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The Determinants of Firm-Level Enterprise Risk Management Adoption: Literature Review and Future Directions

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Abstract

As the business world grows in complexity, business leaders are resorting to a robust risk management approach known as enterprise risk management (ERM). ERM is a systematic approach to holistically managing an organisation's risks. Since its inception, scholars have been paying much attention to ERM implementation, with a particular focus on identifying its key determinants. Therefore, this study provides a comprehensive literature review on the determinants of ERM adoption. Research articles were distilled from Google Scholar and Scopus databases between 2003 and 2023. The existing literature highlights that firm size, institutional ownership, type of industry, profitability and the presence of a Big Four audit firm are key determinants of ERM adoption. Their significant positive effect validates this. Additionally, scholars underscore the importance of industrial diversification, earnings volatility, and internal audits due to their positive coefficient estimates. However, the impact of financial leverage, asset opacity, international diversification and stock price volatility remains inconclusive. The study suggests essential gaps, including new determinants, emerging contexts and methodological gaps for future research. Again, variables such as organisational culture and context, environment, social and governance and regulation could be considered to advance knowledge on the determinants of ERM adoption.

Keywords: Determinants; Enterprise Risk Management; Firm-level; Literature Review.

JEL classification: C80, G32, M00

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1. Introduction

Over the past two decades, enterprise risk management (ERM) has received much attention from scholars and industry practitioners. This is due to the growing dynamics in the business environment, which have led to highly volatile, ambiguous, complex and heightened business uncertainties. This exposes the weakness of the traditional risk management (TRM) system, which is no longer sufficient to deal with these complexities (Horvey and Odei-Mensah, 2023). Hence, a pressing need arises for a more robust and integrated approach to risk management, referred to as ERM. Compared to the TRM system, where firms manage risks in 'silos,' ERM aids firms to manage risks holistically. Thus,

it is the art and science of comprehensively managing an organisation's internal and external risks to minimise threats and maximise business opportunities. This suggests that ERM is essential for building resilience and improving firm performance (Pagach and Warr, 2010). Again, COSO (2004, p. 4) define ERM as 'A process, effected by an entity's board of directors, management and other personnel, applied in a 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.' This reveals that ERM is a top-level decision problem and extends throughout the organisation, starting from the top managers and flowing down to the lower-level managers. Again, ERM promotes proactive and prudent decision-making in determining emerging risks and opportunities (Gatzert and Martin, 2015). It also improves strategy selection by ensuring alignment with the organisation's vision, mission, and core values. This suggests that ERM implementation is of paramount importance to practitioners and academics. Hence, it is imperative to consider the factors influencing its adoption.

Studies on ERM have been conducted from diverse perspectives. Scholars mostly focus on the ERM-performance nexus (Gordon et al. 2009; McShane et al. 2011; Florio and Leoni, 2017; Horvey and Ankamah, 2020); ERM frameworks and components (Meulbroek, 2002; Lundqvist, 2014); and factors influencing ERM adoption (Liebenberg and Hoyt, 2003; Beasley et al. 2005; Hoyt and Liebenberg, 2008, 2011; Pagach and Warr, 2011; Farrell and Gallagher, 2015; Bohnert et al. 2019; Meskovic and Zaimovic, 2021; Bailey, 2022; Pan et al. 2023). While some scholars adopt a qualitative approach, others adopt a quantitative approach to investigate the performance and determinants of ERM. What emerges from the literature is the myriad of factors influencing ERM adoption. The determinant of ERM adoption is a multi-faceted phenomenon, encompassing different dimensions such as financial, asset and organisational characteristics. In this light, this study conducts a comprehensive review of the determinants of ERM adoption by consolidating the various firm-level factors considered in the literature. Understanding the reasons for ERM adoption is crucial as it influences firm growth and survival. Identifying these factors supports management decisions on how to manage them and the need to integrate ERM into a firm's operations. Hence, this review demonstrates the current body of knowledge in this research area and establishes the gaps in the existing literature, which provides a basis for further research.

Existing review studies offer deep insights into ERM. This includes Horvey and Odei-Mensah (2023), who provide a comprehensive and systematic review of the measurements and performance of ERM. They narrate that since there is no set method for quantifying ERM, researchers use a variety of proxies, with the majority relying on a dummy variable such as the appointment of a Chief Risk Officer (CRO) or ERM keywords. They also found enough evidence to support the assertion that ERM enhances firm value and that an advanced level of ERM implementation significantly improves performance. Regarding the determinants, Gatzert and Martin (2015), as far as we know, were the first to review the factors influencing ERM adoption. However, it is imperative to acknowledge the inherent limitations in their study, including the search period, scope, and narrow selection of the determinants considered. For instance, their review was based on seven studies published between 2003 and 2012 focusing on eight factors. Also, the context of their review was limited to the US and Malaysia. To broaden our knowledge on the essential factors steering ERM adoption, this study considers a more comprehensive and up-to-date review of the determinants of ERM adoption, surpassing the constraints in the previous study. This is because the factors that affect ERM adoption are diverse and are likely to vary according to context and period. Consequently, this paper identifies five additional determinants to those demonstrated by Gatzert and Martin (2015) while introducing new contexts such as Europe, Africa, Australia and North America. Given this, twenty-one (21) studies published between 2003 and 2023 are reviewed, focusing on thirteen determinants while reflecting on recent developments in this subject area. As a result, this study provides a more comprehensive understanding of the critical drivers of ERM adoption. This has several implications

for regulators, practitioners, businesses and scholars.

Google Scholar and Scopus were the main search engines used in selecting research articles. The review was based on the number of citations, geographical location, industry context, method of analysis, and the thirteen determinants. These determinants are reviewed based on their similarities and differences. According to the empirical findings, the majority of studies reveal that industrial diversification, earnings volatility, stock price volatility and internal auditor have a positive impact on ERM adoption, while size, institutional ownership, profitability, the Big Four auditors, and industry type were mostly seen to be statistically significant determinants. Other factors such as financial leverage, asset opacity, international diversification and firm complexity revealed mixed findings. The study suggests further research within new geographical contexts, as the US and Europe have been the leading contributors to research on ERM adoption. The rest of the paper is structured as follows. Section two describes our search strategy for collecting empirical studies. The presentation and discussion of the findings followed this. Section four discusses the main determinants of ERM adoption. The final section concludes and provides recommendations.

2. Methodology

2.1 Search Strategy and Data Sources

The study is based on a systematic review of the existing empirical literature on ERM determinants. We searched for and retrieved prior studies on the determinants using Google Scholar. The motivation for this search engine is due to its ease of accessibility, wide coverage and suitability for multidisciplinary research. The first step in the search process was to choose relevant keywords that capture the determinants of ERM. As a result, the keywords used to find scholarly papers were the “Determinants of enterprise risk management,” “Drivers of enterprise risk management”, and “Critical success factors of ERM adoption”. The first search was conducted on 17 April 2023, which produced initial hits of over 2,000 articles. This was then restricted to the publication years 2003 to 2023. The decision was based on the fact that the concept of ERM was first developed and made popular in the literature at the beginning of the 21st Century by Dickinson (2001), and the initial study on the determinants of ERM was published in 2003 (Liebenberg and Hoyt, 2003). Following this, a search was conducted on the first 30 pages of Google Scholar. Articles were sorted by reviewing their titles and abstracts and thoroughly reading the entire manuscript successively. To ensure that more recent articles were included in the study, an advanced search was conducted to include scholarly papers between 2013 and 2023. The final search was done on 7 January 2024. This produced a total of 15 articles.

