

THE EFFECT OF RISK MANAGEMENT ON THE PERFORMANCE OF CANADIAN FIRMS

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Abstract

How to cite this paper: Gouiaa, R., & Issa, E. (2022). The effect of risk management on the performance of Canadian firms. *Risk Governance and Control: Financial Markets & Institutions*, 12(3), 19–33.

<https://doi.org/10.22495/rgcv12i3p2>

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ISSN Online: 2077-4303

ISSN Print: 2077-429X

Received: 28.05.2022

Accepted: 23.09.2022

JEL Classification: G32, G38, G28

DOI: 10.22495/rgcv12i3p2

Since the 2008 financial crisis, the relationship between investing in enterprise risk management (ERM) and its influence on business performance has continued to gain popularity and with the enormous volatility in the business world today, proper ERM is more important than ever (Chen, Tsao, Hsieh, & Hu, 2019; Maruhun, Atan, Yusuf, Rahman, & Abdullah, 2021). Is it the companies that manage risks better that perform better, regardless of the industry? The objective of this research is to analyze the effect of the way in which risks are managed by Canadian firms in different industries and the impact of this management on different levels of performance. A sample of 30 annual reports covering the fiscal years ending in 2019 and 2020 from fifteen Canadian companies that trade on the Toronto Stock Exchange (TSX) has been completed. The analysis of Pearson's correlation coefficients as well as the coefficients of determinations made it possible to assess the relationship between the various ERM variables and company performance. By analyzing the correlations obtained for the 2019 and 2020 financial years, no significant relationship could be demonstrated between ERM, and 5 performance indicators analyzed. However, several significant correlations have indeed been demonstrated between each industry studied, these affecting different performance indicators depending on the sector.

Keywords: Enterprise Risk Management, Firm Performance, Industries, Canadian Firms

Authors' individual contribution: Conceptualization — R.G. and E.I.; Methodology — R.G. and E.I.; Validation — R.G. and E.I.; Formal Analysis — E.I.; Investigation — R.G. and E.I.; Writing — R.G. and E.I.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

Acknowledgements: We are very grateful for the support of the Performance Research Group at the University of Québec in Outaouais.

1. INTRODUCTION

Enterprise risk management (ERM) is a fundamental concern in today's extremely dynamic environment. ERM can be characterized as a tool for identifying threats that would harm the achievement of the desired strategy. Good ERM is embodied in all business processes and, when matched with adequate internal communications channels, enables

senior management to take calculated risks that can pay off (Gouiaa, Zéghal, & El Aoun, 2020; Maruhun, Atan, Yusuf, Rahman, & Abdullah, 2021). In addition, the level of risk aversion of decision-makers will dictate the tone indirectly and directly propagated in all spheres of the company implicitly dictating the most favorable behaviors to adopt in order to achieve targets. Having said that, ERM is, therefore, a very important pillar of any organizational culture.

It is reasonable to suggest that significant ERM gaps are factors that indicate a weak organizational culture and which in turn would limit the achievement of a strategy. Despite the fact that different ERM models exist (COSO, ISO and others) today, it is very difficult for companies to anticipate the panoply of potential obstacles that can limit a desired organizational performance. In fact, the 23rd annual PricewaterhouseCoopers (PWC) survey conducted in 2019 among a large number of chief executive officers (CEOs) in Canada reveals that in terms of obstacles to organizational growth, 82% of Canadian CEOs have ranked economic and political uncertainty among their top obstacles, 80% believe that cyber threats, as well as over-regulation in Canada, will be obstacles to growth, between 73% and 79% are concerned about trade disputes, the accessibility to essential skills, geopolitical uncertainty as well as protectionism and finally, 62% shared their concerns about climate change and environmental damage as obstacles to the growth of their organizations. In addition to all these concerns being not only obstacles but also risks for Canadian businesses, on March 11, 2020, the World Health Organization (WHO) declared that COVID-19 could be qualified as a global pandemic; this one is having phenomenal repercussions for many organizations.

To ensure the achievement of organizational objectives, there can be no doubt that risk management processes have been established considering the current uncertainty associated with the panoply of potential threats that could impact the performance of Canadian organizations. Indeed, in the absence of effective risk identification mechanisms, companies are exposed to different types of threats that may materialize, thus limiting performance. For example, in May 2020 Aldo, a company with approximately 8,000 employees, managing 700 retail stores and having 3,000 points of sale in more than 100 countries, requested to be placed under the protection of the Creditors Arrangement Act ("Le Groupe Aldo se place à l'abri", 2020). Despite Aldo's CEO explaining that it was the pandemic that put too much strain on cash flow as the reason why the company is struggling (Aldo, 2020), further thought might suggest that it is due to Aldo's pre-pandemic vulnerability caused by the mismatch between the low level of reserve maintained by the company as well as a weak online sales strategy that has resulted in the current difficulties. In other words, the COVID-19 pandemic is the event that exposed this vulnerability of the company, which did not necessarily have adequate risk management mechanisms beforehand. However, a more in-depth case study would be relevant, the objective of this example is to emphasize the importance of an ERM mechanism that could potentially prevent organizations from experiencing difficult times. This is why it is interesting to study the relationship between ERM and business performance in order to try to testify whether the investment in ERM is really paying off. Is it valid to say that if Aldo had invested more in more robust ERM mechanisms that it would not find itself in its current situation? Many examples exist in different industries, all of which are relevant to the need to further study the impacts of ERM on business performance. Reitmans (Canada) closed

two of its retail chains and lay off around 1,400 workers as the company restructured amid the pandemic (Deschamps, 2020). The Starbucks coffee chain has decided to accelerate its five-year transformation strategy in response to changes in the consumption habits of its customers during the COVID-19 pandemic. The restructuring includes adding new drive-thru locations, expanding delivery, and piloting curbside pickup-only coffee shops ("Starbucks to close up to 300 locations", 2021). Can Starbucks' ability to adapt be justified by the way it properly analyzes the threats in its environment? Identifying situations in a timely manner that will harm the maximization of profit or the maintenance of a reputation, isn't that the objective of ERM? Does the business industry determine the appropriateness of the level of investment needed in ERM and are certain business industries inherently more vulnerable to different risks? Analyses are necessary to identify the variables that contribute to maintaining the desired performance regardless of the situation a company may face (such as the pandemic). The focus of this research is to understand the importance of ERM across different industries and its potentially positive impact on the performance of Canadian public companies.

A definition of ERM often used as a first benchmark by many in the business world and included in many annual company reports is developed in the terms of reference of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) published in 2004:

Enterprise risk management is 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, p. 4).

This definition touches on several aspects that are very relevant for all organizations that wish to be successful. This is because, as defined, the process of managing risks helps to achieve organizational objectives. Indeed, a component of the agency theory stipulates that controls and incentives must be put in place to protect shareholders who are interested in the growth of their assets and, therefore, short, medium and long-term strategies are developed in order to meet the expectations of stakeholders. The ability to achieve a corporate strategy, therefore, represents a fundamental characteristic of a so-called successful business and in theory, ERM positively impacts organizational performance.

The objective of this research is to analyze the effect of the way in which risks are managed by Canadian firms in different industries and the impact of this management on different levels of performance. The research question is, therefore, the following:

RQ: Do companies that manage risks better perform better, regardless of the industry?

The first hypothesis is:

H1: Companies that manage risks better are more efficient.

A total of five performance indicators will be studied, which are presented below. The second assumption is:

H2: The impact of ERM on business performance is industry-specific.

A total of five industries will be studied, these are presented below.

To conduct this research, a sample of 30 annual reports covering fiscal years ending in 2019 and 2020 of fifteen Canadian companies that trade on the Toronto Stock Exchange (TSX) was conducted. Five relevant industries were selected: the financial services industry, communications and media, public services and pipeline companies, real estate (specific to senior residences offering medical support or other medical centers) and finally, the mining industry.

For the ERM variables, the analysis of 4 types of risk was carried out. These are the global risks, the financial risks, the credit risks and the market risks. For the business performance variables, the analysis of 4 types of performance was carried out: operational performance, financial performance, stock market performance and finally societal performance.

