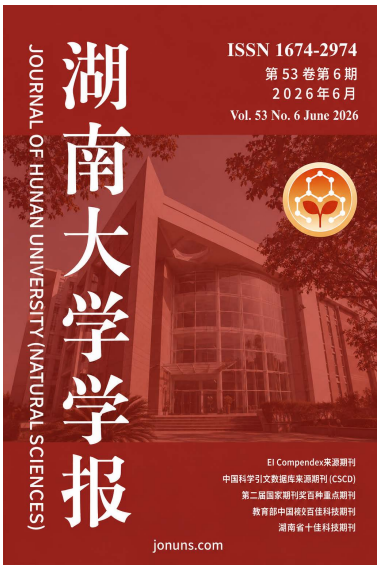


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Determinants of Risk Management Adoption in SMEs: A PRISMA-Based Systematic Review, 2015–2025

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Abstract: Risk management has evolved into a strategic competence for organizational resilience in volatile, uncertain, complex, and ambiguous environments. Small and medium-sized enterprises (SMEs), however, are constrained by several distinct limitations that have thus far precluded the adoption of sophisticated risk management practices. This study investigates the key determinants of the adoption of risk management practices and theories by SMEs.

A PRISMA-guided systematic search of Scopus, Web of Science, ScienceDirect, and Google Scholar, complemented by backward and forward citation chasing, was performed by conducting a series of transformed search queries inspired by the research question. A total of 22 studies met the inclusion criteria and were retained in the final synthesis corpus, with all studies being published in the last decade (2015–2025). An inductive qualitative meta-synthesis methodology inspired by grounded theory methodology and theoretical themes of information systems was employed for the synthesis.

Thematic analysis revealed that studies identified five key determinants of risk management adoption by SMEs, which have been classified into an integrated typology: internal determinants (resources, formalisation, planning sophistication); managerial determinants (owner-manager competencies, leadership commitment, risk perception); external determinants (regulatory and stakeholder pressures, sectoral determinants); environmental determinants (crises, climate change, digital transformation); and informational determinants (information systems, reporting, documentation, training/advisory support).

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This study provides a consistent framework for the adoption of risk management by SMEs within volatile environments. Prior research has identified a large set of potential determinants, and by synthesizing these, this study reveals distinct patterns of divergence within and across regional and industrial boundaries. Furthermore, this study shows that environmental and information determinants are increasingly important but have been relatively under researched, particularly in the post-2020 era. This study specifically captures post-2020 transformations associated with digitalisation, cybersecurity exposure, crisis preparedness, climate-related uncertainty, and informational capabilities affecting SME resilience and risk governance.

As a qualitative evidence synthesis, the review identifies recurring patterns and determinant categories rather than estimating statistical effect sizes.

Implications are provided for both managers and policymakers. Future research directions focus on longitudinal research and the development of standard measures.

Keywords: Small and medium-sized enterprises; Risk management adoption; Enterprise risk management; Determinants; Systematic review; PRISMA; Resilience.

中小企业采纳风险管理的决定因素：基于 PRISMA 的系统综述（2015–2025）

摘要：风险管理已发展成为组织在动荡、不确定、复杂和模糊环境中提升韧性的一项战略能力。然而，中小企业（SMEs）受到多种特殊限制的制约，这些限制在一定程度上阻碍了其采纳更为成熟的风险管理实践。本研究旨在探讨影响中小企业采纳风险管理实践与相关理论的关键决定因素。

本研究遵循 PRISMA 指南，对 Scopus、Web of Science、ScienceDirect 和 Google Scholar 数据库进行了系统检索，并结合前向和后向引文追踪加以补充。检索过程采用了一系列基于研究问题转化而来的检索式。最终，共有 22 项研究符合纳入标准，并被纳入最终的综合分析语料库；所有研究均发表于过去十年，即 2015–2025 年。研究采用受扎根理论方法和信息系统理论主题启发的归纳性定性元综合方法进行分析。

主题分析结果表明，既有研究识别出影响中小企业采纳风险管理的五类关键决定因素，并可归纳为一个综合类型框架：内部决定因素（资源、正式化程度、规划成熟度）；管理决定因素（业主兼管理者能力、领导承诺、风险感知）；外部决定因素（监管压力与利益相关者压力、行业因素）；环境决定因素（危机、气候变化、数字化转型）；以及信息决定因素（信息系统、报告、文档记录、培训与咨询支持）。

本研究为理解动荡环境下中小企业采纳风险管理提供了一个一致性框架。既有研究已经识别出大量潜在决定因素，而本研究通过综合分析揭示了不同区域和行业内部及其之间的差异模式。此外，本研究表明，环境因素和信息因素的重要性日益提升，但相关研究仍相对不足，尤其是在 2020 年之后。本研究特别关注了 2020 年后与数字化、网络安全风险暴露、危机准备、气候相关不确定性以及信息能力相关的转型，这些因素均会影响中小企业的韧性和风险治理。

作为一项定性证据综合研究，本综述旨在识别反复出现的模式和决定因素类别，而非估算统计效应量。

本研究为管理者和政策制定者提供了相应启示。未来研究可重点关注纵向研究设计以及标准化测量工具的开发。

关键词：中小企业；风险管理采纳；企业风险管理；决定因素；系统综述；PRISMA；韧性。

1. Introduction

Management of risk has evolved from a purely technical tool, considered instrumental to organisational performance, to a strategic capability. As the world becomes increasingly volatile, uncertain, complex and interconnected, organisations feel a growing need to address risks with a view to protect their assets and achieve their goals. In today's global environment, subject to recurrent economic and financial crises,

political instability, cross-border health crises, an exponential rise in cyber-attacks and escalating effects of climate change, risks of various kinds are likely to affect organisations in terms of their objectives, earnings and sustainability. Therefore, risk management is no longer conceived merely as a preventive function against loss, but also as a tool for achieving competitiveness and sustainability over time.

Small and medium-sized enterprises (SMEs) have a special place in this context. On one hand, SMEs are the real engine of global economies. On the other hand, SMEs are particularly vulnerable to shocks due to lack of financial slack, deficiencies in human capital, informational disadvantages, and owner-managers' influence on strategic decisions (Falkner & Hiebl, 2015). This vulnerability is further exacerbated when SMEs take quick decisions mostly relying on informal procedures, ad-hoc measures and on tacit knowledge. The question of why some SMEs pursue a more systematic risk management while others fail to do so in a timely manner therefore raises considerable theoretical and practical interest.

Although the literature on SME risk management adoption has expanded significantly over the last decade, existing evidence remains fragmented across geographical, sectoral, and methodological contexts. Previous systematic reviews, particularly those of Falkner and Hiebl (2015) and Crovini et al. (2021), primarily focused on traditional Enterprise Risk Management (ERM) practices, organisational constraints, and managerial issues affecting SMEs. However, recent post-2020 developments have profoundly transformed the SME risk landscape through digitalisation, cybersecurity threats, crisis exposure, climate-related disruptions, and increasing dependence on information systems.

