshan et al., 2012; Farrell and Gallagher, 2015).

### 3.12. The liquidity

All the researchers find that the liquidity does not exert any significant influence on ERM's integration (Hoyt and Liebenberg, 2011; Pagach and Warr, 2011; Farrell and Gallagher, 2015).

### 3.13. The stock volatility

The majority of the empirical studies that we analyzed finds that the stock volatility (stock price and stock returns) does not exert any significant influence on ERM's integration in organizations (Liebenberg and Hoyt, 2003; Hoyt and Liebenberg, 2011; Golshan et al., 2012; Baxter et al., 2013). Only Pagach and Warr (2011) find that the stock volatility positively influences ERM's integration in organizations.

### 3.14. The earnings volatility

The results of all the empirical studies that we analyzed indicate that earnings volatility does not have any significant influence on ERM's integration (Liebenberg and Hoyt, 2003; Hoyt and Liebenberg, 2011; Farrell and Gallagher, 2015).

### 3.15. The cash-flows volatility

Whereas the results of Pagach and Warr (2011) show that the cash-flows volatility positively influences ERM's integration, Baxter et al. (2013) do not find any significant relation between these two variables.

### 3.16. The turnover

On the one hand, Razali et al. (2011) find that the turnover positively influences ERM's integration in organizations; on the other hand, Farrell and Gallagher (2015) find that the turnover does not exert any significant influence on this integration.

### 3.17. Institutional ownership

Some empirical studies finds that the institutional ownership positively influences ERM's integration (Hoyt and Liebenberg, 2008, 2011; Pagach and Warr, 2011).

In contrast, the remainder of the empirical studies that we analyzed find that the institutional ownership does not exert any influence on ERM's integration (Liebenberg and Hoyt, 2003; Razali et al., 2011; Golshan et al., 2012; Paape and Speklé, 2012).

### 3.18. The growth opportunities

All the empirical studies that we analyzed find that growth opportunities do not have any significant influence on ERM's integration (Liebenberg and Hoyt, 2003; Pagach and Warr, 2011; Lin et al., 2012; Paape and Speklé, 2012; Waweru and Kisaka, 2013).

### 3.19. The environmental uncertainty

Baxter et al. (2013) find that the presence of credit risk and bankruptcy risk positively influences ERM's integration within organizations. On the other hand, they find that the presence of the audit-related risk negatively influences ERM's integration in organizations.

### 3.20. The previous losses

Baxter et al. (2013) find that the previous losses undergone by the organizations do not exert any significant influence on ERM's integration. Moreover, Farrell and Gallagher (2015) find that the value change does not statistically influence ERM's integration within organizations.

### 3.21. The tax savings

Pagach and Warr (2011) find that tax saving does not exert any significant influence on ERM's integration.

Table N°1 presents a synthesis of the various empirical studies on the determinants of ERM's within the organizations that we identified in our literature review.

**Table N°1 :** Synthesis of empirical studies on the determinants of ERM's integration of an ERM within organizations

| Authors | Sample | ERM proxy | Methodology | Variables | Significant results |
|---|---|---|---|---|---|
| Colquitt et al. (1999) | 379 organizations between 1995 and 1996 | Survey | Descriptive statistics | The size, the industry, the experiences and training of the risk manager. | The size (+), the industry (+), the experiences and training of the risk manager (+) |
| Kleffner et al. (2003) | 118 Canadian organizations | Survey | Descriptive statistics | The board of directors requests, the competition, the responsibility of the directors, the innovation, the uncertainty, the compliance and the influence of the risk manager of the head office | The Influence of the risk manager (+), the encouragement of the board of directors (+) and the compliance (+) |
| Liebenberg and Hoyt (2003) | 26 American organizations with an ERM between 1997 and 2001 and 26 controlling organizations. | Scanning public data for the keyword CRO | Logistic regression | The Size, the industry, the earnings volatility, the financial leverage, the growth opportunities, the opacity and the institutional ownership. | The financial leverage (+) and the size (-) |
| Beasley et al. (2005) | 123 organizations members of the Global Audit Information Network. | Survey | Logistic regression | The presence of a CRO, the independence of the board of directors, the management requests, the type of auditors, the size and the industry. | The presence of a CRO (+), the independence of the board of directors (+), the management requests (+), the presence of a Big Four auditor (+), the size (+) and the industry (+) |
| Gates (2006) | 271 organizations in 2004 (64% North America, 28% Europe, 8% the U.K.) | Survey | Descriptive statistics | A better corporate governance, a better comprehension of the strategic and operational risks, the regulatory pressures, the board of directors requests and the competitive advantage | A better corporate governance (+), a better comprehension of the strategic and operational risks (+), the regulatory pressures (+), the requests of the board of directors (+) and the competitive advantage (+) |
| Desender | 100 American | The | Linear | The independence of the board | The Independence of the |