In order to validate the research hypotheses, data collection, as well as descriptive statistical analyses, correlations and comparisons, were performed.

The subsequent sections of this document are as follows: Section 2 addresses the theoretical framework of ERM, business performance as well as the literature review of their relationship, Section 3 elaborates on the methodology adopted to carry out the study, Section 4 presents the analysis and interpretation of the results, and lastly Section 5 concludes the paper.

2. THEORETICAL FRAMEWORK

Firstly, theoretical concepts of ERM and business performance will be presented and then proceeded by a review of the literature related to the relationship between these two variables.

2.1. Enterprise risk management (ERM)

A risk can be defined as a specific uncertainty related to current or future situations and its management, as a vigorous process, comprising adequate mechanisms and relevant information, helping all companies to avoid unnecessary exposure to avoidable uncertainties (Naciri, 2011). Uncertainty in business includes two factors: risk which is the possibility of negatively impacting established goals and opportunities which are the possibility of positively impacting established goals (Hillson, 2002). For an ERM process to be adequate, it must be explicitly linked to business objectives (Power, 2009). Regardless of the type of organization, one of the starting points for any effective ERM program starts with corporate targets. It is from the entity's objectives that the entire practice of identifying potentially threatening events to their occurrence flows as well as the most relevant responses (control activities) to retain.

The possible responses to the identified risks are acceptance (doing nothing), elimination, mitigation (reducing the risk) and finally transferring the risk (taking out an insurance policy, for example). Elimination, mitigation and transfer occur through control activities. The risk-related control

that a company retains depends a lot on the risk aversion of decision-makers, the probability of a risk materializing and the quantitative or qualitative impact of the risk on the company's objectives. Risk aversion refers to the appetite for and tolerance for risk. Risk appetite represents the total load of risk that a company is willing to accept based on its risk-return trade-off against different scenarios studied and, risk tolerance refers to the total level of uncertainty that a company is willing to accept (Fox, 2012).

Several adaptable models are available for companies to assess the different risks surrounding their activities and then determine the threats that require the most attention. For example, the use of a risk matrix divided into various operational cycles and processes is a suitable methodology. The idea is to identify all the organizational objectives as well as the risks associated with them and then multiply their probabilities of occurrence as well as their impact on the entity to finally obtain a certain score or level of overall risk. Once the risk matrix is completed, ERM managers will be able to assess the different levels of overall risks identified in order to prioritize them. This prioritization will then guide the allocation of the necessary resources according to the risk response decided. This is why the use of a risk matrix is effective, it illustrates all the risks associated with all the different spheres of an organization. Other than a risk matrix, a large number of different tools exist among the multiple ERM repositories available.

It is important to stress that good ERM practices advocate a holistic approach and not a siloed management approach. Indeed, it is with an overview of all the risks affecting all the activities of the organization that senior management can adequately determine those that are the most significant (by using a risk matrix, for example). By delegating responsibility for ERM to the different heads of divisions within a company, the company exposes itself to many risks that would be counterproductive to the very purpose of ERM. Indeed, there could be risks that "fall between silos" that none of the silo managers would have identified, certain risks affect several silos in different ways and, therefore, while a silo manager could recognize a potential risk, they might not realize how important that risk is to other aspects of the business, individual managers may not understand how an individual response to a particular risk can impact others aspects of a business and ultimately, they focus on the risks of internal operations within the walls of the organization with minimal attention to risks that might emerge from the outside (Beasley, 2016). This is why communication is an extremely stressed factor in the majority of ERM repositories. Good ERM does not happen in isolation, it adds a dimension to the company and forces it to view its processes as an integrated whole that highlights the links between all types of risks faced (Naciri, 2011).

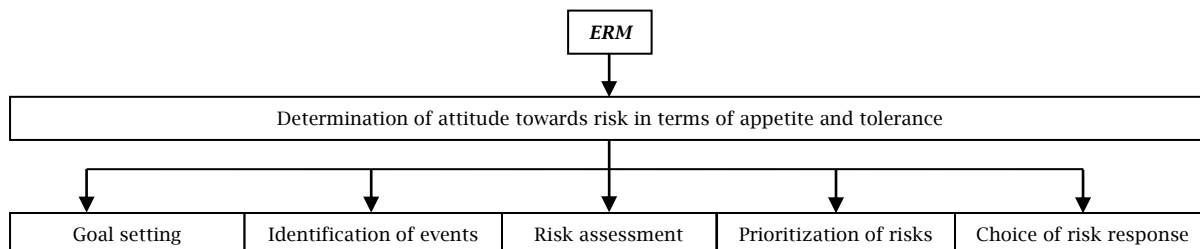
ERM is an orderly approach that helps determine the best decision to make in the event of uncertainty by identifying, analyzing, appreciating, communicating key questions and taking appropriate action on them (Naciri, 2011). ERM considers that the ultimate end of any business is value creation for all stakeholders and that,

throughout the value creation process, uncertainty is pervasive (Gendron, 2016).

The main components of the ERM process explained are listed in the following table. It is the match between the risk aversion of decision-makers and the stages of the ERM process that will

determine the necessary response to the identified risks. The basic steps in the ERM process are: setting goals, identifying events that potentially threaten to achieve goals, risk assessment, prioritization of risks and ultimately, choosing risk responses.

Figure 1. Main components of the ERM process



Source: Gendron (2016, p. 65).

In short, ERM is a tool to assess risks, order them and then prioritize them according to organizational objectives and risk aversion of decision-makers in order to develop the most appropriate control activities according to the circumstances (Gendron, 2016). The tone set by management in relation to how risks should be managed has a big influence on how the company will continue to operate in the pursuit of meeting organizational targets.

2.2. Businesses performance

Several performance indicators exist, and in the business world, analysts spend many hours and are paid large sums of money for their work to inform a number of stakeholders.

Assessing an organization's financial statements is a good starting point for any quantitative performance analysis. Indeed, through several performance indicators, users of financial statements will be able to make well-informed decisions. There are many stakeholders as well as decisions to be made. For example, an investor could be interested in the capacity of value creation of an organization having a positive impact on its return on investment, banks could be interested in the solvency of an entity to decide the conditions attached to granting a loan, a conglomerate with a strategy of mergers and acquisitions will want to know if an entity is making a profit, etc. There are many stakeholders and various performance indicators are more relevant to some than others depending on the decision at stake.

As Le Maux (2014) asserts, "the general principle of quantitative performance evaluation lies in the comparison between an accounting indicator expressing the results generated by the company and an accounting indicator relating to the means or capital committed by the company to generate these results" (p. 52).

Chapters of financial analysis are explicitly written with the aim of illustrating the most relevant variables to consider depending on the type of decision to be made. It is the combination of the analysis of these multiple indicators (financial ratios) that make it possible to determine whether a company as a whole is said to be successful. It is always relevant to compare the ratios calculated for

a given period to previous periods as well as to competitors in order to determine whether the company under study is really on the right track. Without this comparison, the user will not really have a full understanding of the performance of the given entity. Examples of financial indicators are, but not limited to: analysis of sales, margins, profitability and activity. However, there are other performance indicators that are not calculated from the outcome of a company's accountability process. Indeed, stock market performance is an example of interesting metrics that are driven by market supply and demand. Indeed, measures such as the volatility of a stock or the comparison of the price of the stock against competitors can be very relevant to decision-making. The performance indicators are numerous, and several books exist helping to understand which are the most relevant according to the needs.

Nowadays, the societal consequences of the activities of any business are increasingly scrutinized by the world. Companies that do not pay attention to the impact of their operations could experience a publicized ethical crisis which, regardless of the size and availability of resources of the given entity, could have phenomenal repercussions on reputation and or even harm the sustainability of the company. Banks even offer investment portfolios that are titled "socially responsible" for investors wanting to be careful not to encourage potentially unethical businesses.

According to a 2015 study, 73% of millennials were willing to pay extra for ethical and sustainable product offerings (Nielsen, 2015). Studies on the importance of corporate social responsibility (CSR) are numerous and as evidenced by the annual reports of several organizations, the sections dedicated to CSR are increasingly on the rise.