Despite these developments, there is still no integrated analytical framework capable of synthesising the multiple determinants influencing SME risk management adoption. Existing findings remain dispersed and sometimes contradictory, particularly regarding the interaction between organisational readiness, leadership commitment, external pressures, and emerging digital and environmental risks.

The paper employs a systematic review and qualitative meta-synthesis to answer the research question: What determinants influence SMEs' adoption of risk management practices, and can these determinants be classified into a meaningful typology?

Risk management refers to the process of identifying, assessing, dealing with, and monitoring risks and opportunities (Crovini et al., 2021). SMEs are typically characterised by limited resources, centralised decision-making, and lower levels of formalisation. In this context, determinants refer to factors influencing both the willingness and ability of SMEs to implement risk management practices (Ahmad & Teo, 2024).

In this review, risk management (RM) is used as the overarching concept referring to the identification, assessment, treatment, and monitoring of organisational risks. Enterprise Risk Management (ERM) represents a more formalised and organisation-wide approach integrating risk considerations into strategic decision-making. Business Continuity Management (BCM) focuses specifically on maintaining organisational operations during and after disruptive events. Risk governance refers to the broader structures, processes, and responsibilities through which risk-related decisions are coordinated and monitored. While related, these concepts are not synonymous and are distinguished throughout the analysis.

For this purpose, five analytical propositions are formulated that will be used in the directed synthesis. These propositions are derived from the literature and are assessed through qualitative evidence synthesis rather than statistical hypothesis testing.

P1: Greater organisational resources and planning sophistication are positively related to the likelihood of formal risk management adoption.

P2: Owner-manager competencies, risk perception, and leadership commitment positively influence the adoption and implementation of risk management practices in SMEs.

P3: Pressures stemming from institutions and stakeholders (regulation, value-chain pressures, financing pressures) will increase the incentives for SMEs to adopt risk management practices.

P4: Systemic disruptions and cyber-attacks may speed up adoption, yet limit the quality of implementation when capabilities are low.

P5: Information availability (reporting systems, external advisory support, training) reduces uncertainty and supports adoption and continuous monitoring.

Accordingly, the main contribution of this study is the development of an integrated five-category typology of SME risk management adoption determinants encompassing internal, managerial, external, environmental, and informational dimensions based on a PRISMA-guided systematic review and qualitative meta-synthesis of studies published between 2015 and 2025.

Unlike earlier systematic reviews focused primarily on traditional Enterprise Risk Management practices and organisational constraints, this review specifically synthesises post-2020 developments associated with digitalisation, cybersecurity exposure, crisis preparedness, climate-related risks, and informational capabilities shaping SME resilience and risk governance.

Furthermore, the study contributes to the literature by explicitly identifying environmental and informational determinants as distinct analytical categories that have received limited attention in

previous SME risk management reviews.

The paper explores how these determinants interact across different institutional, sectoral, and regional contexts. The study also identifies several important research gaps, particularly the need for longitudinal approaches, SME-adapted digital risk frameworks, and more robust investigation of environmental and informational determinants that remain comparatively underexplored in the current literature.

2. Literature Review

Before examining the empirical evidence on the determinants of risk management adoption in SMEs, it is useful to consider the theoretical lenses commonly used to explain adoption decisions. Adoption decisions are rarely the result of a singular antecedent, instead being the result of a complex interplay between multiple governance needs and constraints, organisational institutional processes and artefacts, and the perception of risk management that individual managers hold. An integrated perspective is therefore needed to make sense of the proliferation of studies into risk management determinants and to structure the vast array of antecedents in a meaningful way that reflects the informal, highly centralised and capability constrained nature of the SMEs under study.

Table 1. Theoretical lenses commonly used to explain risk management adoption in SMEs and their analytical contributions (Source: Developed by authors from the cited foundational works)

Theoretical lens	Key reference	Core explanatory mechanism for adoption	Determinant domains most directly informed
Agency theory	Jensen & Meckling (1976)	Risk practices reduce information asymmetry and governance costs between owners, managers, and financiers	Managerial; internal governance
Transaction cost economics	Williamson (1985)	Risk management stabilises exchanges by lowering search, monitoring, and enforcement costs under uncertainty	External; economic/contractual
Resource-Based View (RBV)	Barney (1991)	Risk management protects and leverages scarce strategic resources (knowledge, reputation, capabilities)	Internal capabilities
Institutional theory	DiMaggio & Powell (1983)	Coercive, mimetic, and normative pressures push SMEs toward formalisation and legitimacy	External; regulatory/normative
Stakeholder theory	Freeman (1984)	Adoption helps secure trust and continuity with customers, banks, suppliers, employees, communities	External; relational
Legitimacy theory	Suchman (1995)	Formal practices signal conformity and credibility, reducing reputational exposure	External; reputational
Contingency theory	Donaldson (2001)	Fit between context (size, sector, complexity) and practice design determines adoption intensity	Internal–external interaction
Behavioural approaches (prospect/attention)	Kahneman & Tversky (1979); Ocasio (1997)	Decisions depend on loss aversion, perceived threat salience, and attentional focus of owner-managers	Managerial cognition

2.1 Internal resources and organisational readiness

Research findings indicate that SMEs engage in risk management if they possess sufficient organisational readiness. Adopting risk management means shifting from ‘gut feeling’ to structured risk identification and monitoring using existing managerial systems (Falkner & Hiebl, 2015). While risk management is a vital function for business success, in many SMEs resources are usually scarce and the focus is on short-term operational survival. Thus, risk governance is generally managed in an informal and often reactive way and not formalized. This means that some elements of risk management are formalised, for example a risk register is used for daily work, whereas other elements remain informal. Thus, the level of formalisation varies and even firms facing similar risks may implement risk management to different extents (Buganová et al., 2023).

In addition to SME-level characteristics, adoption is further influenced by structural characteristics embedded in the SME itself, such as size, ownership and sector. As SME grow, coordination requirements rise,

information becomes more spread out and the cost of informal communication increases, making formal risk processes a valuable coordination and control mechanism. While the overall business environment affects risk processes, SMEs also face sectoral risk profiles that can condition the adoption of formal risk processes. For instance, construction and manufacturing SMEs are typically exposed to greater liability, regulatory and operational risk than service-oriented SMEs, which in turn may trigger more systematic risk planning. However, the exposure of SMEs to risks does not automatically translate into effective risk processes, should internal capabilities be underdeveloped.

Existing scientific findings illustrate the relevance of planning sophistication, i.e., the degree to which a firm has successfully laid out a concrete plan. This comprises aspects such as budgeting and forecasting as well as management accounting and internal reporting. Such planning sophistication increases the feasibility and cost efficiency of risk assessment (López & Hiebl, 2015). Moreover, Heinze & Henschel (2021), considering the context of SMEs, found that planning sophistication, i.e., cost transparency and performance-oriented planning, helps translating risk into tangible, operational planning goals. On the other hand, poorly developed financial planning hinders risk management, perceiving it as abstract, bureaucratic or irrelevant for daily operations.