Following this, a subsequent search was conducted in the Scopus database on 13 January 2024. Scopus is known for its extensive coverage and article search precision. It contains a vast archive of studies on an extensive range of disciplines, enhancing the diversity of a research phenomenon. Using a tailored search strategy based on keywords and insights from the Google Scholar search, relevant literature specific to the subject was found. This strategy aided in discovering 6 additional studies, resulting in a comprehensive dataset comprising 21 articles. This two-step approach was designed to improve the literature review’s comprehensiveness and reduce any potential bias from depending on one database. Through the integration of Google Scholar and Scopus, this study aimed to get a more comprehensive assessment of the present level of understanding in the domain of ERM determinants.

2.2 Journal Credibility

To ensure the journals’ credibility, authors were systematic in the selection of empirical studies. A three-stage criteria was used. First, journal articles were confirmed using Jeffery Beall’s list of predatory journals. This was done to ensure the trustworthiness of each article included in the study. Predatory journals were dropped. Second, the paper must be published in a peer-reviewed journal.

Third, the paper must be published in a journal listed in the Scimago journal ranking H index. Scimago reveals the importance of scholarly journals and citations received by that journal. It also has a wider coverage and provides a multidisciplinary database with index ratings for all journals based on Scopus/Elsevier's extracted data. This study makes an exception for one paper (Hoyt and Liebenberg, 2008) not listed in the aforementioned journals but included in this study due to their relevance and the number of citations received in the literature. The relevance of this paper is further motivated by the fact that it is published by the American Risk and Insurance Association (ARIA), which hosts two peer-reviewed journals (i.e., *Journal of Risk and Insurance* and *Risk Management and Insurance Review*). This process gave us a final sample of 21 papers for review.

2.3 Content Analysis

The empirical studies are analysed based on their citations, type of journals, geographical location, annual publications, data collection and analysis approach, estimation techniques and the thirteen (13) determinants of ERM adoption. The determinants are firm size, leverage, profitability, institutional ownership, industry type, external auditor type, financial slack, industrial diversification, asset opacity, international diversification, earnings volatility, stock price volatility, and internal auditor. The characteristics are used because of their frequency of appearance in the literature. These characteristics can be placed in three categories, namely: financial characteristics (Leverage, profitability, external auditor type, financial slack, stock price volatility, earning volatility and internal auditor), asset characteristics (firm size and asset opacity) and organisational characteristics (institutional ownership, industry type, industrial diversification and international diversification).

3. Presentation of Findings

3.1 Citation Analysis of Key Studies

This section examines the scholarly impact and influence of articles within this domain by assessing studies' citation patterns on ERM's determinants. According to the results presented in Table 1, Hoyt and Liebenberg (2011) emerged as the most cited paper in our study, recording a total number of 1,493 citations as of the last search period. This indicates that Hoyt and Liebenberg's (2011) paper has not only lasted but also acquired a reputation throughout time, confirming its status as a foundational work in the subject area. This is followed by Beasley et al. (2005), which garnered increased attention with a citation count of 1,129. The seminal work by Liebenberg and Hoyt (2003) received the third highest citation of 1,036, while Pagach and Warr (2011) recorded 609 citations. The results show that these authors are the most influential in the ERM literature. They also represent the pioneers of the ERM literature and provide a basis to explore this new paradigm further within the risk ecosystem. On the other hand, Pan et al. (2023) received no citations as of the period of this study. This may be attributed to the challenges encountered by recent articles to gain immediate widespread attention. Besides this paper, Rahmawati and Prasetyo (2020) and Zaimovic and Meskovic (2021) received the lowest recorded citations of 3 and 4, respectively. This also reflects the recent nature of their studies and contexts where the concept of ERM is still developing and gaining recognition among scholars and practitioners. Scholars should, therefore, be mindful of these trends when navigating and contributing to the ERM literature.

3.2 Type of Academic Journal

Figure 1 presents information on the journals that have contributed significantly to the area. The *Journal of Risk and Insurance* represents the leading scholarly publication outlet in research on the determinants of ERM adoption, recording 4 studies, representing 19% of the total sample. The preeminence of this journal, in terms of the number of publications in addition to its highest citations, as revealed in the previous section, demonstrates its central role as the primary platform for sharing influential research on the factors influencing ERM adoption. The second most influential publication

Table 1. Summary of Journal Articles and Citations

Author/citations	Title	Citations
Liebenberg and Hoyt (2003)	The Determinants of Enterprise risk management: Evidence from the appointment of a Chief Risk Officer	1,036
Beasley, Clune and Hermanson (2005)	Enterprise risk management: An empirical analysis of factors associated with the extent of implementation	1192
Hoyt and Liebenberg (2008)	The value of Enterprise Risk Management: Evidence from the US insurance industry	255
Hoyt and Liebenberg (2011)	The value of Enterprise Risk Management	1493
Pagach and Warr (2011)	The characteristics of firms that hire chief risk officers	609
Paape and Speckle (2012)	Adoption and design of ERM practices: An empirical study	449
Lin et al. (2012)	Enterprise Risk Management: strategic antecedents, risk integration and performance	189
Baxter, Bedard Hoitash and Zezebel (2013)	Enterprise Risk Management Program Quality: Determinants, Value Relevance and the Financial Crisis	516
Farrell and Gallagher (2015)	The evaluation implications of enterprise risk management maturity	374
Khan, Hussain and Mehmood (2016)	Why do firms adopt enterprise risk management (ERM)? Empirical evidence from France	104
Lechner and Gatzert (2018)	Determinants and value of enterprise risk management: Empirical evidence from Germany	242
Mardessi and Arab (2018)	Determinant of ERM implementation: the case of Tunisian companies	23
Ai et al. (2018)	The combined effect of ERM and diversification on property and casualty insurer performance	67
Bohnert, Gatzert, Hoyt and Lechner (2019)	The value and drivers of Enterprise risk management: evidence from ERM rating	102
Rahmawati and Prasetyo (2020)	Determinants on the extent of ERM disclosure in annual reporting: An Indonesian study	3
Abbas et al. (2021)	Determinants of ERM disclosure: Evidence from the insurance industry	72
Meskovic and Zaimovic (2021)	Risk management maturity, its determinants, and impact on firm value: Empirical evidence from the joint-stock companies in Bosnia and Herzegovina	4
Syrová and Spička (2022)	The impact of foreign capital on the level of ERM implementation in Czech SMEs	6
Oyewo (2022)	Enterprise risk management and sustainability of banks performance	20
Bailey (2022)	The relationship between CRO expertise, ERM quality and firm performance	34
Pan et al. (2023)	Does Enterprise risk management benefit manufacturing firms: Evidence from China	0

outlet is the European Journal of Finance, which represented 10% of the total sample. With one article each, many additional journals have made significant contributions to studying factors influencing the adoption of ERM. The presence of different publication outlets highlights the broader distribution of research across many scholarly platforms, showing that the ERM literature is found in various fields, mainly in the business, management, and accounting disciplines. It highlights the significance of these journals in influencing the scholarly landscape in this developing field and is a useful resource for scholars looking for reliable sources on the determinants of ERM adoption.