2.3. The relationship between ERM and business performance

Since the 2008 financial crisis, the relationship between investing in ERM and its influence on business performance has steadily gained in popularity. Before the crisis, the relationship between ERM and business performance was a topic of discussion but lightly studied. In 1963, the publication of the book "Risk Management in

the Business Enterprise” by authors Robert I. Mehr and Bob Hedges initially introduced the goal of risk management as maximizing the productive efficiency of the business (Mehr & Hedges, 1963).

Several benchmarks speak out on the purpose of ERM by claiming that it promotes business performance (Chen, Tsao, Hsieh, & Hu, 2019; Maruhun et al., 2021). Indeed, as defined by COSO in 2004, ERM aims to provide reasonable assurance that the organization's objectives are being met. The Basel Committee, responsible for global banking supervision, claimed that failure to carefully measure the risks associated with traded financial instruments caused significant losses for several banks during the global financial crisis in 2008 (Basel Committee on Banking Supervision, 2019). According to the principles established in ISO 31000-10, ERM creates and preserves value by making a tangible contribution to the achievement of objectives and improvement of performance (for example, in the area of health and safety of people and goods, compliance with legal and regulatory requirements, public acceptance, environmental protection, product quality, project management, operational efficiency and governance of the organization, as well as its reputation) (Canadian Standards Association [CSA], 2015).

Despite the many definitions of ERM mostly advocating all the positive impacts of properly managing risks on business performance, the relationship is not easily demonstrable in practice. ERM touches on several concepts, not all of which are observable, and no return on investment indicator can be easily calculated against threats avoided due to good ERM mechanisms. Take the example of a fire in a building that could easily cost thousands of dollars in damage, but which is extinguished by the recent investment in a sprinkler system installed on the ceilings of each floor.

Logically, the return on investment could be characterized by the difference between the costs that would have been caused by the damage and the costs incurred for the installation of the sprinklers. However, in the context of the business world, there is no added value for an organization to disclose estimates of avoided costs due to their ERM investments. No one can say for sure that the fire would have spread to all floors of the building before the firefighters could extinguish it and, therefore, the cost savings estimates may not be reliable.

This is why university studies or consultations are devoted to the analysis of the relationship between investment in ERM and business performance with the objective of answering questions about the relevance for organizations to devote precious resources to ERM mechanisms.

According to the literature review, previous studies do not appear to demonstrate consistent research findings regarding the positive or negative relationship of the effect of ERM on organizational performance. On the other hand, some have been able to statistically demonstrate the positive correlation between ERM and business performance and, conversely, other studies come to the conclusion that there is no observable relationship between both concepts.

The studies that were unable to identify a relationship between ERM and business performance are presented below.

No relationship could be demonstrated between the level of ERM information contained in annual reports versus different measures of organizational performance with respect to a study of non-financial companies from the TSX for the period from 2006 to 2009 (Quon, Zéghal, & Maingot, 2012).

A study examining the reaction of the stock price of different companies in different industries following the adoption of an ERM program found that there was generally no significant market reaction (positive or negative) following the adoption of an ERM program (Pagach & Warr, 2007). In addition, the same researchers also studied the effects of adopting an ERM program on long-term business performance, but again, they found little impact, although they found that some companies had experienced a reduction in the volatility of their earnings, as well as the volatility of stock returns (Pagach & Warr, 2010).

In 2008, a study using companies in the financial and non-financial sectors sought to test the hypothesis that a positive correlation existed between certain key performance variables and the adoption of an ERM program, but no significant relationship between the variables has been identified (Beasley, Pagach, & Warr, 2008).

In 2011, a study argued that the benefits of ERM are overstated and that it's an exaggerated practice (McShane, Nair, & Rustambekov, 2011). A study of banking sector companies listed on the Indonesian Stock Exchange for the period 2011 to 2013 indicates that ERM has no influence on the value of the firms studied (Agustina & Baroroh, 2016).

A study carried out on 33 companies listed on the Istanbul Stock Exchange for the period 2009 to 2015 was unable to demonstrate the effects of an ERM program on company performance (Şenol & Karaca, 2018). Indeed, the study affirms that the ERM had no effect on the value of analyzed firms, no effect on the value of the share price on the market compared to the book value (price to book, *P/B*), no effect on return on assets (*ROA*) and ultimately no effect on stock price stability.

A 2015 study of 208 small and medium-sized enterprises (SMEs) located in the United Kingdom/the North of Ireland could not demonstrate a positive relationship between the two variables (Lukianchuk, 2015).

Some studies have been able to identify a relationship between ERM and business performance.

Standard and Poor's rating agency claimed in 2007 that ERM became a differentiator among major U.S. insurance companies in the aftermath of Hurricane Katrina, which occurred in 2005 and cost insurers over \$41 billion. The agency argued that when reviewing credit ratings immediately after the event, insurance companies with stronger ERM processes were able to estimate their losses as quickly as possible, which were less than 25% of the actual claims. The agency further noted that, on the contrary, insurance companies with weaker ERM processes suffered losses twice as high as they had previously reported as their “maximum probable

loss" and, even, several days after the event, could not reliably estimate their losses.

A 2009 study of 112 American companies affirmed that the relationship between ERM and business performance depends on 5 contextual factors: the uncertainty related to the environment of the given company, the competitiveness of the industry, firm size, business complexity and ultimately board oversight (Gordon, Loeb, & Tseng, 2009).

The study of the effects of adopting an ERM program on the performance of companies operating in different industries has shown a strong relationship between the adoption of ERM mechanism and stock market performance measured over one year (Gordon et al., 2009). The same conclusion was demonstrated in a similar study carried out in 2010, in the banking industry as well as the insurance sector, where a significant relationship is demonstrated between the implementation of an ERM program and the value of a given firm (Hoyt & Liebenberg, 2011). A 2015 study examined the impact of implementing an ERM program on the performance of listed companies in Malaysia and found that a positive relationship existed (Ping & Muthuveloo, 2015).

In 2017, a positive relationship was demonstrated in the Nigerian banking industry between the implementation of an ERM program and business performance as measured by return on average equity, return on the share price as well as the value of firms (Soliman & Adam, 2017).

In short, the literature review seems to show that the results of previous studies with respect to the relationship between ERM and company performance are not consistent; many claim a positive correlation exists and others claim the opposite.

3. RESEARCH METHODOLOGY

According to the literature reviewed, it is clear that a relationship between ERM and business performance is not always demonstrable. As part of this study, we will analyze the effect of ERM, measured by global risk, financial risk, credit risk and market risk on organizational performance which, in turn, is measured by the operational, financial, stock market and societal indicators. The analysis is carried out on 15 entities listed on the TSX for the period of 2019 and 2020. This method is adopted with the aim of answering the research question: "Do companies that manage risks better perform better, regardless of the industry?".

This section of the study explains the research methodology used to attempt to confirm the hypotheses developed and will include a presentation of the samples selected, the source of the studied data and details concerning the measures and variables used.

From the outset, a descriptive analysis of the data will be carried out to highlight the means and standard deviations of each of the ERM and business performance variables. The objective will be to determine if there is homogeneity in the samples in order to then possibly compare the means between the variables. If the means are

not considered representative of all the populations, they will not be compared.

Subsequently, an analysis of the correlation coefficients r , as well as the coefficients of determinations r^2 , will be carried out with the aim of assessing the relationship between the different variables of ERM and business performance regarding the various industries studied; an industry comparison will also be made.

3.1. Presentation of the sample

To carry out this study, a sample of 30 annual reports covering the fiscal years ending in 2019 and 2020 of fifteen Canadian companies that trade on the TSX will be made. Five relevant industries have been selected from which we will analyze 3 companies per industry. The industries of analysis are the financial services industry, communications and media, utilities and pipeline companies, real estate (specific to the retirement center/residence providing medical support) and finally, the mining industry. The five industries were chosen with the objective of spreading our appreciation of the relationship between ERM and business performance through the analysis of various industries and not necessarily with the aim of analyzing the industries having the greatest monetary impact on the stock market.

For each chosen industry, we divided the three samples according to their sizes (large, medium and small) measured by the market capitalization specific to each industry. This stratification allows the objective identification of the relationship between ERM and business performance, regardless of the size of the organization. In other words, having only chosen leaders in each of the 5 industries, the relationship identified between ERM and business performance would not necessarily have been representative of the entire population.