| Authors | Sample | ERM proxy | Methodology | Variables | Significant results |
|---|---|---|---|---|---|
| (2007) | pharmaceutical organizations listed on the stock exchange | creation of an ERM index | regression | of directors and the separation between the functions of the chairman and the Chief Excecutive Officer | board of directors (+) and the separation between the functions of the chairman and the Chief Excecutive Officer (+) |
| Hoyt and Liebenberg (2008) | 275 American insurers | Scanning public data for several key words | Maximum of likelihood | The size, the institutional ownership, the international diversification, the industrial diversification and the financial leverage | The size (+), the institutional ownership (+) and the financial leverage (-) |
| Daud et al. (2010) | 86 organizations listed on Bursa Malaysia | Suvey | Logistic regression | The quality of the CRO | The quality of the CRO (+) |
| Manab et al. (2010) | 55 organizations listed on Bursa Malaysia | Survey | Descriptive statistics | A better governance, a better decision-making, an improvement of the shareholder value, the board of directors' requests and a better management of the activities of the organization | A better governance (+), a better decision-making (+) and a better management of the activities of the organization (+) |
| Daud et al. (2011) | 86 organizations listed on Bursa Malaysia | Survey | Logistic regression | The quality of the board of directors | The quality of the board of directors (+) |
| Hoyt and Liebenberg (2011) | 117 American insurers between 1995 and 2005 | Scanning public data for several key words | Maximum of Likelihood | The size, the financial leverage, the international diversification, the industrial diversification, the opacity of assets, the institutional ownership, the liquidity and the volatility of the earnings and stocks | The size (+), the institutional ownership (+), the financial leverage (-) and the international diversification (-) |
| Pagach and Warr (2011) | 138 American organizations between 1992 and 2005. | Scanning public data for the keyword CRO | Cox proportional hazard model | The size, the financial leverage, the liquidity, the cash-flows volatility, the institutional ownership, the tax savings, the opacity of assets, the growth opportunities, the stock volatility and the management requests | The size (+), the cash-flows volatility (+), the institutional ownership (+), the stock volatility (+) and the management requests (+) |
| Razali et al. (2011) | 528 organizations listed on Bursa Malaysia in 2007 | OSIRIS Database | Logistic regression | The size, the financial leverage, the profitability, the international diversification, the institutional ownership, the presence of a CRO and the turnover | The turnover (+), the presence of a CRO (+) and the international diversification (-) |
| Golshan et al. (2012) | 90 organizations listed on Bursa Malaysia (48 with an ERM and 42 without an ERM) | Scanning public data for several key words | Test of Student and logistic regression | The size, the complexity, the industry, the financial leverage, the presence of a Big Four auditor, the independence of the board of directors, the opacity of assets, the stock volatility and the institutional ownership | The financial leverage (+) and the presence of a Big Four auditor (+) |