Finally, internal readiness also interacts with the perceived complexity of formal frameworks such as ERM. Many studies report that comprehensive ERM models are viewed as resource-intensive and insufficiently tailored to SME constraints; as a result, SMEs may adopt simplified or hybrid approaches rather than implementing full frameworks. The fact that adoption is not simply a binary choice and SMEs opt for "good enough" configurations that provide adequate balance between rigidity and flexibility, underlines the need for typologies that capture a degree of adoption beyond simple presence/absence indicators. (Ahmad & Teo, 2024).

2.2 Managerial cognition, leadership, and risk culture

The second stream of research views the owner-manager as a key determinant of how risk management is handled, through their perceptions, skills and leadership style. Because SMEs are typically centralised, managerial attention becomes a scarce organisational resource; therefore, risks that are not salient to the leader may remain unmanaged even when objectively significant. Put differently, adoption often depends less on "best practice availability" and more on whether the owner-manager recognises risks as strategic and feels capable of acting on them (Chakabva & Tengeh, 2023).

Managerial cognition also plays a role in how SMEs make sense of uncertainty leading to adoption decisions. Research in the field of behaviour studies shows that loss aversion and risk framing heavily influence the decisions of SME managers. They may overinvest in familiar risks and underinvest in new uncertainties like cyber-attacks as long as these consequences are perceived as sufficiently distant in time and lacking physical properties. Studies on cognitive biases and risk perception show that framing uncertainty adoption benefits arise when risks are translated into case studies, measured through specific key performance indicators and weighed up against alternative investment options rather than categorized solely according to risk. A cognitive perspective on uncertainty thus helps to explain why seemingly similar SMEs respond to identical environmental conditions in distinct ways.

Implementation of risk practices also depends on leadership commitment. Leadership can embed risk practices into the normal routine of the organisation by allocating time for practices, validating the documentation of practices, and incorporating risk considerations into business planning. On the flip side, a passive leadership style is associated with a "firefighting" culture whereby risk practices are performed in an ad-hoc fashion, are not documented, and are severely impacted by staff turnover. Ultimately, successful implementation depends on leaders who are able to maintain organisational learning and discipline while sustaining agility.

Besides, the entrepreneurial orientation and personal competencies may enhance technology adoption by being more proactive and balanced in searching for opportunities and assessing associated risks and implications. In small and medium enterprises (SMEs), planning, networking, and opportunity recognition competence are negatively related to the unstructured risk taking behavior, especially under uncertain or turbulent market conditions and growth. Moreover, the level of education and the experience of past disasters can increase awareness of risks, and encourage owners/managers of SMEs to adopt measures for mitigating negative effects and ensuring business continuity, especially in markets and networks lacking effective institutional support. A critical review of the empirical research in this domain should consider the managerial determinants in terms of their multi-dimensions (skills, attitudinal and way of thinking/cognitive competences) rather than the over-simplified leadership construct (Chakabva & Tengeh, 2023).

2.3 External pressures and emerging environmental risks

A third stream of literature associates adoption of risk management with external pressures, such as regulatory requirements, pressure from stakeholders and

value-chain players. This can be addressed through institutional theory, which argues that organisations conform to certain practices in order to achieve legitimacy. For instance, small and medium-sized enterprises may adopt formal risk management practices primarily to signal to others that they are managing risk in order to gain contracts, financing or access to export markets (DiMaggio & Powell, 1983). For example, banks, insurers and large customers of SMEs may require owners/managers to provide evidence of the organisation's risk controls in order to access products or contracts (Freeman, 1984).

While external pressures are fairly uniform across sectors, there are significant variations regarding both sectoral standards, and levels of enforcement. Formalisation is more likely in regulated industries, such as construction, finance, or occupational safety, where even weak enforcement can prevent loss from the costs of formalisation for SMEs. However, in a weak enforcement environment, the expected returns from formalisation do not outweigh the cost of implementation, and SMEs rely on informal means of coping with pressures towards legal. Consequently, the expected return on formalisation relative to its costs turns out to be a key factor in the SME adoption decision, as the incentives for compliance derive from rewards to formalisation, such as access to contracts, legitimate status, and reduction of liability (Williamson, 1985).

This study focuses on the impact of digitalisation on risk and adoption in SMEs. While digitalisation can potentially bring benefits such as better monitoring and more availability and quality of data and thus increase the need for structured risk management from SMEs, it also introduces new risks such as cybersecurity risks, supply-chain risks and 'black swan' events caused by technology (Adriko & Nurse, 2024). Furthermore, studies have reported that cybersecurity frameworks are only partially adopted in SMEs due to knowledge gaps, lack of adequate detection and response capabilities, and lack of awareness of cost-effective controls (Alahmari & Duncan, 2020).

Crisis research finds that the current wave of crises, economic shocks, and supply-chain disruptions exposes vulnerabilities of small and medium enterprises (SMEs). Moreover, there is a growing interest in crisis preparedness as well as business continuity management (BCM) to enhance SME resilience. However, BCM remains relatively underutilised among SMEs despite emerging evidence of its benefits for both performance and resilience. While availability of BCM resources may limit the ability of SMEs to practice BCM, adopting a learning perspective on crisis experiences suggests that some SMEs eventually institutionalize lessons from disruptions and develop formal preparedness practices over time (Adikaram & Surangi, 2020). However, research is limited in terms of how organizations learn to manage crisis.

Sustainability, environmental risk and occupational safety are emerging fields of adoption, especially for SMEs which are subject to environmental legislation, specific operating hazards or environmental risks. The focus on sustainability pathways (Damiano & Valenza, 2024) implies that risk management can serve not only to maintain a competitive edge, but also to gain competitive advantage through "green" approaches and sustainable conduct. Nevertheless, environmental and safety management practices are only slowly being adopted, since environmental standards are often perceived as complex or unsuitable for SMEs, therefore there is a need for simplified guidelines for specific sectors.

Existing streams of literature may offer insights on why SMEs are slow to adopt risk management; namely, organisational readiness to adopt innovation, managers' perceptions and cognition, and external factors that create opportunistic environments. A comprehensive synthesis of evidence is required to map out the landscape of antecedents of risk management adoption in SMEs. This synthesis will identify convergences and divergence of findings from various contexts as well as reveal key determinants extracted from more recent studies.

2..4 Informational determinants and knowledge capabilities

A growing stream of literature has increasingly emphasised the role of informational determinants and knowledge capabilities in shaping SME risk management adoption. In addition to organizational, managerial, external and environmental factors, the availability and quality of information, reporting systems, documentation practices, training opportunities, and advisory support constitute important enabling conditions for the effective implementation of risk management (López & Hiebl, 2015; Heinze & Henschel, 2021).

Many SMEs suffer from a lack of information as they have a limited number of reporting systems, lack of documentation, fragmented data collection and insufficient analytical capability. López & Hiebl (2015) highlighted how the management accounting systems of SMEs often lack the appropriate information to identify, evaluate and monitor risks. As a result, risk management in SMEs is typically implemented on an ad-hoc basis, with managers relying largely on experience and intuition, rather than on information.