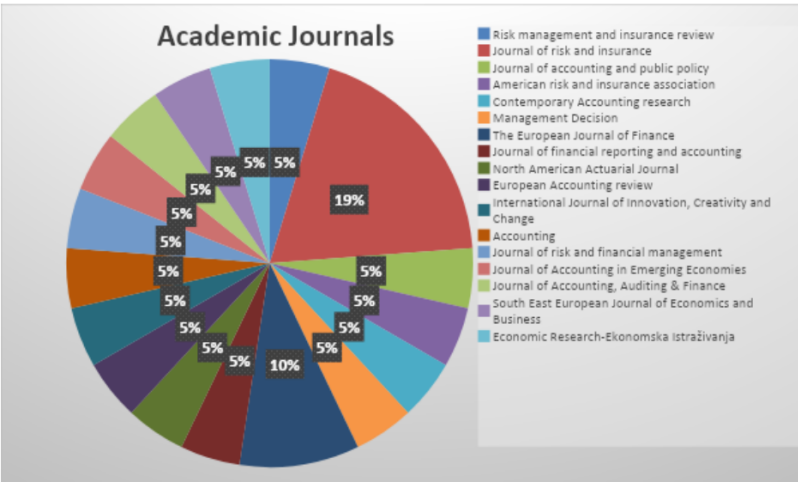


Figure 1. Types of Academic Journals

3.3 Active Contributors according to Geographical Context

The context of a study is essential because the geographical characteristics of countries are different. These will likely influence the study's findings due to differences in data, regulatory environments, cultural and other environmental characteristics. The geographical setting also mirrors the extent of recognition and growth on the topic. The review was based on twenty-one (21) research articles. Out of these, eleven (11) were from the US. Europe has also been a primary contributor to research in this area, recording studies from countries such as Germany, France, Croatia, the United Kingdom, the Czech Republic and Bosnia and Herzegovina. In addition, a cross-country analysis was conducted by Bohnert et al. (2019), who examined several European countries, while Farrell and Gallagher (2015) focused on different firms in the US, Canada, the UK, and Australia. Asia is represented by publications from Malaysia, Indonesia and China, while Africa records two publications, which are represented by Tunisia and Nigeria. The review shows that most of these studies concentrate on the US and European countries. This is not surprising, given that the concept of ERM developed and is very prominent in the US and European countries (Horvey & Odei-Mensah, 2023). This implies that ERM has not received the global attention it deserves, with little empirical effort in emerging economies such as Africa. Globalisation has exposed businesses in emerging economies to diverse risks, demanding a robust risk management system. Hence, we recommend further studies within other contexts to test the generalisability of these factors. Given the global interconnectedness of businesses, such studies will bridge an essential gap in the literature and inform regulators and policymakers about the policies that must be taken to promote a robust ERM system.

3.4 Annual Publications

Figure 2 shows the distribution of annual publications of relevant papers on the determinant of ERM adoption during the period covered by the study. The review shows several fluctuations in the number of peer-reviewed publications. The seminal work by Liebenberg and Hoyt (2003) is the only publication recorded in the first year of the sample period. The highest number of publications over the years was three papers, which were recorded in 2018 and 2022. Some of the years recorded no publication. The last six years have seen an increase in the research by eleven papers (i.e., 52% of total publications). Following the global economic crises and the pandemic in 2020, ERM has become essential to businesses that want to build resilience in this highly uncertain and complex economic environment. This might account for the growing interest that practitioners and scholars have shown in studying the determinants of ERM in recent years. Notwithstanding, the literature on determinants of ERM adoption is still limited and is projected to increase in the subsequent years due to the regulatory reforms occurring across businesses and different countries on the importance of a robust risk management system. Hence, there is a need for further investigation to examine the factors affecting ERM adoption in other contexts.

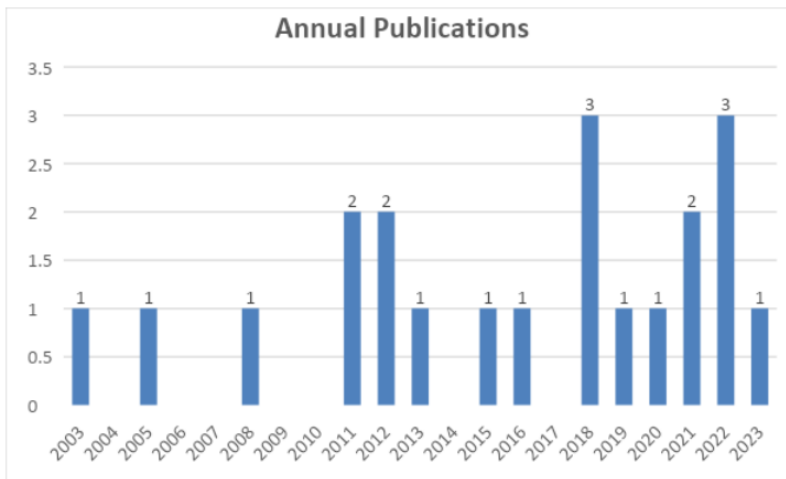


Figure 2. Year of Publications

3.5 Method of Analysis and Data Collection

According to the available literature, studies mostly adopt a quantitative approach for their empirical analysis. Panel and Cross-sectional regression were the main techniques employed to examine the determinants of ERM adoption. Secondary data was the main source of information for many scholars, while just a few relied on primary data. This may explain the lack of in-depth information regarding the adoption of ERM. The use of primary data may provide information on the specific events influencing firms to adopt ERM. It may also provide useful insights into the challenges associated with ERM adoption. Furthermore, we find that twelve (12) of these studies performed industry-specific analysis, with the majority considering the insurance industry. This is because insurers typically shoulder risk associated with individuals and other market segments, requiring a more robust risk management system (Bailey, 2022). Nine of these studies relied on a combination of financial and non-financial firms. This underscores the critical significance of the ERM concept for businesses, both financial and non-financial, given their universal exposure to risks (Horvey and Ankamah, 2020). Table 2 provides a summary of the research design and organisational contexts adopted by scholars.

Table 2. Analysis and data collection technique

Author	Approach	Data	Industry
Liebenberg and Hoyt (2003)	Quantitative/Cross sectional regression	Secondary data	Financial and Non-financial firms
Beasley et al. (2005)	Quantitative	Survey	Financial and Non-financial firms
Hoyt and Liebenberg (2008)	Quantitative/ Panel regression	Secondary data	Insurance
Hoyt and Liebenberg (2011)	Quantitative/Panel regression	Secondary data	Insurance
Pagach and Warr (2011)	Quantitative/Panel regression	Secondary data	Financial and Non-financial firms
Paape and Speckle (2012)	Quantitative Analysis /Cross-sectional	Survey	Financial and Non-financial firms
Lin et al. (2012)	Quantitative/Panel regression	Secondary data	Insurance
Baxter et al. (2013)	Quantitative/Panel regression	Secondary data	Banking and Insurance
Farrell and Gallagher	Quantitative/Panel regression	Secondary data/Survey	Financial and Non-financial firms
Khan et al. (2016)	Quantitative/Panel	Secondary data	Financial and Non-financial firms
Lechner and Gatzert (2018)	Quantitative/Cross sectional/ Panel regression	Secondary data	Financial and Non-financial firms
Mardessi and Arab (2018)	Quantitative/cross sectional	Survey	Financial and Non-financial firms
Ai et al. (2018)	Quantitative/Panel	Secondary	Insurance
Bohnert et al. (2019)	Quantitative/Panel Secondary data	Insurance	
Rahmawati and Prasetyo (2020)	Quantitative/Panel regression	Secondary data	Manufacturing companies
Abbas et al. (2021)	Quantitative/Panel regression	Survey	Insurance
Meskovic and Zaimovic (2021)	Quantitative/Cross sectional	Survey and Secondary	Financial and Non-financial
Syrová and Spička (2022)	Quantitative/cross sectional	Survey	Non-financial SMEs
Oyewo (2022)	Quantitative/Panel regression	Secondary data	Banks
Bailey (2022)	Quantitative/Panel regression	Secondary	Insurance
Pan et al. (2023)	Quantitative/Panel regression	Secondary	Manufacturing