| Authors | Sample | ERM proxy | Methodology | Variables | Significant results |
|---|---|---|---|---|---|
| Lin et al. (2012) | 85 American insurers listed on the stock exchange between 2000 and 2007 | Scanning public data for several key words | Probit regression model | The reinsurance, the use of derivatives, the international diversification, the industrial diversification, the asset allocation, the size, the growth opportunities, the financial leverage and the complexity | The reinsurance (+), the international diversification (+), the size (+) and the complexity (+) |
| Paape and Speklé (2012) | 825 organizations headquartered in the Netherlands | Survey | Logistic regression | The corporate governance requirements, The listing on the stock exchange, the audit committee, the presence of a CRO, the institutional ownership, the management requests, the type of auditors, the growth opportunities, the size and the sector | The listing on the stock exchange (+), the presence of a CRO (+), the presence of an audit committee (+), the sector (+) and the management requests (-) |
| Baxter et al. (2013) | 165 observations for banks and insurances between 2006 and 2008. | S&P ERM rating | Linear regression, logistic regression and Heckman model | The size, the complexity, the stocks return volatility, the cash-flows volatility, the previous losses, the credit risk, the bankruptcy risk, the audit-related risks, the financial leverage, the presence of a CRO or an audit committee, the independence of the board of directors, the board tenure and the separation between the function of Executive Officer and chairman of the board | The size (+), the complexity (+), the credit risk (+), the risk of bankruptcy (+), the presence of a CRO (+), the presence of a committee of risk or audit (+), the board tenure (+), the financial leverage (-) and the audit risks (-) |
| Waweru and Kisaka (2013) | 22 organizations listed on the Nairobi stock exchange in 2009 | Survey | Linear regression | The size, the industry, the independence of the board of directors, the presence of a CRO and the growth opportunities | The presence of a CRO (+) |
| Farrell and Gallagher (2015) | 225 listed organizations that operate in several industries and countries between 2006 and 2011 | RIMS ERM maturity model | Probit regression model | The size, the financial leverage, the turnover, the international diversification, the industrial diversification, the liquidity, the earnings volatility, the asset opacity and the change in the value of the organization. | The size (+) and the international diversification (-) |
| Vo (2016) | 101 European insurers listed between 2007 and 2013 | Scanning public data for several key words | Probit regression model | The size, the maturity, the financial leverage, the industrial diversification, the productivity, the market value and the long-term investments | The financial leverage (+), the size (+), the productivity (+), the market value (+) and the long-term investments (+) |

**Source :** Prepared by the author

## Conclusion

We note through this literature review that there is no universal method to identify the presence of an ERM in organizations. The principal methods used by the researchers are: surveys, scanning certain key words in the annual reports or other publications, using specialized databases, using ratings and ERM's models established by other institutions and the creation of new ERM's indexes.

Regarding the methods used to test the most statistically significant ERM's integration determinants, the majority of the researchers use the logistic regression.

As for the results of these empirical studies, we found that there is not a real consensus between the researchers. First, in line with the hypotheses that we formulated (H1, H2, H3, H4, H5, H6 and H7), the following variables have a significant positive impact on ERM's integration: the presence of a CRO, the listing on the stock exchange, the independence of the board of directors, the management requests, the presence of a Big Four auditor, the size and the complexity. Second, international diversification has a significant negative impact on ERM's integration, we therefore reject H8; this result contradicts the theoretical assumptions in which the organizations that are internationally diversified are risky and are more likely to incorporate an ERM. Third, contrary to what was expected on our hypotheses (H8, H11, H12, H13, H14, H18, H20 and H21), the following variables do not exert any significant effect on ERM's integration within organizations: the industrial diversification, the asset opacity, the liquidity, the stock volatility, the earnings volatility, the growth opportunities, the previous losses and the tax savings. Finally, there are contradictory results regarding the following variables: the industry, the financial leverage, the cash-flows volatility, the turnover, the institutional ownership and the environmental uncertainties. Therefore, we also reject the following hypotheses: H9, H10, H15, H16, H17 and H19).

This study has important contributions to scientific literature because it identifies multiple variables that statistically impact ERM's integration in organizations, whereas other studies only use a limited number of ERM's integration variables to test their hypotheses. These results have also important managerial consequences, since it will motivate the companies that have those variables and still have not integrated an ERM to do so in the near future, which will have a positive impact on their value.

The main limit of this study is that we could not statistically test ERM's integration variables on a sample of organizations. Indeed, we only used the available studies and data to draw our conclusions.

Our literature review stresses a need for additional empirical studies on this subject. We recommend that these studies use more precise methods to evaluate the presence of an ERM in organizations, by creating models that are based on specialized ERM's frameworks like the COSO 2 or the ISO 31000 standard. Then, to test the maximum variables of ERM's integration that we identified in this study on an important sample of organizations, in order to have significant results.

Moreover, organizations do not only need to integrate an ERM, but they must ensure its effectiveness by providing the information and the resources that the people in charge of that process need. Hence, further studies can try to answer the following question: what is the current ERM's maturity level in the organizations that integrated this process?

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