Table 1. Samples by industry and their sizes according to the market capitalization of the sector

<i>Industry</i>	<i>Business</i>	<i>Size</i>
Financial services	Royal Bank of Canada	Large
Financial services	Bank of Nova Scotia (The)	Medium
Financial services	National Bank of Canada	Small
Communications and media	Bell Canada	Large
Communications and media	TELUS Corporation	Medium
Communications and media	Shaw Communications Inc.	Small
Public services and pipelines companies	Enbridge Inc.	Large
Public services and pipelines companies	TC Energy Corporation	Medium
Public services and pipelines companies	Hydro One Limited	Small
Real estate (specialized)	Chartwell Retirement Residences	Large
Real estate (specialized)	Extendicare Inc.	Medium
Real estate (specialized)	Medical Facilities Corporation	Small
Mining	Barrick Gold Corporation	Large
Mining	Wheaton Precious Metals Corp.	Medium
Mining	HudBay Minerals Inc.	Small

3.2. Data source

The financial statements and annual reports of the samples were downloaded from the websites of the sampled companies or through SEDAR (the System for Electronic Document Analysis and Retrieval) that is the system used for electronically filing most securities-related information with the Canadian securities regulatory authorities.

In addition, *Bloomberg and Investor* databases were used to extracting the different data used.

3.3. ERM measures as well as the variables used

We will use four ERM variables to capture how different risks are managed by different industries and companies.

Table 2. Variables to measure ERM

<i>Nomenclature</i>	<i>Nature</i>	<i>Variables</i>	<i>Measures</i>
<i>ERM_1</i>	Qualitative	Global risk	Disclosed information (annual reports)
<i>ERM_2</i>	Quantitative	Financial risk	Debt ratio (liabilities/equity)
<i>ERM_3</i>	Quantitative	Credit risk	Allowance for doubtful accounts divided by receivable
<i>ERM_4</i>	Quantitative	Market risk	Stock price volatility (beta coefficient)

Four variables were chosen with the aim of diversifying the measures used in order to obtain the greatest possible significance in relation to the quality of the results for this study.

With regard to the *global risk (ERM_1)*, we will complete a 10-question questionnaire during our readings of the various annual reports of the selected companies. The objective will be to assign a "score" out of 10 in order to identify the level of importance given by company governance in relation to ERM. The higher the score obtained, the more importance the entity attaches to ERM. This practice is acceptable since the questions are predetermined (each giving 1 point out of 10) which allows the analysis to be objective, leaving no room for arbitrary scores.

Additionally, good ERM disclosures can provide information to investors to assess the quality and potential volatility of earnings and cash flow of the respective company and, therefore, it is relevant for companies, especially listed ones in the stock market, to include a large volume of ERM disclosures (Beretta & Bozzolan, 2004). In other words, a company capable of revealing good ERM in its annual reports indicates that it is able to manage the risks related to the various activities implemented (Agustina & Baroroh, 2016). The following questions are those that are deemed relevant for our study, each giving a maximum of 1 point out of 10:

Table 3. ERM questionnaire

<i>ERM_1</i>	<i>Information disclosed in the annual reports</i>
<i>Quest_1</i>	Is there an ERM committee or equivalent? (1 point)
<i>Quest_2</i>	Does the report mention the use of an ERM framework? (1 point)
<i>Quest_3</i>	Does the report indicate the main risks? (1 point)
<i>Quest_4</i>	Does the report mention controls to address significant risks? (1 point)
<i>Quest_5</i>	Does the annual report indicate the potential impact of the main risks? (1 point)
<i>Quest_6</i>	Does the annual report mention different scenarios (or projections) that are analyzed internally in relation to the potential impacts of risks? (1 point)
<i>Quest_7</i>	Does the annual report indicate that ERM training is provided to ensure the identification of new potential risks? (1 point)
<i>Quest_8</i>	Does the report indicate an ERM manager? (1 point)
<i>Quest_9</i>	How many pages address ERM? (0.25, 0.5, 0.75 or 1 point)
<i>Quest_10</i>	How many paragraphs does ERM cover? (0.25, 0.5, 0.75 or 1 point)

To measure the level of *financial risk (ERM_2)* of the different samples, the debt ratio will be analyzed (debt to equity). The debt ratio helps understand the financial structure of an organization. This ratio is one of the financial characteristics most disseminated in the press and discussed by specialists allowing to estimate the financial risk attached to a company; information that is relevant when making an investment decision (Le Maux, 2014).

A higher debt ratio means more financial risk and, on the contrary, less debt corresponds to a low risk (Blanchette, 2012). The debt ratio is a variable that makes it possible to assess the solvency of a given company (Le Maux, 2014). A company's level of solvency represents its ability to pay its debts. Here is the formula used to calculate the debt ratio:

$$\text{Debt rate} = \frac{\text{Financial debt}}{\text{Equity}} \quad (1)$$

Credit risk (ERM_3) (or default risk) is the risk that a debtor will default on its obligations under a debt instrument, including by not making payment of interest or principal when they are due to the company (Le Maux, 2014). In order to measure how well a sample manages its credit risk, an analysis of the total amounts of the allowance for doubtful accounts (IFRS 9) compared to the total amount of the account receivable will be made. This makes it possible to assess the monetary portion that an entity expects not to recover from its customers. Therefore, the higher the ratio, the higher the credit risk.

$$\text{Credit risk} = \frac{\text{Allowance for doubtful accounts} * 100}{\text{Accounts receivables} * 100} \quad (2)$$

Finally, the way in which *market risk (ERM_4)* is managed will be assessed through an analysis of

the beta coefficient. This coefficient is a measure of the volatility of security compared to the volatility of a stock market index (TSX for this study) and for most stocks, the beta coefficient is between 0.2 and 3 (Morissette, 2011). A beta coefficient of 1 means security without risk (for example, a Canadian Treasury bill), a coefficient below 1 indicates that the returns of security are less volatile than those of the market as a whole and, conversely, a coefficient above 1 means that the returns of a given security are more volatile than those of the market as a whole (Morissette, 2011).

In other words, the higher the beta coefficient, the more volatile the security and, therefore,

the market risk is increased. The beta coefficient is calculated by the ratio of the covariance between the profitability of a portfolio (R_p) (or security) and that of the market (R_m), by the variance of the implicit profitability of the market (R_m):

$$\text{Beta coefficient} = \frac{\text{Cov}(R_p, R_m)}{\text{Var}(R_m)} \quad (3)$$

3.4. Performance measures and variables used

We will use four variables that will measure different types of business performance.

Table 4. Business performance measures

Nomenclature	Nature	Variables	Measures
PERF_A	Quantitative	Operational performance	Change in sales
PERF_B	Quantitative	Financial performance	Return on assets (ROA)
PERF_C	Quantitative	Stock market performance	Stock price/Book value
PERF_D	Qualitative	Societal performance	Disclosed information (annual reports)

With regard to *operational performance* (PERF_A), the analysis of the variation in sales from 2018 to 2019 and from 2019 to 2020 will be carried out. This measure is adequate since it directly reflects the company's effectiveness in gaining market share and maintaining a competitive advantage. The relevant formula for calculating the change in turnover is as follows:

$$\text{Change in sales} = \frac{\text{Current year sales} - \text{Previous year sales}}{\text{Previous years sales}} \quad (4)$$

The assessment of the *financial performance* (PERF_B) of a company requires the use of a measure of profitability. The profitability analysis aims to assess the ability of the company to make profits from its resources (assets or equity) (Blanchette, 2012). Return on equity (ROE) helps investors gauge how their investments are generating income, while ROA helps investors measure how management is using its assets or resources to generate more income.