3.6 Estimation techniques

Different techniques have been employed in the literature to examine the relationship between the dependent variable (ERM) and the independent variables (Determinants). Most of the studies used a logistic regression technique to analyse this relationship (Liebenberg and Hoyt, 2003; Beasley et al. 2005; Razali and Tahir, 2011; Farrell and Gallagher, 2015; Lechner and Gatzert, 2018; Ai et al. 2018; Bohnert et al. 2019; Pan et al. 2023), while Farrell and Gallagher (2015) used the probit model. The logistic and probit models were used because most studies rely on a binary variable to measure ERM. This is due to the difficulty in assessing ERM information; hence, scholars rely on simple proxies such as the CRO appointment or ERM keywords to measure ERM (Horvey and Odei-Mensah, 2023). While the logit and probit models are suitable for binary dependent variables, the study recommends using the marginal effect, which has been ignored in these analyses. The marginal effect explains the absolute change in the probability of an outcome resulting from a change in the independent variable while holding other factors constant (Hosmer et al. 2013). This improves the interpretability and applicability of logit and probit models. The maximum likelihood model was employed by (Hoyt and Liebenberg, 2008; 2011; Pan et al. 2023). Pagach and Warr (2011) and Khan, Hussain and Mehmood (2016) examined their variables using the Cox proportional hazard model, while Lechner and Gatzert (2018) used both the logistic and the hazard model. The benefit of this model is that it takes into account the time that a company implemented ERM. Paape and Speckle (2012) and Bailey (2022) also adopted the ordinal logistic regression technique to assess the factors that influence the extent of ERM implementation among firms in the Netherlands. This is motivated by using the S&P ERM ratings, which classify ERM implementation into four levels: 0=weak, 1=adequate, 2=strong and 3=excellent. Oyewo (2022) employed the Jonckheere-Terpstra test (J-T) for analysis. The J-T test was used due to its statistical strength in establishing the correlation between a continuous dependent variable (ERMI) and a categorical independent variable (the six bank features). Ai et al. (2018) used the two-stage least square estimation technique to account for endogeneity issues in the model. Rahmawati and Prasetyo (2020), Abbas et al. (2021), Syrová and Spička (2022), and Meskovic and Zaimovic (2021) used multiple regressions, cross-sectional and ordinary least square estimation techniques.

4. Determinants of ERM adoption

Scholars have applied several factors to identify the determinants of ERM adoption. According to the literature, various firm characteristics influence firms to adopt ERM. This study reviews empirical literature based on thirteen firm characteristics, as revealed in Table 3. The table provides details about the author, period, context, sample size, regression technique, ERM measurement and the thirteen firm characteristics. This study is limited to the thirteen variables because of their common usage in the empirical literature. Scholars examined these relationships on the assumption that the presence of these factors is more likely to influence firms to adopt and implement ERM.

4.1 Firm size

H₁: Companies with increasing firm size are more likely to adopt ERM

Firm size has received the greatest scholarly attention of all the variables that are commonly investigated in the literature as determinants of ERM adoption. The size of a firm reveals the extent of growth in its business operations, spanning multiple business units and functions. As firms increase in size, the scope and complexities of their operations increase as well. This complexity leaves them open to greater risks, affecting the nature, timing and extent of risks facing the firm. As a result, ERM is crucial for these firms since it allows them to identify and manage risks throughout the whole business systematically. Abbas et al. (2021) affirm this argument, stating that the larger the size, the higher the risk faced, including financial, reputational, operational, and regulatory risks.

Scholars generally measure this variable as the natural logarithm of total assets and provide much coherence in the results, showing that firm size is positively related to ERM adoption and maturity (Hoyt and Liebenberg, 2011; Rahmawati and Prasetyo, 2020; Meskovic & Zaimovic, 2021; Oyewo, 2022). Lechner and Gatzert (2018) submit that a proportionate increase in firm size leads to a rise in the number of risks. Hence, larger firms are more likely to adopt an ERM system as it helps to manage the risk associated with firm growth (Hoyt and Liebenberg, 2011; Gatzert and Martin, 2015). Furthermore, larger firms are more formalised and are able to channel enough resources towards their ERM implementation. In some cases, scholars such as Beasley et al. (2005) and Paape and Speckle (2012) used a firm's revenue as a proxy for firm size and also found a significant positive relationship. Syrová and Spička (2022) measured firm size using the interval of the number of employees, specified as 4–15, 16–49, 50–99 and 100–249 (using the last category as a reference point). This study also found a positive relationship, explaining that the level of ERM implementation increases as the size of the firm grows. The only exception is Liebenberg and Hoyt (2003), who found an inverse relationship, measuring firm size as the log of the book value of total assets over three years prior to CRO appointment and attributing this as the variance brought about by our failure to find a close enough match for each sample company. In summary, the literature finds consistency in the results as most of the studies reveal that firm size has a significant positive influence on ERM adoption (Hoyt and Liebenberg, 2008, 2011; Pagach and Warr, 2011; Farrell and Gallagher, 2015; Lechner and Gatzert, 2018; Bohnert et al., 2019; Pan et al., 2023). This supports the hypothesis that companies with increasing firm size are more likely to adopt ERM and implement it.

4.2 Financial leverage

H₂: Companies with increasing financial leverage are more likely to adopt ERM

Leverage is defined as the extent to which a firm finances its assets with debt. It is the use of financial instruments such as borrowed capital to expand firm assets. It is also a metric for assessing a company's capacity to pay short-term debts with its present assets or settle debts with its equity (Rahmawati and Prasetyo, 2020). Studies have shown that financial leverage is a major determinant of ERM adoption, as highly leveraged firms face higher financial distress. The greater the corporate leverage, the more dependent the firm is on external parties (creditors), increasing the risks of difficulties in meeting its financial obligations and interests (Abbas et al. 2021). On the other hand, firms may increase their leverage because of improved risk awareness (Bohnert et al. 2019). Scholars measure financial leverage as the ratio of total debt (liabilities) to asset capital (Hoyt and Liebenberg, 2011; Pagach and Warr, 2011; Lechner and Gatzert, 2018). Though leverage is found to be very significant, it has diverse relationships with ERM adoption. While some studies found a positive relationship (Liebenberg and Hoyt, 2003; Khan et al. 2016; Abbas et al. 2021; Meskovic and Zaimovic, 2021), others had a negative relationship (Hoyt and Liebenberg, 2008, 2011; Pagach and Warr, 2011; Lechner and Gatzert, 2018; Bohnert et al. 2019; Bailey, 2022; Pan et al. 2023). The positive relationship means that firms with high leverage are more likely to adopt an ERM system because high-leverage firms have high risks and a high propensity to go bankrupt. It also ought to be observed that in a highly leveraged firm, the risk of bankruptcy shifts from shareholders to creditors. In other words, creditors can continue controlling the firm, albeit with minimum investment, since creditors do not vote at the annual general meeting. Therefore, the pressure to adopt ERM in highly leveraged firms could also be linked to these dynamics. In contrast, the negative relationship implies that firms with ERM may reduce their financial leverage because they want to reduce the probability of financial distress (Hoyt and Liebenberg, 2011). Additionally, Abbas et al. (2021) explain that firms with high debt tend to be cautious in carrying out their operations, including risk management, because they demand a lot of funds. As a result, it is believed that businesses with external funding sources would favour allocating their resources to projects that align with their priorities to minimise the impact on risk management disclosure. Despite the mixed findings, leverage is believed to influence firms'

decision to adopt ERM. However, the literature has yet to reach a consensus on the direction of this relationship. The divergence could be attributed to the differences in measurement, sample size, contexts and estimations. Hence, further studies are needed to explore leverage's impact on ERM adoption.