Importantly, information systems (such as management accounting tools) and internal reporting (within organizations as well as between departments) can improve risk governance and incorporate risk into planning and decision-making within organizations. While some SMEs have well developed information

systems, for example, accounting packages, others do not have any systems in place. Also, internal reporting can take place in different forms and some organizations are better than others in using reporting for internal purposes. Performance measures can be used to monitor risk, as well as to monitor other aspects of organization's performance. Performance monitoring systems can therefore also support risk management.

In addition to the organizational information resources SMEs also draw on external sources of knowledge. Training programs, business advisors, consultants, industry peers and professional networks as well as industry associations all can provide the small firm with access to specialized knowledge that it does not have internally. Studies have found that the diffusion and successful implementation of ERM frameworks such as those for identifying, assessing, monitoring and responding to risks in financial performance, depend greatly on the organization's ability to acquire, interpret and apply risk management knowledge. There are also studies which found that the reasons for the limited adoption of cybersecurity practices by SMEs are linked to knowledge gaps about the different types of cyber threats, how to deal with them as well as problems in translating technical guidance into practical actions that can be implemented in the organization.

More recent research indicates that information capabilities can be cross-determinants influencing other factors of risk management adoption in SMEs. Wang (2023) emphasizes the role of digitalization for increasing the need for risk information as well as for providing technologies for risk monitoring and support for decision-making. Leadership commitment for risk management is more likely to be translated into effective risk management implementation when top management has access to information and to decision-support tools. External pressures from regulators or market etc. also would be more likely to be translated into effective risk management implementation when SMEs have information capabilities to understand and to operationalize the required measures for compliance.

The studies that have investigated the role of information for risk management in SMEs highlight the following underexplored factors of the adoption of risk management practices in SMEs: information quality, reporting systems, documentation, training and advisory services. These factors are increasingly important as SMEs are operating in an environment that is becoming more digital, data-intensive and uncertain. Thus, these factors can be treated as a separate analytical category, in addition to the well-established internal, managerial, external and environmental factors.

Table 2. Illustrative evidence map of determinant categories identified in prior SME risk management studies (Source: Developed by authors from the cited studies)

Study	Primary determinant emphasis	Typical adoption pattern reported	Dominant barrier(s)	Reported outcome orientation
Falkner & Hiebl (2015)	Internal resources; owner role	Partial and informal adoption common	Resource limits; weak formal routines	Resilience/strategic alignment
Anton & Nucu (2020)	ERM frameworks; organisational factors	Low ERM uptake in SMEs	Framework complexity; limited tailoring	Performance link debated
Wang (2023)	Digital transformation; crisis risks	Adoption increases with digitalisation	Cybersecurity capability gaps	Digital resilience gains
Alahmari & Duncan (2020)	Cyber risk governance	Uneven and incomplete adoption	Awareness and skill deficits	Reduced vulnerability potential
Damiano & Valenza (2024)	Sustainability–resilience linkage	Emerging integration	Resource/knowledge gaps	Sustainable resilience framing

3. Methodology

a. Review design and reporting standard

The study presents a systematic review of the SME risk literature. It follows the PRISMA statements to guarantee transparency in identifying relevant articles and in their inclusion or exclusion in the review. However, determinants of risk are usually treated in qualitative form and operationalized in vastly different ways. For this reason, the synthesis of included papers follows an inductive meta-synthesis approach inspired by grounded theory (Glaser & Strauss, 1967). This combines the regular steps of open, axial, and selective coding with the goal of deriving an integrated typology of SME risk from the existing body of knowledge. The study thus combines the regular procedures for systematic reviews as proposed by PRISMA with a theory-building synthesis to tackle the scattered content of the SME risk literature (Falkner & Hiebl, 2015).

The review process followed the main PRISMA 2020 reporting principles, including identification, screening, eligibility assessment, and final inclusion stages, adapted to the qualitative and exploratory nature of the review. Particular attention was given to transparency in study selection, screening consistency, and traceability of inclusion and exclusion decisions throughout the review process.

b. Database search strategy

The search strategy for the literature review was developed as a structured Boolean search string based on the central research question, i.e. "What are the determinants influencing the adoption of risk management practices in SMEs?".

For this literature study four databases have been used: Scopus, Web of Science, ScienceDirect and Google Scholar.

The searches were conducted within the titles, abstracts and keywords in order to maximize the number of relevant studies, whilst at the same time keeping the scope as broad as possible for a multidisciplinary study on risk management in SMEs.

A number of combinations of keywords and Boolean operators were tested. In addition to the term risk management, relevant terms related to other risk management practices such as Enterprise Risk Management (ERM), Business Continuity Management (BCM), cybersecurity, organizational resilience, digital transformation and various climate-related risks were included in the search strategy.

The principal Boolean search structure of search strings used in all databases is given below.

- ("SME*" OR "small and medium-sized enterprise*" OR "small business*" OR "MSME*")

  AND

- ("risk management" OR "enterprise risk management" OR "ERM" OR "business continuity management" OR "BCM")

  AND

- ("adoption" OR "implementation" OR "determinants" OR "drivers" OR "barriers" OR "readiness")

Furthermore, search terms for the additional combinations were included to cover the new risks that have arisen after 2020.

- ("cybersecurity" OR "digital transformation" OR "climate risk" OR "resilience" OR "crisis management")

To increase consistency and to improve relevance, a number of filters have been used. For instance, only a number of peer-reviewed articles have been selected. These articles were published between 2015 and 2025.

In addition, all selected articles have been written in English. In designing the search strategy, a balance between comprehensiveness and specificity has been made in order to avoid an excessive number of 'irrelevant' studies being retrieved for the topic of SME risk management adoption.

A final verification search was carried out just prior to final manuscript submission to pick up any additional, relevant recent publication indexed for 2025.

Table 3. Representative Boolean search strings and database search configuration (Source: Developed by authors)

Database	Representative search syntax	Search fields	Filters applied
Scopus	(("SME*" OR "small business*") AND ("risk management" OR "ERM") AND ("adoption" OR "implementation" OR "determinants"))	Title, Abstract, Keywords	English; 2015–2025; peer-reviewed
Web of Science	(("SME*" OR "small business*") AND ("risk management" OR "ERM") AND ("adoption" OR "drivers"))	Topic search	English; 2015–2025
Science Direct	("SME*" AND "risk management adoption")	Abstract, Keywords	English; 2015–2025
Google Scholar	"SME risk management adoption determinants"	General search	Relevance-based screening

c. Inclusion and exclusion criteria

For the purpose of this review, a set of explicit inclusion and exclusion criteria were defined and consistently applied across all databases searched. These criteria were aimed at ensuring methodological rigor, relevance and analytical coherence, and were designed to be highly congruent with the research objective. In essence, the criteria were defined with a view to identifying determinants of risk management practices' adoption and implementation in SMEs.