Since the objective of this study is to analyze the effects of risk management on business performance, it is more relevant to retain ROA as an indicator, because it is more focused on management decision-making (invest or divest) who are responsible for ERM and not the investors. A high return on assets is preferable since it means that total assets bring in a greater profit (Blanchette, 2012). The relevant formula for calculating the return on assets is:

$$\text{ROA} = \frac{\text{Net profit}}{\text{Total assets}} \quad (5)$$

To continue, in order to analyze the *stock market performance* (PERF_C) of a sample, the use of the ratio of the share price divided by the book value, price to book (P/B) will be relevant. P/B is

a financial ratio used to compare a company's current market value to its book value. If the P/B ratio is below 1.0, this means that the stock is trading on the stock market at a price lower than its book value and vice versa, the more the P/B is above 1.0, the more the stock is traded at a price above book value. However, the standard of a "good P/B value" varies by industry, but for the sake of simplicity and for our study, we will consider that the higher the ratio, the better the stock market performance. The relevant formula is the following:

$$\text{P/B} = \frac{\text{Share price}}{\text{Book value of the share}} \quad (6)$$

Finally, at the level of *societal performance* (PERF_D), we will complete a questionnaire of 10 questions during our readings of the various annual reports of the companies chosen. The objective will be to assign a "score" out of 10 in order to identify the level of importance given by company governance with regard to its image. Many empirical studies come to the conclusion that a positive influence exists for companies that have a good societal performance in regard to economic performance (Fouda, 2011). It is, therefore, reasonable to suggest that a company able to indicate the societal considerations of its activities in its annual report is able to better manage the various aspects related to the achievement of the desired performance.

Therefore, the higher the score granted, the more we will consider that the company attaches importance to the impact of its activities on society, meaning that its societal performance is increased for this research. This practice is acceptable since the questions are predetermined (each giving 1 point out of 10) which allows the analysis to be objective, leaving no room for arbitrary scores. The following questions are those that are deemed relevant for our study, each giving a maximum of 1 point out of 10:

Table 5. Social performance questionnaire

<i>PERF_D</i>	<i>Information disclosed in annual reports</i>
<i>Quest_1</i>	Does a CSR committee (or equivalent) exist? (1 point)
<i>Quest_2</i>	Does the report mention the use of a code of ethics? (1 point)
<i>Quest_3</i>	Is a quality certification obtained (or equivalent), an award won or testimony of CSR activities mentioned? (1 point)
<i>Quest_4</i>	Is a CSR/sustainability strategy (or equivalent) indicated in the report? (1 point)
<i>Quest_5</i>	Are the societal consequences resulting from the main activities indicated? (1 point)
<i>Quest_6</i>	Does the annual report refer to another report (sustainability report) or other disclosure issued by the organization specific to CSR or the equivalent? (1 point)
<i>Quest_7</i>	Does the report mention the controls in place for the societal consequences related to the company's activities? (1 point)
<i>Quest_8</i>	Does the report mention the creation or support of a foundation, charity or equivalent to support a philanthropic cause? (1 point)
<i>Quest_9</i>	How many times are the words: protection, environment, community, social and sustainable mentioned in the report? (0.25, 0.5, 0.75 or 1 point)
<i>Quest_10</i>	Does the report indicate an amount invested for a philanthropic cause? (1 point)

4. RESULTS ANALYSIS

4.1. Descriptive statistics

A descriptive statistical analysis over two years (2019 and 2020) of ERM variables and business performance variables was made.

For each of the 8 variables analyzed (*ERM_1* to *ERM_4* and *PERF_A* to *PERF_D* in Tables 6 and 7

below), we calculated the average, the minimum (Min), the median, the maximum (Max) as well as the standard deviation for all 15 samples; this was done for the year 2019 and 2020. A comparison of the variation of the averages as well as the standard deviations of the two years is presented in Table 8 in order to understand the impacts of the COVID-19 pandemic on the variables studied.

Table 6. 2019 ERM variables and performance report

<i>Sector</i>	<i>Sample</i>	2019							
		<i>ERM variables</i>				<i>PERF variables</i>			
		<i>ERM_1</i>	<i>ERM_2</i>	<i>ERM_3</i>	<i>ERM_4</i>	<i>PERF_A</i>	<i>PERF_B</i>	<i>PERF_C</i>	<i>PERF_D</i>
Financial services	Royal Bank of Canada	10.00	0.12	0.50	0.97	0.17	0.90	1.95	8.75
Financial services	Bank of Nova Scotia (The)	10.00	0.11	0.85	1.11	0.15	0.73	1.41	7.50
Financial services	National Bank of Canada	10.00	0.14	0.46	1.05	0.12	0.78	1.84	8.75
Comm & Media	Bell Canada	6.25	1.25	3.49	0.48	0.01	4.95	3.19	7.75
Comm & Media	TELUS Corporation	7.50	1.76	3.05	0.56	0.03	4.52	2.88	8.75
Comm & Media	Shaw Communications Inc.	5.00	0.85	18.00	0.55	0.03	4.69	2.18	4.50
Utilities & Pipelines	Enbridge Inc.	5.00	0.99	0.96	0.95	0.08	3.57	1.80	7.50
Utilities & Pipelines	TC Energy Corporation	5.00	1.62	-	0.90	(0.03)	4.47	2.42	6.50
Utilities & Pipelines	Hydro One Limited	6.00	1.30	3.04	(0.09)	0.05	2.96	1.60	7.75
Real Estate	Chartwell Retirement Residences	5.75	2.90	37.46	0.71	0.06	0.03	3.56	5.50
Real Estate	Extendicare Inc.	7.00	4.82	4.11	0.17	0.01	3.22	6.95	0.50
Real Estate	Medical Facilities Corporation	2.50	1.07	10.78	0.91	0.02	(1.23)	0.92	0.25
Mining	Barrick Gold Corporation	5.50	0.26	-	(0.29)	0.34	7.58	1.54	10.00
Mining	Wheaton Precious Metals Corp.	4.75	0.16	-	(0.22)	0.08	1.37	2.50	4.25
Mining	HudBay Minerals Inc.	5.50	0.58	-	3.42	(0.16)	(7.71)	0.59	10.00
Parameters	Average	6.38	1.20	5.51	0.75	0.06	2.06	2.36	6.55
	Min	2.50	0.11	-	(0.29)	(0.16)	(7.71)	0.59	0.25
	Median	5.75	0.99	0.96	0.71	0.05	2.96	1.95	7.50
	Max	10.00	4.82	37.46	3.42	0.34	7.58	6.95	10.00
	Standard deviation	2.18	1.27	10.13	0.87	0.11	3.56	1.50	3.05

With regard to overall risk management measured by the information disclosed in annual reports (*ERM_1*), companies have a score between 2.5 (weak overall risk management) and 10 (strong risk management overall) out of a total of 10 points that can be awarded. On average, the samples scored a score of 6.38 out of 10 with a standard deviation of 2.18 which means that the average does not seem to reasonably represent the level of overall risk management of our sample. Indeed, by referring to Table 2, we can observe a non-homogeneous dispersion between the results of *ERM_1*.

In terms of financial risk management measured by the debt ratio (*ERM_2*), companies have between a ratio of 0.11 (low level of debt) and 4.82 (high level of debt). On average, the observed debt

ratio is 1.20 with a standard deviation of 1.27. The standard deviation is important which means that the average is not necessarily representative of all the samples since some companies seem to be much more indebted than others.

In relation to credit risk management (*ERM_3*) measured through the ratio of doubtful debt reserve to total accounts receivable, the data ranges between 0 (no credit risk) and 37.46 (increased credit risk). The average is 5.51 with a standard deviation of 10.13, which means that the average is not representative of the level of credit risk management of all the samples. Indeed, some companies appear to have a much higher debt ratio compared to other organizations that illustrate a small portion of allowance compared to their total receivables.

In terms of market risk management (*ERM_4*), measured by stock price volatility (beta coefficient), the results behave between -0.29 (volatility inverted relative to that of the market) and 3.42 (very volatile relative to the market). The average is 0.75 with a typical deviation of 0.87. The majority (9 out of 15) of the companies studied seem to be managing their market risks well, falling below market volatility ($R_m = 1$) with the exception of a few stocks that are more volatile (3 out of 15) or inversely volatile (3 out of 15) to market. The average, therefore, does not represent the majority of the calculated results.

With regard to operational performance (*PERF_A*) measured by the variation in sales turnover (2018 to 2019), the data is between -16% (decrease in turnover) and +34% (increase in turnover). The average is a 6% increase compared to the previous year with a standard deviation of +/-11%. The standard deviation is quite large which means that the average is not representative of our portfolio of samples.