4.3 Profitability

H₃: Companies with increasing profitability are more likely to adopt ERM Firm profitability is generally defined as how well a firm generates profits/revenue from its assets. Firm profitability is seen as a major contributing factor towards ERM adoption. It is believed that companies with higher profitability can channel more financial resources to fund their ERM system (Farrell and Gallagher, 2015). Lechner and Gatzert (2018) further submit that firms with a higher level of ERM maturity have improved performance, while firms with a higher level of performance are more likely to adopt ERM. This is affirmed by Bailey (2022) and Oyewo (2022), who argue that profitable firms typically possess greater resources, such as human and financial capital. Because of their strong financial position, they can invest in creating and implementing extensive ERM processes. They can set aside money for staff training, technology, risk management tools, training and other items required for a functional ERM framework. Most studies provide that profitability is best measured using return on assets, defined as the ratio of net income to total assets (Lechner and Gatzert, 2019). Khan et al. (2016) also used the market-to-book ratio as a proxy for performance and found a significant positive relationship confirming the assertion made by Farrell and Gallagher (2015) that highly profitable firms have sufficient resources to support an ERM system. However, Lechner and Gatzert (2018) found an inverse relationship, even though the multiplicative effect of the hazard ratio was relatively small. They argue that the number of resources needed for ERM implementation is high, which discourages more profitable firms from adopting ERM. Further empirical investigations are required to justify the impact of profitability on ERM adoption, as the evidence provided in the literature is insufficient to make any generalisable conclusion.

4.4 Institutional Ownership

H₄: Companies with higher institutional ownership are more likely to adopt ERM

Another factor identified in the literature as a determinant of ERM adoption is institutional ownership. Business organisations are characterised by diverse classes of ownership. This refers to the share ownership of the firm, specifically whether foreigners own the firm or not. It also delineates the manner and individuals in charge of the company's ownership and the management of its business operations (Abbas et al. 2021). It is argued that pressure from shareholders is an important driving force towards ERM adoption and implementation. According to proponents, shareholders gain from integrated risk management because it allows corporations to make better risk-adjusted decisions and raise company value (Paape and Speckle, 2012). This is mostly measured as a dummy variable that takes the value of one if owned by foreigners and zero if otherwise. The existence of external stakeholders is a significant determinant of ERM adoption (Pagach and Warr, 2011). This is because external stakeholders are primarily interested in receiving their return within a short period and, hence, are more likely to adopt ERM to manage any cost of financial distress. Syrová and Špička (2022) expand this argument by highlighting that foreign ownership is not only associated with financial inflows but also with knowledge and new practices in ERM and conclude that foreign ownership is positively associated with ERM implementation. Hoyt and Liebenberg (2011) measured institutional ownership as the percentage of shares owned by foreigners. They argue that firms with higher shares are more likely to adopt ERM because institutions have greater power and influence than individuals (Liebenberg and Hoyt, 2003). Paape and Speckle (2012) point out that institutional owners have a significant number of voting rights that can directly affect management decisions. In summary, the literature finds consensus that institutional ownership affects ERM adoption. This is

confirmed by the significant and positive relationship that was found in all the studies.

4.5 Industry type

H₅: Firms belonging to a particular industry are more likely to adopt ERM

Another factor found in the literature to influence ERM adoption is the type of industry to which a firm belongs. Some industries are exposed to high risk and are more regulated than others. This is particularly true for the financial sector, including banks and insurance companies. Additionally, while some industries face more complex risks and intense competition, others are less competitive and have a lower risk. Hence, firms operating in highly regulated environments with highly complex risks are likelier to adopt ERM (Hoyt and Liebenberg, 2011). This is supported by Paape and Speckle (2012), who further revealed that some organisations adopt ERM to meet regulatory requirements, such as solvency, governance and capital requirements. This aligns with the institutional theory, which explains that firms must implement ERM in a regulatory environment to withstand external influences (Powell, 1991). Scholars treat this variable as binary; however, the literature's focus on industry type is diverse. Existing studies focus on the banking, education and insurance sectors (Beasley et al. 2005; Hoyt and Liebenberg, 2011), financial services (Paape and Speckle, 2012), as well as the energy sector (Lechner and Gatzert, 2018). These studies assert that firms in any of these sectors are more likely to adopt and implement ERM. Thus, a significant positive relationship exists between industry type and ERM adoption (Beasley et al. 2005; Hoyt and Liebenberg, 2008; Gatzert, 2018; Meskovic and Zaimovic, 2021). In summary, this review found agreement in the evidence that industry type is a significant determinant of ERM adoption. This supports the hypothesis that firms belonging to specific industries are more likely to implement an ERM system.

4.6 External Auditor type

H₆: Companies that are audited by one of the Big four auditing firms are more likely to adopt ERM

Literature also suggests that the type of external auditor a firm uses influences the adoption and implementation of ERM. There is a strong indication that firms audited by one of the Big Four audit companies (KPMG, Ernest and Young, Deloitte and PricewaterhouseCoopers) are more likely to adopt ERM (Beasley et al. 2005; Lechner and Gatzert, 2018). This is because these auditors want to ensure transparency and reliability in the firms they serve. They are also interested in maintaining their own reputation, promoting a wider audit scope and guaranteeing the quality of the business's internal controls (Rahmawati and Prasetyo, 2020); hence, they encourage their clients to adopt ERM. Furthermore, external auditors have a duty to ensure that the financial systems and internal controls within the firms they audit are consistent with the generally accepted accounting principles and norms. This applies to all organisations, with risk management being one of the key components. On the other hand, it is also plausible to argue that companies that hire these Big audit firms may be more devoted to risk management and good governance in general (Paape and Speckle, 2012). Researchers measure this variable using a binary representation, which is equal to one if the firm is audited by one of the Big four and zero if otherwise. The empirical studies broadly showed a positive relationship between firms audited by one of the big four auditing companies and ERM adoption (Paape and Speckle, 2012; Lechner and Gatzert, 2018; Bailey, 2022). Beasley et al. (2012) found this relationship to be statistically significant. The positive association could be explained by the fact that the Big Four audit firms are very knowledgeable and experienced in financial reporting, governance, and risk management. Their participation in the implementation of ERM provides a plethora of best practices, insights, and information that may greatly improve an organisation's risk management procedures. Contrarily, Rahmawati and Prasetyo (2020) revealed a negative relationship using the Big four and the non-Big four as proxies and asserted that the engagement of a Big Four audit firm does not guarantee a successful ERM implementation because the auditor profession may have different independent attitudes. Also, a supportive organisational