These studies focused on different determinants of risk management adoption in SMEs, i.e. factors that influence the adoption and the implementation of risk management, in terms of enabling factors and barriers, of organizational and managerial factors influencing risk management adoption in SMEs, and of institutional factors pressuring organizations to adopt Risk Management. Other studies on risk in general, risk modeling or financial risk, and on corporate governance in large firms were not included because they did not refer to the specific context of risk Management adoption in SMEs.

All reviewed publications were scientific peer-reviewed articles. Non-validated reports, opinion articles, editorials, and other publications lacking the

essential methodological transparency and adequate analytical depth were excluded from the review.

A specific time frame of 2015–2025 was chosen to allow for the consolidation of ERM in SMEs as well as account for the array of new risks that have emerged in post-2020 business environments, including those of a digital and cyber nature. Studies conducted prior to this time frame would not capture the current risk profiles of SMEs and their organizational practices for dealing with these risks.

The review incorporated studies from diverse geographical regions and industrial sectors in order to improve contextual diversity and enhance the transferability of findings across different SME environments. Excluded from the review are studies of large companies, public organizations, and studies of risk at a macro level that are not related to SMEs and their risk management practices.

In practice, only English-language publications were selected that are listed in the main scientific databases. English is the dominant language in the international scientific publication market that is listed in databases. By restricting to English-language publications, the risk of language bias is kept to a minimum.

Table 4. Inclusion and exclusion criteria applied during screening (Source: Developed by authors, aligned with SME risk review practices)

Dimension	Inclusion criteria	Exclusion criteria
Timeframe	Studies published between 2015 and 2025 to capture contemporary SME risk management developments, including post-2020 digital and resilience-related risks	Studies published before 2015 or outside the selected timeframe
Document type	Peer-reviewed journal articles, scholarly books, conference proceedings, and academically rigorous review papers	Blogs, editorials, opinion papers, non-reviewed reports, professional magazines, and non-academic publications lacking methodological transparency
Organisational scope	SMEs/MSMEs from all sectors and geographical regions	Studies focused exclusively on large firms, public administration, or macro-level governance without SME-specific analysis
Topical focus	Studies addressing determinants, drivers, barriers, organisational readiness, implementation conditions, or adoption processes related to RM, ERM, BCM, resilience, cybersecurity, or continuity management in SMEs	General risk studies without adoption focus, purely technical risk modelling, financial risk modelling without organisational adoption perspective, or studies unrelated to SME risk management implementation
Methodological relevance	Empirical, conceptual, review-based, or mixed-method studies providing explicit analytical insights into SME risk management adoption	Descriptive publications lacking analytical depth, methodological rigor, or explicit discussion of adoption determinants
Language	English-language publications indexed in major academic databases	Non-English publications without accessible English version

d. Screening, citation chaining, and relevance ranking (selection logic)

We follow the PRISMA framework to describe the study selection process in several steps in detail. A total of 305 references were retrieved from the databases Scopus, Web of Science, ScienceDirect and Google Scholar. In addition, 47 references were identified by backward and forward citation chaining. Thus, in total 352 identified references were managed by Zotero.

Afterwards, all relevant references have been screened for inclusion by Rayyan, a web-based software for conducting systematic reviews. By applying the predefined inclusion and exclusion criteria the title and abstract and the full text of the studies have been screened for inclusion. After removal of the duplicates a sorting for title and abstract was performed by means of Rayyan . All titles and abstracts were screened in accordance with the respective inclusion- and exclusion criteria.

We sorted through the studies in Rayyan according to title and abstract, and excluded studies that dealt with risk management in large firms or in public organizations, studies in which risk was treated from a purely technical perspective or in which the focus was on financial risk while implementation in SMEs was lacking, as well as studies in which there was a lack of

methodological quality and insufficient analytical depth and conceptual framework for the aims of this review.

All studies, which went through the title and abstract screening process, were subjected to full-text eligibility assessment. In the full-text eligibility assessment, studies were evaluated based on methodological quality, analytical relevance, and conceptual alignment with the study's objectives. Studies, which did not explicitly discuss the determinants of risk management adoption and implementation in SMEs, studies that focused only on technical/financial risk modeling without adoption in practices in organizations, and studies that lacked methodological transparency and sufficient analytical substance were excluded from the study.

The most common reasons for study exclusion after full-text screening related to insufficient focus on SMEs, the studies did not contain any analysis of risk management adoption or its implementation, the studies described general risk taxonomies without any practical application for managerial decisions in organizations, and the studies lacked sufficient empirical or conceptual content regarding the process of risk management adoption in SMEs.

After full screening 22 studies were retained for the qualitative meta-synthesis. The study selection process is outlined in a PRISMA flow diagram in Figure 1.

APPENDIX 1. Figure 1. PRISMA 2020 flow diagram illustrating the identification, screening, eligibility assessment, and inclusion process of studies related to SME risk management adoption (Source: Developed by authors)

e. Data extraction and coding procedure

A structured data extraction form was developed for each of the 22 studies included in this review to facilitate the extraction of the relevant data from the included studies in an organized and systematic manner. The data extraction form was designed to contain indicators that described key characteristics of each study, such as year of publication, geographic location, sector(s) of application, methodological approach (quantitative, qualitative, literature review, conceptual), underlying theory(ies), and determinant(s) that influenced the adoption of risk management by SMEs.

In addition to these indicators that described the key characteristics of the studies, the data extraction form also contained several analytical indicators. These indicators assessed the level of adoption, as well as the ways in which risk management was implemented by SMEs as reported in the included studies. Specifically, the studies were assessed in terms of the degree to which risk management was formalized, as well as the scope of adoption (partial or comprehensive). The presence or absence of various risk governance mechanisms, such as reporting systems, business continuity plans, and digital tools for managing risk, were also assessed.

For each of the 22 studies selected, additional indicators for the analysis of differences of the degree of implementation and of the implementation were recorded. These indicators relate to the formalization of the risk management, the scope of the implementation (partial or complete), as well as to the existence of specific risk-governance mechanisms (e.g. reporting, business-continuity management, digital risk management).

These data were analyzed by means of a qualitative synthesis by means of a Grounded Theory-inspired coding procedure, implemented in three stages of coding: open coding, axial coding and selective coding (Glaser & Strauss, 1967). In the open coding stage, the determinant-related statements and concepts as they appeared in the studies under review were coded by using the authors' own terminology. Some examples are: "lack of resources", "commitment by top management", "pressure from stakeholders", "awareness of cybersecurity risks", "training".

Axial coding involved grouping related concepts into categories of higher levels of aggregation.

The authors grouped determinant-related statements and concepts into five higher-order determinant categories based on conceptual similarity and recurring patterns across the reviewed studies.

In the final stage of coding, the categories identified during axial coding were integrated into an explanatory typology describing SME risk management adoption as the result of interacting organisational, managerial, external, environmental, and informational determinants.

All coding decisions and the resulting categories were reviewed by the authors at regular intervals during the synthesis process. Any disagreements that arose regarding the allocation to categories or the interpretation of the determinants were solved by repeating the discussion until a solution was found that was acceptable to all authors. The resulting coding structure was thus transparent and analytically reliable.