Regarding financial performance (*PERF_B*) measured by *ROA*, the data ranges between -7.71 (poor return) and 7.58 (good return) with a mean of 2.06 and a standard deviation of 3.56 which means that the mean does not seem to represent our samples reasonably well. Indeed, by referring to

Table 2, we can observe a non-homogeneous dispersion between the results of *PERF_B* compared to the financial performance of the different companies.

In relation to stock market performance (*PERF_C*), measured by the *P/B* ratio, the data is between 0.59 (poor performance) and 6.95 (good performance) with an average of 2.36 and a standard deviation of 1.50. The high standard deviation explains why the average is not necessarily representative of the entire population.

Finally, the societal performance (*PERF_D*) measured by the information disclosed in the annual reports has resulted between 0.25 (worse performance) and 10 (excellent performance) with an average of 6.55 out of 10 and a standard deviation of 3.05, which means that the average does not seem to reasonably represent the level of societal performance of our entire sample. Indeed, by referring to Table 6, one can observe an inhomogeneous dispersion between the results of *PERF_D*.

Table 7 below illustrates the data collected for the same samples and variables as Table 6. The only difference is the observed period which is now the 2020 fiscal year of the selected companies.

Table 7. 2020 ERM variables and performance report

Sector	Sample	2020							
		ERM variables				PERF variables			
		ERM_1	ERM_2	ERM_3	ERM_4	PERF_A	PERF_B	PERF_C	PERF_D
Financial services	Royal Bank of Canada	10.00	0.11	0.85	0.78	(0.09)	0.70	1.64	9.00
Financial services	Bank of Nova Scotia (The)	10.00	0.16	1.25	0.77	(0.06)	0.59	1.01	7.75
Financial services	National Bank of Canada	10.00	0.11	0.73	1.25	(0.06)	0.60	1.60	8.75
Comm & Media	Bell Canada	7.50	1.25	5.42	0.63	(0.04)	4.01	2.90	7.75
Comm & Media	TELUS Corporation	7.50	1.69	5.91	1.37	0.05	2.66	2.70	9.00
Comm & Media	Shaw Communications Inc.	5.00	0.97	21.64	0.84	0.01	4.26	2.11	5.00
Utilities & Pipelines	Enbridge Inc.	5.00	1.10	1.75	0.89	(0.22)	2.13	1.55	7.50
Utilities & Pipelines	TC Energy Corporation	5.00	1.58	-	1.00	(0.02)	4.90	1.77	6.50
Utilities & Pipelines	Hydro One Limited	6.00	1.37	5.99	0.67	0.13	5.93	1.63	9.00
Real Estate	Chartwell Retirement Residences	*5.75	3.43	66.97	1.43	0.02	0.43	3.29	5.50
Real Estate	Extendicare Inc.	7.00	4.40	3.58	1.25	0.03	5.63	4.91	0.50
Real Estate	Medical Facilities Corporation	2.50	0.97	9.01	0.85	(0.09)	(3.95)	1.35	0.25
Mining	Barrick Gold Corporation	6.50	0.23	-	0.66	0.30	2.22	1.74	9.00
Mining	Wheaton Precious Metals Corp.	4.75	0.03	-	0.64	0.28	8.52	3.28	5.25
Mining	HudBay Minerals Inc.	*5.5	0.71	-	1.73	(0.12)	(3.10)	1.08	10.00
Parameters	Average	6.67	1.21	8.21	0.98	0.01	2.37	2.17	6.72
	Min	2.50	0.03	-	0.63	(0.22)	(3.95)	1.01	0.25
	Median	6.50	0.97	1.75	0.85	(0.02)	2.22	1.74	7.75
	Max	10.00	4.40	66.97	1.73	0.30	8.52	4.91	10.00
	Standard deviation	2.32	1.25	17.20	0.34	0.14	3.35	1.06	3.00

Note: * The 2020 Annual Reports of Chartwell Retirement Residences and Hudbay Minerals Inc. were not yet available at the time of the study and a conservative assumption of allocating the same score as 2019 is deemed relevant for study purposes with respect to the global risk management variable (*ERM_1*) and of societal performance (*PERF_D*) both measured by the information disclosed in the annual reports. The other 2020 variables for these 2 companies could be calculated from the audited financial statements of Q4 (sum of Q1 to Q4) of each.

Instead of analyzing the parameters of each of the variables (as done in Table 6), it is more relevant to compare the means and standard deviations between the two years in order to then understand whether changes in the policy of ERM have affected different levels of organizational performance.

We will also be able to witness the tendencies of the variables that may have been affected by the repercussions of the COVID-19 pandemic. Table 8 below presents the comparison and is followed by an interpretation.

Table 8. Change in key ERM metrics and performance between 2019 and 2020

Parameter	ERM_1	ERM_2	ERM_3	ERM_4	PERF_A	PERF_B	PERF_C	PERF_D
2019								
Average 2019	6.38	1.20	5.51	0.75	0.06	2.06	2.36	6.55
Average 2020	6.53	1.21	8.21	0.98	0.01	2.37	2.17	6.72
Variation	(0.15)	(0.01)	(2.69)	(0.24)	0.06	(0.31)	0.18	(0.17)
2020								
Standard deviation 2019	2.18	1.27	10.13	0.87	0.11	3.56	1.50	3.05
Standard deviation 2020	2.18	1.25	17.20	0.34	0.14	3.35	1.06	3.00
Variation	(0.00)	0.02	(7.07)	0.53	(0.03)	0.22	0.45	0.05

The standard deviations of 2020 for all the variables and averages all seem significant and, therefore, the comparison of the means of 2019 compared to 2020 would not have any added value in terms of answering our research question that it is the companies that manage risks better that perform better regardless of the industry. A degree of the additional level of analysis is necessary, the following sections will, therefore, present an analysis of correlation as well as the comparison between the various variables of the ERM and the organizational performance between the different industries studied from the perspective of answering the research question.

4.2. Analysis of the correlations and comparison between ERM and business performance in the different sectors of activity

In order to appreciate the relationship between the different ERM variables and those of business performance, we performed 32 simple linear regression analysis. In Tables 10 and 11 (2019 and 2020), the ERM variables are independent while the performance variables are dependent in order to be able to statistically demonstrate whether ERM positively impacts business performance. The tables are summaries of the results by industry of our calculations. Pearson’s correlation coefficient *r* as well as the coefficient of determination *r*² are indicated. Pearson’s *r* coefficient calculates values between -1 and 1 and measures the linear relationship between two quantitative variables.

When the coefficient *r* is above 0, it means that the linear relationship is positive and the closer

the coefficient is to 1, the closer the degree of the relationship between the variation of one variable and that of another variable will be strong. When the coefficient *r* is below 0, it means that the linear relationship is negative and the closer the coefficient is to -1, the more the degree of the relationship between the variation of one variable and that of another variable will be strong. As for the coefficient of determination *r*², this calculates values between 0 and 1 and measures the percentage variation of *Y* (dependent variable) which is represented by its regression on *X* (independent variable).

In other words, *r*² measures how close each data point (in a scatterplot) is to the regression line and tells us how well the regression line predicts actual values. For example, an *r*² of 0.5 would mean that 50% of the results obtained for the dependent variable are explained by the levels of the independent variables. So, the more the *r*² is increased, the better the model will be able to predict the different impacts on the dependent variable when the independent variable fluctuates according to the formula:

$$PERF = ERM(a) + b \tag{7}$$

where the performance (*PERF*) represents the dependent variable and the *ERM* is the independent variable. The following table (presented in absolute values) is an example of a conventional approach to interpreting a correlation coefficient *r* (Schober, Boer, & Schwarte, 2018) as well as the coefficient of determination *r*² (Moore, Notz, & Flinger, 2013).