...Table 3 Continued

Author(s), year and setting	Journal	Methodology	Time Period	ERM Proxy	H ₁	H ₂	H ₃	H ₄	H ₅	H ₆	H ₇	H ₈	H ₉	H ₁₀	H ₁₁	H ₁₂	H ₁₃
Oyewo (2022) Nigeria	Journal of Accounting in Emerging Economies	Panel Regression/14 companies	2008-2017	ERM Index using COSO framework	***		***								***		
Bailey (2022) Nigeria	Journal of Accounting, Auditing & Finance	Ordered Logistic Regression/196 firms	2006-2012 rating	S&P ERM		-	***	+		+	+	****	+		***		-*
Pan et al. (2023) China	Economic Research-Ekon Istraživanja	Maximum Likelihood estimation	2010-2019	Dummy	****	***		***				+		-*	* * *	***	

NOTE: Where H₁ = Firm Size; H₂=Leverage; H₃=Profitability; H₄=Institutional Ownership; H₅=Industry type; H₆=External Auditor type; H₇ = Internal Auditor; H₈=Financial Slack; H₉= Industrial Diversification; H₁₀= Asset Opacity; H₁₁= International Diversification; H₁₂=Earnings volatility; H₁₃= Stock price volatility

culture, the active participation of staff members at all levels, and the leadership of the company are all necessary for the successful implementation of ERM. Furthermore, each organisation’s own needs and features will determine the precise type and extent of ERM implementation. Hence, organisations need to promote a risk-awareness culture and empower employees with the skills and resources crucial for the success of an ERM system. Considering the limited attention given to this variable, it is evident that there is a noteworthy gap in its importance in determining ERM adoption, which requires further investigation.

4.7 Internal Auditor

H7: Companies with an internal auditor are more likely to adopt ERM

Internal audit committees play an important role in the supervision of risk management practices at the firm level. Rizvi and Thomas (2013) posit that internal auditors are supposed to be involved in risk management because the work of an internal auditor is to ensure that firms comply with policies and adhere to good risk management principles and financial policies. Paape and Speckle (2012) make the additional point that internal auditors can influence the executive board to ensure that ERM receives great attention and that sufficient resources are committed to its implementation. Internal auditing standards have switched from internal controls to risk-based internal auditing. The new regulation introduces risk management as an important factor to be considered when evaluating a firm’s financial performance (Institute of Internal Auditors, 2004). They provide assistance in developing organisational risk framework, analysis, monitoring and review. According to available empirical reviews, the presence of an internal auditor has a significant positive relationship with ERM adoption (Baxter et al. 2013; Mardessi and Arab, 2018; Bailey, 2022), concluding that their presence reinforces how crucial a strong ERM framework is to accomplishing corporate goals and guaranteeing sustainability. They further provide insightful analysis, assurance, and suggestions that can improve an organisation’s capacity to recognise, evaluate, and successfully manage risks. Overall, the literature on internal auditor is scant, requiring further empirical analysis to validate the results.

4.8 Financial slack

H8: Companies with increasing high financial slack are more likely to adopt ERM

The term “financial slack” describes a company’s internal financial resources that are not allocated

to any specific project (Pan et al. 2023). It is also defined as the amount of highly liquid assets that a business has on hand and may use to make up a difference in operating cash flows (Pagach and Warr, 2010). It stands for the cushioning of a company's financial resources, which it may utilise to weather economic downturns, seek new investment possibilities, and pay for unforeseen bills. While financial slack may be a tool for creating possibilities, too much of it may create inefficiencies, as it may reduce return on assets and equity. Hence, it is crucial for companies to manage their financial slack using a robust risk management system (Bailey, 2022). It is often argued that firms with a robust risk management system have a high level of financial slack. This is because ERM adoption enables them to reduce the chance of financial distress (Hoyt and Liebenberg, 2011). On the other hand, it is also possible to reduce the level of a firm's financial slack due to a strong risk management system (Pagach and Warr, 2010). Studies used in this paper define financial slack as the ratio of cash plus securities to total assets (Pagach and Warr, 2011; Bailey, 2023; Pan et al. 2023). Farrell and Gallagher (2015) found an insignificant negative relationship, indicating that ERM users may feel less financial slack is needed due to their robust approach to risk management. However, most of the literature reveals a positive relationship between financial slack and ERM adoption, explaining that firms with high financial slack are more likely to employ ERM to reduce financial distress. However, we find no strong evidence to affirm this relationship as these relationships were mostly insignificant. Notwithstanding, the positive relationship supports the assertion that firms with a high level of financial slack have an improved risk management system.

4.9 Industrial diversification

H₉: Industrially diversified Companies are more likely to adopt ERM

Industrial diversification refers to the number of business segments a firm operates (Hoyt and Liebenberg, 2008, 2011; Lechner and Gatzert, 2018). Theory suggests that diversification has costs and benefits. Industrial diversification is believed to lead to higher performance and, in most cases, reduce operational risks (Hoyt and Liebenberg, 2008, 2011), but sometimes contribute to loss of information (Lechner and Gatzert, 2018). Even though industrial diversification is often considered a risk management strategy due to diversifying across different industries, it can also hurt performance due to the complexities in management, which can result in high risks (Ai et al. 2018). As a result, firms with more business segments are seen to be very complex and face higher risk, which influences their decision to implement an ERM system. Additionally, it is important to note that industrial diversification can lead to group risk. Group risk is a concept that was brought to the fore by the 2008 financial crisis, where the world's largest insurer, AIG, was brought to the brink of financial collapse by risk transmitted to the group through a subsidiary. Consequently, regulatory systems like Solvency II, which came into operation in 2012, pay specific attention to group risk. In the literature, this variable is assessed as a binary indicator equal to one if the firm is industrially diversified and zero otherwise (Hoyt and Liebenberg, 2008, 2011). The results from the empirical review support the hypothesis that there is a positive relationship between industrial diversification and ERM (Ai et al. 2018; Bailey, 2022), while Meskovic and Zaimovic (2021) found a significant positive relationship, suggesting that industrial diversification significantly influence ERM adoption. This affirms the assertion that ERM is arguably beneficial to diversified firms due to its complexities. Given the diversity of potential benefits of ERM, businesses with effective ERM systems may be better equipped to capture the value-enhancing implications of the diversification option, whereas those with weak ERM systems may not.

4.10 Asset Opacity

H₁₀: Companies with increasing asset opacity are more likely to adopt ERM

Another factor that is considered a determinant of ERM adoption is asset opacity. Asset opacity is the lack of transparency or clarity regarding a financial institution's assets' composition, quality,

or true value. To put it another way, it is the uncertainty or difficulty in ascertaining the actual nature and risk of a company's assets. The literature commonly expresses this variable as the ratio of intangibles to total assets (Lechner and Gatzert, 2018; Meskovic and Zaimovic, 2021; Pan et al. 2023), except for Liebenberg and Hoyt (2003), who treat it as binary, given a score of 1 if there is a difference between Moody and S&P ratings prior to the appointment of CRO and zero if otherwise. It is argued that firms with more opaque assets are not able to sell their assets in times of financial distress due to challenges of liquidation and information asymmetry and may not get a fair market value for their assets (Pagach and Warr, 2011). Therefore, they are more likely to adopt ERM as a support system. This is because ERM adoption reduces information asymmetry and ensures the flow of communication within the organisation and across to stakeholders. This reduces the uncertainties regarding the financial health of the firm. The relationship between asset opacity and ERM adoption remains uncertain, as scholars have revealed conflicting results. Not only that, asset opacity was mostly found not to be a significant determining factor for ERM adoption. Gatzert and Martin (2015) submit that the positive relationship is because ERM may result in a higher economic benefit for firms with greater opacity because risk experts ensure proper risk profiling communication and help avoid financial disagreement. This relationship is far from reaching a consensus and might be due to the different measures, sizes and estimations used for analysis.