Table 5. Data extraction framework used for the analysis of included studies (Source: Developed by authors)

Data category	Extracted information
Bibliographic information	Author(s), year of publication, country
Study context	Sector, SME type, geographical setting
Research design	Quantitative, qualitative, mixed methods, review, conceptual
Theoretical foundation	Underlying theories or frameworks
Risk management focus	RM, ERM, BCM, cybersecurity, resilience, digital risk, climate risk
Determinants identified	Drivers, barriers, enabling factors, institutional pressures
Adoption characteristics	Level of adoption, implementation stage, formalisation
Governance mechanisms	Reporting systems, BCM plans, risk committees, digital tools
Main findings	Key conclusions regarding SME risk management adoption

Table 6. Coding stages and analytical outputs used to build the determinant typology (Source; Developed by authors based on grounded theory coding principles)

Table 6. Coding stages and analytical outputs used to build the determinant typology (Source: Developed by authors based on grounded theory coding principles)

Coding stage	Analytical objective	Activities performed	Output produced
Open coding	Identify all determinant-related concepts reported in the literature	Extraction and coding of statements referring to drivers, barriers, organisational capabilities, managerial influences, external pressures, environmental disruptions, and informational resources	Initial determinant codes (raw concepts and statements)
Axial coding	Group related concepts into higher-order categories	Comparison, aggregation, and refinement of determinant codes based on conceptual similarity and recurring patterns across studies	Five determinant categories: Internal, Managerial, External, Environmental, and Informational determinants
Selective coding	Integrate categories into an explanatory framework	Synthesis of relationships among determinant categories and interpretation of their influence on risk management adoption	Integrated five-category typology of SME risk management adoption determinants and analytical propositions

f. Robustness and transparency procedures

All analysis was conducted in order to ensure robustness, transparency and high analytical reliability. First, the analysis drew on a broad range of academic databases (Scopus, Web of Science, ScienceDirect and Google Scholar). Through backward and forward citation chaining it was possible to trace influential papers not indexed in the databases covered in the search.

The analytical reliability of the study was enhanced through the systematic process of data extraction and coding and followed the procedures of the grounded theory. The coding process was conducted through successive stages of open, axial, and selective coding. The determinants of SME risk management were analyzed through this process of coding and the findings were synthesized to form a number of categories. The coding decisions, determinant classifications and category definitions were continuously reviewed throughout the analytical process to ensure high levels of analytical consistency.

Finally, attention was paid to post-2020 developments in relation to risk management by SMEs, for example digitalization, cyber risks, business continuity management, resilience, climate-related risks, and information management capacity. These developments reflect the current risk situation and changes in risk management of SMEs over time.

In summary, the above steps were implemented to strengthen the review and its findings in terms of credibility, transparency and analytical rigor.

g. Methodological limitations (review-level)

After scrutinizing available research on the determinants of small and medium enterprises (SME) adoption, several key limitations became apparent.

Firstly, there is an overrepresentation of English-language indexed articles that could introduce potential publication and language bias.

Secondly, there is considerable heterogeneity in the way SMEs are defined as well as how the term “adoption” is conceptualized and measured.

Thirdly, despite the use of systematic coding procedures and iterative validation throughout the synthesis process, the qualitative meta-synthesis approach remains inherently interpretive. Consequently, a degree of subjectivity may have influenced the categorisation and interpretation of determinants.

Finally, the reliance on cross-sectional self-reported data means that it is not possible to draw firm causal conclusions about the underlying determinants of SME adoption. Future research is needed, incorporating longitudinal and quasi-experimental designs.

4. Results

4.1 Descriptive profile of the included corpus (n = 22)

Twenty-two papers were selected for inclusion in the literature review, with a noticeable spike in publication activity after 2020. Of these, 13 papers have been published between 2022 and 2025. Successive crises (pandemic, supply chain disruptions, cyber-attacks and climate events) appear to have 'pushed' research on SME risk management and the adoption conditions relevant to it.

The collection is a diverse and representative sample of recent work on SME risk management adoption and comprises papers with a wide range of geographical, methodological and theoretical focuses.

APPENDIX 2: Table 7. General Information Extracted from the Validated Corpus of 22 Articles 2015–2025 (Source: Developed by authors)

The corpus is not only temporally but also geographically diverse, although some regional imbalances remain. The broader body of evidence identified during the review process covered studies from 27 countries across Africa, Asia/Middle East, and Europe, with a particularly strong representation of emerging markets and European contexts. However, the final synthesis corpus comprised 22 studies representing 18 countries. Despite this geographical diversity, certain regions remain underrepresented, notably Latin America, the broader MENA region, small island economies, and transition economies.

In methodological terms, the corpus is almost evenly split between evidence-building and evidence-mapping contributions. Review-based papers account for 45.5% (10/22), while empirical quantitative and empirical qualitative studies each represent 22.7% (5/22), and conceptual/framework papers account for 9.1% (2/22), which confirms that the field is still consolidating foundational explanations of adoption determinants while gradually moving toward more context-sensitive empirical testing (Anton & Nucu, 2020).

Table 8. Descriptive characteristics of the included studies n = 22 (Source: Developed by authors from the final included corpus).

Dimension	Categories	n	%
Publication period	2015–2019	4	18.2
	2020–2021	5	22.7
	2022–2025	13	59.1
Region	Europe	9	40.9
	Africa	8	36.4
	Asia/Middle East	5	22.7
Study design (broad)	Review-based	10	45.5
	Empirical—quantitative	5	22.7
	Empirical—qualitative	5	22.7
	Conceptual	2	9.1

4.2 Meta-analytic synthesis of determinant categories (five-category typology)

The determinants were grouped into several clusters of codes and identified as a combination of inductive coding and constant comparison, resulting in five categories: internal, managerial, external, environmental and informational determinants. Among the included studies, managerial determinants were the most frequently reported category (9/22 studies), closely followed by internal and external determinants, 8/22 each, while environmental and informational determinants, 4/22 and 3/22, respectively, are more visible in the post-2020 data particularly focusing on digital, crisis and resilience perspectives.

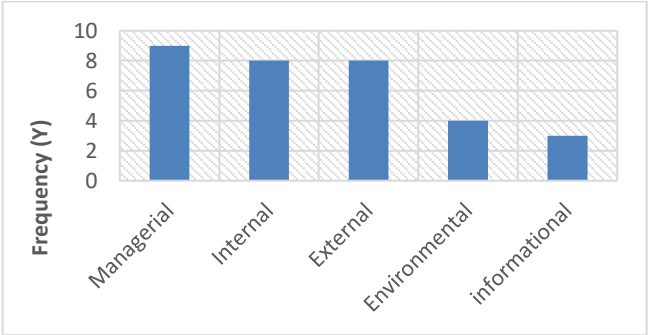


Figure 2. Frequency of determinant categories in the included corpus (n = 22) Source: Developed by authors from thematic coding of the included studies

The typology was further operationalised into a recurring set of sub-determinants for each category. The internal determinants primarily focused on the resources available, organisation, and formalisation. Managerial determinants looked at the leadership's commitment, capacity and risk perceptions. The external, environmental and information determinants were influenced by regulatory requirements, stakeholder expectation, overall value-chain requirements, systemic, external random events, environmental disasters such as natural calamities like cyclones, and weather events, and access to data, reporting systems, documentation, and

external resources such as technical support, training and advisory services.