Table 9. Interpretation of Pearson’s correlation coefficients and coefficient of determination (*r*²)

Correlation <i>r</i>	Interpretation	Determination <i>r</i> ²	Interpretation
0.00-0.10	Negligible correlation	0.00-0.30	Very weak determination
0.10-0.39	Low correlation	0.31-0.50	Weak determination
0.40-0.69	Moderate correlation	0.51-0.70	Moderate determination
0.70-0.89	Strong correlation	0.70-1.00	Strong determination
0.90-1.00	Very strong correlation	N/A	N/A

The table also serves as a legend to easily understand the relationships demonstrated in Tables 5 and 6 and which are followed by an interpretation. It should be noted that for the ERM variables related to financial risk, credit risk and stock market risk (*ERM_2*, *ERM_3* and *ERM_4*), negative relationships (under 0) are relevant since more than its variables increased, the less well the associated risks are managed.

When interpreting the results, we will return to our two hypotheses. *H1* is that “companies that manage risks better are more efficient”. A total of five performance indicators will be studied, these are presented below. *H2* is that “the impact of ERM on business performance is industry-specific”. A total of five sectors of activity will be studied, these are presented below.

Table 10. Sector-specific r -correlation and r^2 determination analysis on ERM and corporate performance for the fiscal year 2019

Independent variable	Dependent variable	Global		Financial services		Comm & media		Utilities & pipelines		Real estate		Mining	
		r	r^2	r	r^2	r	r^2	r	r^2	r	r^2	r	r^2
X	Y												
ERM_1_2019	PERF_A_2019	0.33	0.11	0.00	0.00	0.27	0.07	0.29	0.09	0.05	0.00	0.02	0.00
ERM_1_2019	PERF_B_2019	-0.01	0.00	0.00	0.00	-0.39	0.15	-0.81	0.65	0.88	0.77	-0.11	0.01
ERM_1_2019	PERF_C_2019	0.10	0.01	0.00	0.00	0.68	0.46	-0.69	0.47	0.95	0.90	-0.87	0.75
ERM_1_2019	PERF_D_2019	0.45	0.20	0.00	0.00	0.96	0.91	0.65	0.43	0.29	0.08	1.00	1.00
ERM_2_2019	PERF_A_2019	-0.35	0.12	-0.69	0.48	0.33	0.11	-0.96	0.92	-0.21	0.04	-0.72	0.51
ERM_2_2019	PERF_B_2019	0.13	0.02	0.10	0.01	-0.46	0.21	0.60	0.36	0.97	0.95	-0.80	0.64
ERM_2_2019	PERF_C_2019	0.86	0.75	0.62	0.38	0.62	0.39	0.73	0.53	1.00	1.00	-0.96	0.91
ERM_2_2019	PERF_D_2019	-0.55	0.30	0.76	0.57	0.93	0.87	-0.76	0.58	0.03	0.00	0.68	0.47
ERM_3_2019	PERF_A_2019	-0.12	0.01	0.14	0.02	0.22	0.05	0.57	0.33	1.00	1.00	0.00	0.00
ERM_3_2019	PERF_B_2019	-0.08	0.01	-0.66	0.44	-0.09	0.01	-0.95	0.90	-0.42	0.18	0.00	0.00
ERM_3_2019	PERF_C_2019	0.21	0.05	-0.96	0.92	-0.95	0.89	-0.88	0.77	-0.26	0.07	0.00	0.00
ERM_3_2019	PERF_D_2019	-0.35	0.12	-1.00	0.99	-0.98	0.96	0.86	0.73	0.97	0.95	0.00	0.00
ERM_4_2019	PERF_A_2019	-0.58	0.34	-0.54	0.29	0.99	0.98	-0.25	0.06	0.45	0.20	-0.86	0.75
ERM_4_2019	PERF_B_2019	-0.81	0.66	-0.99	0.98	-0.96	0.92	0.78	0.61	-1.00	1.00	-0.92	0.85
ERM_4_2019	PERF_C_2019	-0.40	0.16	-0.91	0.83	-0.65	0.42	0.66	0.43	-0.98	0.96	-0.86	0.73
ERM_4_2019	PERF_D_2019	-0.35	0.12	-0.69	0.48	0.33	0.11	-0.96	0.92	-0.21	0.04	-0.72	0.51

With respect to the relationship between ERM and business performance variables across all business industries (globally), the study demonstrates only one significant correlation, and that is between the market risk managed (measured by the beta coefficient) on the financial performance (measured by the ROA). The coefficient of determination r^2 indicates that 66% of the variations in observed *PERF_B_2019* levels are caused by the *ERM_4_2019* variable, which means that the statistical validity of the model is moderate. By observing the relationship between the ERM variables and those of business performance for all of our samples, we cannot conclude that *H1* is valid.

For the financial services industry, a total of 4 significant relationships are observed. Indeed, a significant correlation has been demonstrated between credit risk management and stock market performance, societal performance and financial performance. Also, a significant correlation is observed between the management of market risk and its effect on stock market performance. For the 4 identified relationships, the r^2 determination coefficients are all above 83%, which confirms the statistical validity of the model for these variables. So, by observing the relationship between ERM variables and corporate performance variables for the financial services industry, we can conclude that some performance indicators are positively affected by ERM.

Continuing with the communication and media industry, a total of 4 significant relations are observed. Indeed, a significant correlation has been demonstrated between global risk management and societal performance, credit risk management and stock market performance, credit risk management and societal performance and finally between the market risk management and financial performance. For the 4 relationships identified, the r^2 determination coefficients are all above 89%, which confirms the statistical validity of the model for these variables. By observing the relationship between ERM variables and business performance variables for the communication and media industry, we can conclude that some performance indicators are positively affected by ERM.

A total of 4 significant correlations are observed for the utilities and pipeline company industry. Indeed, a significant correlation is

demonstrated between financial risk management and operational performance, credit risk management and financial performance, credit risk management and stock market performance and finally, stock market risk management and societal performance. For the 4 relationships identified, the determination coefficients r^2 are all above 77%, which confirms the statistical validity of the model for these variables. Moreover, a significant correlation is identified between financial risk management and its effect on societal performance. The coefficient of determination r^2 indicates that 58% of the variations in observed *PERF_D_2019* levels are caused by the *ERM_2_2019* variable, which means that the statistical validity of the model is moderate. Therefore, by observing the relationship between ERM variables and business performance variables for the utilities and pipeline company industry, we can conclude that some performance indicators are positively affected by ERM.

With regard to the specialized real estate industry, a total of 4 significant relationships are observed. Indeed, a significant correlation has been demonstrated between global risk management and financial performance, global risk management and stock market performance, market risk management and financial performance and finally, market risk management and stock market performance. For the 4 relationships identified, the coefficients of determination r^2 are all above 77%, which confirms the statistical validity of the model for these variables. So, by observing the relationship between ERM variables and business performance variables for the specialized real estate industry, we can conclude that some performance indicators are positively affected by ERM.

Finally, for the mining industry, a total of 5 significant relationships are observed. Indeed, a significant correlation has been demonstrated between global risk management and societal performance, financial risk management and stock market performance, market risk management and financial, stock market and societal performance. For the 5 relationships identified, the coefficients of determination r^2 are all above 73%, which confirms the statistical validity of the model for these variables. In addition, a significant correlation is identified between financial risk management and its effect on operational and financial performance.

Also, an important relationship is highlighted between market risk management and its effect on societal performance.

The coefficients of determination r^2 for these 3 relationships are all between 51 and 64%, which means that the statistical validity of the model is

moderate for these observations. By observing the relationship between ERM variables and business performance variables for the mining industry, we can conclude that some performance indicators are positively affected by ERM.