4.11 International diversification

H₁₁: Companies that are internationally diversified are more likely to adopt ERM

Similar to the argument on industrial diversification, internationally diversified firms face higher complexities and risks due to the differences in the regulatory systems in the various countries in which they operate and have issues of coordination across borders, thereby leading to lower efficiency (Pan et al. 2023). This may also create agency problems, which will reduce the firm's value (Hoyt and Liebenberg, 2011). In turn, this increases the possibility of adopting ERM. ERM helps a particular firm's management to take a more diversified strategy since its research shows that the company has a unique capacity to manage across diverse locations, providing it a competitive edge and producing value (Ai et al. 2018). International diversification is measured as a dummy variable that takes the value of one when the firm has a subsidiary in another country and zero if otherwise. Our findings reveal that the relationship between international diversification and ERM adoption is ambiguous. Baxter et al. (2011) argue that internationally diversified companies are more likely to adopt ERM than non-internationally diversified companies. This assertion is supported by Lechner and Gatzert (2018), who found that internationally diversified companies have a significant and positive relationship with ERM adoption. Liebenberg and Hoyt (2003) also found that US companies with subsidiaries in Canada and the UK have a higher propensity to adopt ERM. Similarly, Bailey (2022) and Oyewo (2022) revealed that the scope of operations presents a significant positive association with ERM practice because international firms appear to have a more robust ERM system than local firms. On the other hand, Hoyt and Liebenberg (2008, 2011) found that firms that have businesses outside the US have an inverse relationship with ERM adoption. This is in line with the findings of Farrell and Gallagher (2015), who sampled the US and European companies and found that internationally diversified firms are less likely to have an ERM system. They also found this relationship to be statistically significant. Pan et al. (2023) support this view, which could be because the complexities associated with international diversification make it unified to adopt an integrated and effective ERM system. This suggests that the literature is not yet settled on the direction of this relationship, which might be due to the contextual differences, measurements and sample sizes. Hence, it is important to consider further investigation to elucidate and validate this result.

4.12 Earnings volatility

H₁₂: Companies with increasing earnings volatility are more likely to adopt ERM

The term “earnings volatility” describes how much a company’s earnings vary or fluctuate over a certain period. It calculates a company’s earnings deviation from the average or target level. It is argued that firms with an ERM system are more likely to experience lower volatility (Hoyt and Liebenberg, 2011). This is because ERM helps firms effectively manage the risks that cause variability in firm earnings. Hence, higher earnings volatility is more likely to influence firms’ decision to adopt ERM. Earnings volatility is measured as the coefficient of variation of the earnings before interest (EBIT). Pooser and McCollough (2012) and Khan et al. (2016) used the standard deviation of the firms’ returns to measure earnings volatility. The study provides enough consensus to the assertion that a positive relationship exists between earnings volatility and ERM adoption. For instance, Pan et al. (2023) found a positive relationship and indicated that firms with more volatile returns tend to adopt an ERM system. This suggests that firms with higher earnings volatility have a higher propensity to implement ERM because ERM helps reduce the firm’s cost of risks (Ai et al. 2018). The ERM technique decreases volatility by preventing risk from being aggregated across multiple sources. Almost all scholars agree that earnings volatility is essential to ERM adoption.

4.13 Stock price volatility

H₁₃: Companies with increasing stock price volatility are more likely to adopt ERM

Like earnings volatility, stock price volatility is also seen as a determinant of ERM adoption. Stock price volatility is defined as the degree of variations in the stock price returns over a given period. Thus, it measures the statistical dispersion of stock returns and offers information about the degree of risk or uncertainty attached to a specific stock. ERM manages the risks associated with variations in the stock price. With ERM, businesses may better manage market uncertainty, match plans to risk factors, and increase their overall resilience to changing market circumstances. Pagach and Warr (2011) hold the view that since stock price volatility is a proxy for operational volatility, firms with high volatile stocks benefit from introducing an ERM system. Stock price volatility is measured differently in literature. It is defined as the coefficient of variation of the stock returns by Liebenberg and Hoyt (2003) as the standard deviation of stock returns (Hoyt and Liebenberg, 2008; 2011; Baxter et al. 2013; Bohnert et al. 2019; Bailey, 2022), and as the average of the annual price movement (Khan et al. 2016). Most empirical studies support the assertion that stock price volatility is a good determinant of ERM adoption. This is shown to have a positive relationship with ERM adoption (Pagach and Warr, 2011; Hoyt and Liebenberg, 2011). However, Pooser and McCollough (2012), Khan et al. (2016), Bohnert et al. (2019), and Bailey (2022) discovered an inverse relationship between stock price volatility and ERM adoption. The relationship may vary within and across industries based on the sample size, method, period, and the measures employed as proxies for stock price volatility.

5. Conclusion and Recommendations

5.1 Summary and Conclusion

Since the beginning of the 21st century, scholars and practitioners have been paying attention to ERM implementation with particular emphasis on its determinants. Understanding these factors enhances the decision-making process and policies of firms on ERM implementation. Therefore, the objective of this study is to synthesise studies that have explored this topic. It contributes to the existing literature by expanding on previously identified factors and consolidating a comprehensive list of factors from more recent and more geographically diverse literature that contribute to ERM adoption. This overcomes the limitation of previous studies, whose scope was limited to fewer characteristics and a small sample of research articles. The study gathered information from Google Scholar and Scopus and was based on a review of 21 articles published between 2003 and 2023. The

literature review was based on the number of citations, geographical jurisdiction, industrial contexts, data collection method, estimation techniques and determinants. The review shows that the US and Europe have contributed substantially to the literature on ERM adoption. Empirical literature reveals various factors that serve as determinants of ERM implementation. Some of these factors differ based on the context and industry. They include size, leverage, profitability, institutional ownership, industry type, auditor type, financial slack, industrial diversification, asset opacity, international diversification, earnings volatility, stock price volatility, and the presence of an internal auditor. We found that most empirical studies relied on a simple proxy for ERM implementation, such as hiring a CRO or ERM keywords. The second most popular technique is the creation of an index based on a combination of ERM features from the COSO and ISO frameworks, while others adopted the S&P ERM rating. This stream of research mainly employs probit/logit regressions, multiple regressions, and maximum likelihood and hazard models for analysis.

The results from the literature review describe some variables as strong determinants of ERM, while others present inconclusive results. According to the review, most studies agree with the assertion that industrial diversification, earnings volatility, and internal audits positively affect ERM adoption. Additionally, based on the literature's coherence, our study concludes that firm size, institutional ownership, type of industry, profitability and the presence of a Big Four audit firm are significant determinants of ERM adoption. Recognising the importance of these factors should encourage firms to commit more financial and human resources to a robust ERM system to manage any adversities resulting from these factors. However, financial leverage, asset opacity, international diversification, and stock price volatility remain inconclusive. The ambiguity in the results could arise from the differences in measurement, sample period and contexts. The different approaches to data collection may have contributed to the inconclusive result. This review shows that ERM is still evolving. Therefore, further research is needed to enhance practitioner's and researcher's understanding of the dynamics and context of ERM adoption.