Table 9. Integrated typology of determinants of risk management adoption in SMEs (coded themes and sub-themes) Source: Developed by authors from inductive coding of the final included corpus

Determinant category	Core coded sub-themes (illustrative)	Typical mechanism for adoption (meta-synthesis)
Internal	Resource availability; firm size/formalisation ; organisational culture; planning sophistication	Adoption increases when SMEs possess minimal slack resources and routines that reduce the perceived cost of formalisation
Managerial	Owner-manager competencies; leadership commitment; risk perception; entrepreneurial orientation	Adoption depends on managerial attention, perceived value of risk management, and willingness to institutionalise routines
External	Regulation/standards; stakeholder requirements; sectoral pressure; mimetic isomorphism	Adoption is triggered by legitimacy needs and market-access conditions (financing, contracts, certification)
Environmental	Crisis exposure; climate hazards; digital transformation; systemic disruptions	Adoption accelerates when exogenous shocks increase salience of continuity, resilience, and technology-related vulnerabilities
Informational	Access to information systems; internal reporting; documentation; training/advisory support	Adoption strengthens when information reduces uncertainty and enables monitoring, learning, and accountability

Importantly, the analysis reveals environmental and informational determinants as distinct analytical categories that have received comparatively limited attention in earlier SME risk management reviews. Their emergence reflects the growing influence of digitalisation, crisis exposure, resilience requirements, and information capabilities in contemporary SME risk environments.

4.3. Cross-context patterns (regional and temporal)

Comparative regional studies on SMEs often identify management as the primary issue with the majority of African studies emphasizing the informal sector issues. In contrast to Africa, the studies based in Europe distribute the focus across internal, external and environmental factors more equally. Asian/Middle East studies focus equally on the internal, managerial, external and informational factors consistent with the ERM frameworks in the literature. However, the literature also emphasizes the need to translate the models into practical tools and techniques for application in SMEs.

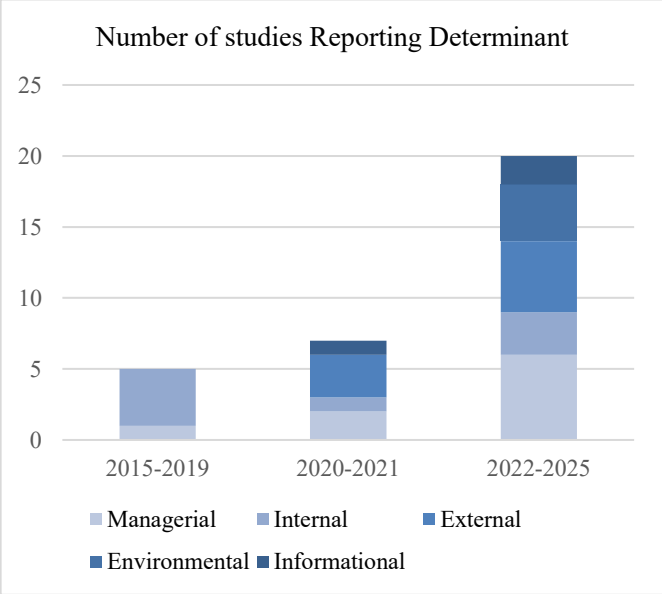
Table 10. Regional patterns in determinant salience within the included corpus Source: Developed by authors from coded regional distribution in the included studies

Region (number of studies)	Most salient determinant categories (based on study-level coding)	Interpretation (synthesis)
Europe (n = 9)	Internal (44.4%); External (33.3%); Environmental (33.3%)	Adoption is frequently framed as a resource–compliance problem, increasingly shaped by digitalisation and continuity concerns
Africa (n = 8)	Managerial (50.0%); External (37.5%)	Owner-manager agency and weak institutional enforcement interact, making leadership and informality decisive
Asia/Middle East (n = 5)	Internal (40.0%); Managerial (40.0%); External (40.0%); Informational (40.0%)	Adoption is often linked to ERM diffusion, governance expectations, and capability-building (training/reporting)

From a temporal perspective, determinant salience shifts from predominantly internal (2015–2019) to a more multi-dimensional pattern (post-2020) dominated by managerial and external determinants, followed by the emergence of environmental determinants as a distinct cluster. The literature has evolved from "can SMEs afford formal risk management?" to "how do SMEs align leadership, compliance and resilience under systemic uncertainty?"

Figure 3. Evolution of determinant salience by period (study-level category counts) Source: Developed by

authors based on the temporal coding of included studies



4.4. Assessment of analytical propositions through evidence synthesis

Given the heterogeneity of the included studies in terms of definitions, contexts, and operationalisations of risk management adoption, a qualitative evidence synthesis approach was used to assess the degree of support for each analytical proposition. Rather than statistically testing hypotheses, the synthesis examined the consistency and recurrence of determinant categories across the reviewed studies.

Table 11. Evidence assessment of analytical propositions P1–P5 based on thematic synthesis (n = 22) Source: Developed by authors

Proposition	Determinant focus	number of studies emphasising the determinant category	Evidence assessment
P1	Internal resources & readiness → adoption	8/22 (36.4%)	Strong evidence support
P2	Owner-manager cognition/competence → adoption	9/22 (40.9%)	Strong evidence support
P3	Institutional & stakeholder pressures → adoption	8/22 (36.4%)	Strong evidence support
P4	Crisis/digital/climate exposure → adoption	4/22 (18.2%)	Emerging evidence support (emerging, post-2020)
P5	Information systems/reporting/support → adoption	3/22 (13.6%)	Emerging evidence support (underexplored but consequential)

The synthesis provides strong evidence for the central arguments put forward in propositions P1, P2 and P3 regarding internal readiness, managerial agency and external pressure respectively to adopt risk management in small and medium-sized enterprises. Propositions P4 and P5 on environmental and informational determinants provide new leads for subsequent studies post-2020, and they are more important than hitherto conceived, although as yet under-researched.

5. Discussion

5.1. Interpreting the "core triad": resources, leadership, and pressure (P1–P3)

The evidence synthesis offers substantial support for Proposition P1. It appears that the adoption of formal risk management in SMEs is less hampered by a lack of awareness than by the limited organizational resources and the underdeveloped internal routines that are needed for formalization. Formalization requires financial, managerial and informational capabilities that many SMEs do not have at their disposal.

Also, to a greater extent than with P1, the reviewed studies consistently provide evidence supporting Proposition P2 as SME owners/managers are central figures in formalisation processes. We observe that owners/managers perceive risks as strategic and manageable, legitimising formalisation efforts and investments in them. Conversely, owners/managers can preclude formalisation even when employees have encountered formalisation-related information, materials and technologies by labelling attempts to manage risk as bureaucracy. A behavioural and attention-based explanation underpins this finding (Crawford & Jabbour, 2023).