Table 11. Sectoral r -correlation and r^2 determination analysis on ERM and corporate performance for the period of 2020

Independent variable	Dependent variable	Global		Financial services		Comm & media		Utilities & pipelines		Real estate		Mining	
		r	r^2	r	r^2	r	r^2	r	r^2	r	r^2	r	r^2
X	Y												
ERM_1_2020	PERF_A_2020	-0.12	0.01	0.00	0.00	-0.08	0.01	0.82	0.67	0.98	0.97	0.12	0.02
ERM_1_2020	PERF_B_2020	-0.01	0.00	0.00	0.00	-0.62	0.38	0.71	0.50	0.96	0.91	-0.47	0.22
ERM_1_2020	PERF_C_2020	-0.06	0.00	0.00	0.00	0.97	0.94	-0.16	0.02	0.98	0.96	-0.62	0.38
ERM_1_2020	PERF_D_2020	0.50	0.25	0.00	0.00	0.95	0.91	0.92	0.84	0.29	0.08	0.69	0.48
ERM_2_2020	PERF_A_2020	-0.05	0.00	0.52	0.28	0.54	0.29	0.63	0.40	0.98	0.97	-0.95	0.89
ERM_2_2020	PERF_B_2020	0.17	0.03	-0.57	0.32	-0.97	0.94	0.75	0.57	0.96	0.92	-0.96	0.92
ERM_2_2020	PERF_C_2020	0.74	0.55	-1.00	1.00	0.62	0.39	0.97	0.95	0.98	0.96	-0.90	0.80
ERM_2_2020	PERF_D_2020	-0.52	0.27	-0.98	0.96	0.94	0.89	-0.33	0.11	0.28	0.08	0.85	0.72
ERM_3_2020	PERF_A_2020	0.00	0.00	0.33	0.11	0.11	0.01	0.62	0.38	0.35	0.12	0.00	0.00
ERM_3_2020	PERF_B_2020	-0.13	0.02	-0.38	0.14	0.60	0.36	0.48	0.23	-0.13	0.02	0.00	0.00
ERM_3_2020	PERF_C_2020	0.30	0.09	-0.96	0.93	-0.98	0.95	-0.43	0.19	-0.03	0.00	0.00	0.00
ERM_3_2020	PERF_D_2020	-0.22	0.05	-0.92	0.84	-0.94	0.89	0.99	0.99	0.99	0.99	0.00	0.00
ERM_4_2020	PERF_A_2020	-0.34	0.12	0.46	0.21	0.94	0.89	-0.58	0.33	0.92	0.84	-1.00	1.00
ERM_4_2020	PERF_B_2020	-0.43	0.18	-0.41	0.17	-0.91	0.83	-0.43	0.19	0.63	0.40	-0.85	0.72
ERM_4_2020	PERF_C_2020	0.13	0.02	0.47	0.22	0.00	0.00	0.48	0.23	0.71	0.50	-0.74	0.55
ERM_4_2020	PERF_D_2020	0.05	0.00	0.35	0.12	0.53	0.28	-1.00	1.00	0.77	0.59	0.67	0.45

In terms of the relationship between ERM and business performance variables across all industries (globally), the study shows no significant correlation. By observing the relationship between the ERM variables and those of business performance for all of our samples, we cannot conclude that $H1$ is valid.

For the financial services, a total of 4 significant correlations are observed. Indeed, an important relationship has been demonstrated between financial risk management and the stock market and societal performance. Also, a significant relationship is observed between credit risk management and the stock market and societal performance. For the 4 relationships identified, the r^2 determination coefficients are all above 84%, which confirms the statistical validity of the model for these variables. By observing the relationship between ERM variables and business performance variables for the financial services sector, we can conclude that some performance indicators are positively affected by ERM.

For the communication and media industry, a total of 6 significant correlations are observed. Indeed, an important relationship is demonstrated between global risk management, stock market and financial performance, financial risk management and financial performance, credit risk management and its effect on stock market and societal performance and finally market risk management and societal performance. For the 6 relationships identified, the determination coefficients r^2 are all above 83%, which confirms the statistical validity of the model for these variables. By observing the relationship between ERM variables and corporate performance variables for the communication and media industry, we can conclude that some performance indicators are positively affected by ERM.

Continuing with the utility industry and pipeline company, two significant correlations are observed. Indeed, an important relationship has been demonstrated between global risk management

and societal performance and market risk management and societal performance. For the 2 relationships identified, the r^2 determination coefficients are all above 84%, which confirms the statistical validity of the model for these variables. A significant correlation is observed between overall risk management and operational performance, but the coefficient of determination is 67%, which means that the statistical validity of the model is moderate for these observations. A significant relationship is also noted between overall risk management and its effect on financial performance, but the coefficient of determination is at 50%, which means that only half of the variations in observed $PERF_B_2020$ levels are caused by the variable of ERM_1_2020 , therefore, the statistical validity of the model is low. By observing the relationship between ERM variables and business performance variables for the utility and pipeline company industry, we can conclude that some performance indicators are positively affected by ERM.

For the specialized real estate industry, a total of 3 significant correlations are observed. Indeed, the study demonstrates an important relationship between global risk management and operational, financial and stock market performance. For the 3 relationships identified, the r^2 determination coefficients are all above 91%, which confirms the statistical validity of the model for these variables. So, by observing the relationship between ERM variables and corporate performance variables for the specialized real estate sector, we can conclude that some performance indicators are positively affected by ERM.

Finally, a total of 5 significant correlations are observed in the mining industry. Indeed, the study demonstrates an important relationship between financial risk management and operational, financial and stock market performance. In addition, a significant correlation has been demonstrated between market risk management and the stock market and societal performance.

For the 4 relationships identified, the determination coefficients r^2 are all above 72%, which confirms the statistical validity of the model for these variables. Also, a significant relationship is observed between market risk management and its effect on stock market performance. However, the coefficient of determination is at 55%, which means the statistical validity of the model is moderate for this relationship. By observing the relationship between ERM variables and business performance variables for the mining industry, we can conclude that some performance indicators are positively affected by ERM.

4.3. Comparison of 2019 and 2020 results

A total of 26 significant correlations between ERM and business performance are observed for the fiscal year 2019 compared to 23 for 2020. Overall (all sectors), the significant relationship demonstrated in 2019 could not be observed in 2020.

For the financial services industry, 4 significant correlations are observed for the two years. However, two correlations demonstrated in 2019 are not observed in 2020 and, vice versa, two correlations demonstrated in 2020 are not observed in 2019. Therefore, the 4 observed relationships do not include the same ERM and performance variables between both years.

For the communications and media industry, 4 significant correlations are observed in 2019 compared to 6 significant correlations in 2020. All the significant relationships of 2019 are still relevant for 2020 in addition to two new ones observed.

To continue with the utilities and pipeline industry, 5 significant correlations are observed in 2019 compared to 4 in 2020. Only one of the relationships was maintained during the two fiscal years.

For the specialized real estate industry, 4 significant correlations are demonstrated in 2019 compared to 3 for 2020. Two relationships are constant during the two years.

Finally, for the mining industry, 8 significant correlations are observed in 2019 compared to 6 for 2020. The 6 relationships demonstrated in 2020 are also observed in 2019.

We can, therefore, conclude that the COVID-19 pandemic does not seem to have had a significant impact on the number of significant correlations demonstrated between ERM and business performance.

5. CONCLUSION

The objective of this research was to analyze the effect of the way in which risks are managed by Canadian firms listed on the TSX in different industries and the impact of this management on different levels of performance. The research question was as follows: “Do companies that manage risks better perform better, regardless of the industry?”

$H1$ was that: “Companies that manage risks better are more efficient”. By analyzing the correlations obtained for all the samples for the 2019 and 2020 financial years, no significant relationship could be demonstrated between ERM and 5 performance indicators analyzed. However, with regards to $H2$ which was that: “The impact of ERM on business performance is industry-specific” this is validated. Indeed, several significant correlations have been demonstrated between each industry studied, these affecting different performance indicators depending on the industry.

A total of 26 significant correlations between ERM and business performance are observed for the fiscal year 2019 compared to 23 for 2020. In all studied industries, the significant relationship demonstrated in 2019 could not be observed in 2020. We can, therefore, conclude that the COVID-19 pandemic does not seem to have a significant impact on the number of significant correlations demonstrated between ERM and business performance.

These results make an academic contribution to the discipline of business administration, more specifically in terms of corporate governance in Canada. At the practical contribution level, this study bears witness to the importance attached to investing in ERM and aims to raise awareness among legislators or any other form of financial market authority to maintain ERM requirements in order to ensure proper continuous health for all companies.

The limitations of this study are the number of samples analyzed by industry and the number of variables analyzed in terms of ERM and business performance. Additional studies that would include a larger number of years, samples and variables could prove interesting and above all relevant in order to better understand the long-term consequences of the COVID-19 pandemic on the relationship between ERM and business performance.

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