5.2 Policy Implications

This study offers several policy implications. First, the determinants should greatly interest regulators and businesses seeking support for adopting and implementing ERM. Also, firms should tailor their approach to ERM based on the factors discussed in this paper. For instance, firms may improve their risk management skills by utilising the tools and expertise of these reputable audit companies. Working with the Big Four audit companies for best practices, audits, and risk management services will help ensure ERM is implemented successfully. Also, allocating sufficient resources to ERM is essential for large, highly leveraged and well-diversified firms due to the risks and complexities associated with these factors. For profitable companies, ERM should be viewed as a strategic initiative contributing to sustaining and improving a firm's profit situation. Again, compliance with regulatory requirements is essential, and firms should ensure that their ERM practices align with local and international regulations, particularly for foreign-owned firms. More so, businesses should see ERM as a crucial component of strategic planning. The characteristics that have been found indicate that ERM serves as both a strategy enabler and a tool for risk mitigation. Companies can link risk management with long-term goals by including risk concerns in their plans. Also, there is a need to encourage regulatory frameworks that allow companies to tailor their risk management practices to meet their unique requirements. Applying general regulations that may not account for the diversity of businesses and industries should not be encouraged.

5.3 Limitations

This study is limited to peer-reviewed journals in Google Scholar and Scopus, excluding other studies, conference presentations, and periodicals that were not revealed by the search criteria used for this article. Furthermore, studies not published in English were not considered, which skews this

study to peer-reviewed articles written in English. However, the scope of this study is comprehensive enough to make generalisable conclusions. As a result, the validity of the results remains credible and implies that scholars and practitioners can rely on these to make ERM decisions.

5.4 Recommendations for future research

Despite the strides made to unravel the determinants of ERM, this study documents that the concept of ERM is still developing and has critical knowledge gaps. As a result, this section suggests several potential areas for future research on the determinants of ERM. It is important to highlight that these suggestions are limited to areas we find particularly significant. These are explained below:

5.4.1 ERM measurement

Generally, the discussion on the determinants of ERM is scant, inconclusive and context-specific. This arises from the different estimation techniques, sample period and ERM measurements. The proxies for ERM are diverse, as highlighted in Table 3, with the majority relying on a dummy variable such as the CRO appointment or ERM keywords. This approach is not sufficient, given that it does not capture the complexities of ERM adoption. Others relied on the S&P risk management rating and an ERM index, which was measured through a survey using the COSO and ISO frameworks. Horvey and Odei-Mensah (2023) comprehensively explain that each technique has its own limitations¹. Hence, there is a need for a better proxy which captures more comprehensive indicators to represent ERM measurement. This should cut across its operating mechanisms, risk oversight, governance, frameworks, and maturity and draw knowledge from primary and secondary sources (Horvey and Odei-Mensah, 2023). This will improve our understanding, help establish a better proxy for ERM, and contribute to the consistency of the ERM results.

5.4.2 Corporate governance, environmental and social issues

The literature search suggests that the determinants of ERM have mostly been centred around financial, asset and organisational characteristics. However, research on the impact of corporate governance on ERM adoption is yet to be explored. We therefore suggest that scholars empirically examine how corporate governance features influence ERM adoption. This is essential given that corporate governance sets the tone, and the board provides the resources for its implementation. This is affirmed by COSO, which posits that ‘Governance sets the organisation’s tone, reinforcing the importance of, and establishing oversight responsibilities for, enterprise risk management’ (COSO, 2017, p. 6). Hence, it will be of great importance to establish how the board’s characteristics influence ERM adoption. Further, implementing environmental, social and governance (ESG) considerations is essential for implementing ERM in the contemporary business setting. By integrating ESG concepts into their risk management processes, organisations may manage a greater variety of risks. Additionally, it contributes to the organisation’s standing as a responsible, resilient, and sustainable institution with stakeholders.

5.4.3 Robust estimation tools (e.g. dynamic regressions, quantiles and thresholds)

The determinants were mostly explored with static models. The challenge with this technique is its inability to capture endogeneity issues in the model. There is, therefore, the need for a robust estimation tool, such as the generalised method of moments technique, which has been utilised less in the literature. This technique addresses endogeneity and is believed to present consistent and efficient parameter estimates compared to most of the techniques employed in the literature (Arellano and Bond, 1991). Additionally, scholars should explore the synergies among the determining factors

1. See Horvey and Odei-Mensah (2023) for an in-depth discussion of the strengths and weaknesses on the proxies for ERM measurements.

using the guidelines provided by (Brambor et al. 2006). Also, the primary assumption underlying the analysis of this study is linearity. Scholars focused on estimating parameters for averages while ignoring that the determinants may vary across different levels. Quantile regression broadly describes the determining factors of different heterogeneity patterns (Bassett and Koenker, 1978). We also call for further research to determine whether nonlinearities exist in the relationship and whether the direction varies at different thresholds. Given this, we suggest using the dynamic panel threshold estimation technique (Seo et al. 2019). These techniques will improve our understanding of the impact of the determinants at different levels, which will help address the conflicting nexus in the literature.

5.4.4 *Digital Transformation*

Another area that has not been empirically investigated is how digitalisation improves ERM implementation. In the wake of the fourth industrial revolution, using digital technology for risk management can improve the effectiveness and efficiency of the ERM process (Silva et al. 2019). This drives the advancement of ERM capabilities, guaranteeing the organisation's performance (Horvey and Moloi, 2024). This is because digital transformation offers risk managers a window into the array of risks facing organisations and the tools to manage these risks. Hence, it will be of great interest to investigate how businesses implementing digital transformation programs include ERM in their changing technological environments. This involves being aware of how ERM techniques are affected by technologies like big data, blockchain, and artificial intelligence.

5.4.5 *Emerging Contexts*

Since most studies in this review were from Europe and the US, further studies from different geographical contexts, particularly in emerging markets such as Africa, are required. Due to growing globalisation, businesses in emerging economies are becoming increasingly integrated into the global economy. Research on ERM determinants in emerging economies, including Africa, is essential because it will help unify risk management practices with international standards, enable smoother interactions with partners and investors, and become competitive in global markets. Also, these environments are characterised by different regulatory, cultural and economic structures. Hence, understanding the determinants of ERM is crucial to tailor risk management practices to the specific opportunities and challenges in these areas (Silva et al. 2019). As a result, further studies could test the relevance of these variables to ERM adoption in these emerging areas. This will aid in the generalisation of the findings.

5.4.6 *Other topical areas*

The aspect of the internal auditor, the Big Four audit firm, industry type, financial slack and profitability has not received much attention in the literature. Therefore, additional investigation of these factors is needed to determine the importance of ERM adoption. Also, scholars could provide further insights into the effect of the risk committee. Another potential area for research is the extent of ERM implementation within an organisation. Further studies could also focus on a single industry (financial or non-financial sector) to determine whether the micro context provides additional insights into ERM adoption (Pan et al. 2023). This will require more reliable and large sample data for accurate results. Since many factors propel organisations to adopt ERM, more research effort is required to identify new variables such as organisational culture and context and managerial characteristics as determinants of ERM. External factors such as regulation should also be considered, as most factors identified in the literature are firm-level factors. Thus, in the presence of a stricter regulatory and volatile environment, businesses are more likely to implement ERM.

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