Moreover, the evidence associated with Proposition P3, that the adopted evolutionary mechanism is often caused by external events rather than by optimal selection, is also significant. SMEs formalise risk practices to satisfy lenders, insurers, key customers, or value-chain partners, especially where standards and compliance function as market-access conditions. This finding is consistent with institutional explanations, in which legitimacy-seeking and coercive expectations translate into adoption even when internal readiness remains imperfect (DiMaggio & Powell, 1983).

The three supported propositions jointly suggest that adoption can be best modelled as an interaction between external pressure for initial adoption,

managerial commitment for sustained adoption, and internal resources that determine substantive adoption as opposed to superficial adoption. Consequently, there is little merit in a "one-size-fits-all" approach and instead, one needs to look at the sequencing and combinations of determinants that drive adoption at different stages.

5.2. Why environmental determinants are "emerging" rather than dominant (P4)

While the evidence associated with Proposition P4 remains comparatively limited by the core data, its temporal profile is instructive in itself: environmental factors become salient only after 2020, partly due to systemic shocks experienced by the global economy. While these shocks have increased the risk exposure of SMEs with respect to factors such as environment and technology, they have simultaneously elevated the strategic importance of risk management and raised the capabilities of SMEs to deal with said.

Additional evidence from the broader literature on crisis management and business continuity supports this interpretation. While there is evidence that businesses that adopt business continuity preparedness practices tend to perform better during periods of crisis, such practices are not commonly practiced due to costs and deficiencies in SMEs' capabilities. However, crises can serve as a 'salience catalyst', foregrounding an issue that was once latent. The lasting translation of this increased salience into routine organisational practice then depends on a variety of factors, with organisational readiness for change and leadership commitment for innovation most significant.

Climate and sustainability drivers are also having an influence, especially in areas where SMEs are at risk or regulated upon. However, the literature suggests that environmental risks are often integrated through fragmented practices (safety measures, compliance checklists) rather than through unified risk governance, indicating that the field is still moving from sectoral treatment (e.g., occupational safety) toward integrated enterprise-level risk management in SMEs.

While the partial support for P4 does not qualify as weak relevance, it does however suggest an emerging determinant set, which is gradually increasing in importance relative to traditional risks with newer digital, climate and system risks becoming more frequent and costing SMEs more. Future reviews will also require increased referencing to domain specific risk literatures (cybersecurity, OSH, BCM) and inclusion in risk adoption models by SMEs .

5.3. Informational determinants as a "missing middle" (P5)

While informational determinants featured less frequently than internal, managerial, and external determinants, their potential influence appears greater than their numerical representation suggests. In SMEs, several barriers to innovation adoption stem from informational instead of technical reasons. These include the lack of timely data, specific risk indicators, documentation habits and reporting processes. As a result, formalised risk management may be perceived as an abstract or low-value activity, thereby reducing its perceived return on investment and limiting adoption incentives. Informational capability refers to the ability to transform ambiguity into signals for adoption and learning (López & Hiebl, 2015).

These studies pointed out that with the provision of training, external advisory support and the use of standardised instruments, weaknesses in the internal capabilities of consultants can be compensated for and better quality of adoption can be achieved. From a diffusion perspective, the extent to which organisations, particularly SMEs, adopt, adapt or reject frameworks such as ERM is determined by their knowledge transfer capability and the perceived level of complexity in implementing the framework.

Cybersecurity and digital risk research faces an information bottleneck when it comes to small to medium enterprises (SMEs), with these organisations underadopting cybersecurity measures due to a lack of knowledge regarding detection and response, difficulties in prioritising different controls, and an inability to translate technical guidance into practical organisational procedures.

Information-related factors were mentioned in the reviewed corpus less frequently than other factors and apparently were often treated as part of a discussion of other factors such as governance, an organization's accounting systems, its leadership or its overall organizational capabilities. Information of high quality, appropriate reporting, complete and accurate internal and external reporting, adequate documentation, appropriate training, and effective support from advisors all appear to have a considerable impact on reducing uncertainty and fostering organizational learning. Thus, as noted previously, the capabilities of an organization with respect to information (information capabilities) should be a more explicit focus of future research on factors influencing the adoption of practices by SMEs, especially in the context of their digital transformation, their cybersecurity preparedness, and the long-term sustainability of their risk management practices.

Taken together, these findings support the view that informational determinants represent an emerging but strategically important dimension of SME risk management adoption, warranting greater attention in both future research and practice.

5.4. Reconciling convergence and divergence: a contingency-driven explanation

The results also help explain why prior findings sometimes appear contradictory across contexts. For instance, in settings with weak enforcement, regulatory

pressure may exist formally but has limited behavioural impact; therefore, managerial agency and informality become more decisive. While in less regulated value chains SMEs' willingness to informalise can prevent formalisation, in more regulated value chains, external demands can dominate and drive SMEs to formalisation, even when their managers are indifferent. (Dioubate, 2025).

Construction SMEs will require different capabilities than manufacturing SMEs to address contractual, liability and compliance risks related to documentation and planning for potential losses. Thus, the determinants to adoption are not only additive but also change in relative importance as institutions mature and as different sectors confront different risk profiles.

The synthesis also shows that informal risk management should not be equated with the absence of risk management. Indeed, many SMEs manage risks intentionally but implicitly, guided by entrepreneurial judgement and the desire to preserve organisational resources. Those informal risk management practices are sufficient for the short term but they become a liability at higher scales, greater complexity and during large shocks. Consequently, the adoption question must be recast from whether risk practices exist, to how risk practices evolve from informal to formal and from reactive to strategic.

This contingency interpretation treats the antecedents as constants in kind (e.g., resources, leadership, external pressures) that differ in degree and/or configuration. Consequently, there is a need to move beyond a cross-sectional perspective, especially following a crisis, and adopt a more longitudinal orientation to observe change as environments shift over time.

5.5. Theoretical implications: toward a staged, multi-level adoption model

The findings seem to support a theoretically grounded complementary perspective on adoption, highlighting why and how RBV, institutional theory and behavioural perspectives explain adoption. In particular, the findings show that the internal readiness conditions that make adoption feasible, the adoption that is frequently externally triggered, and the managerial perception and attention that shape prioritisation and persistence all operate through the way that risk is perceived and framed by managers. The theoretical synthesis thus supports an integrated view of adoption as a dynamic process unfolding through four stages: risk salience and framing, commitment and legitimacy, initial formalisation, and integration and learning (Crovini et al., 2021).

In addition to the risks mentioned earlier, there are digital risks and sustainability risks that are starting to gain prominence. As a result, classical ERM models may need to be interpreted in the context of SMEs. While common challenges to adopting ERM are complexity and abstraction, the literature suggests that ERM frameworks can be made simpler and organised in a modular fashion to enable step-by-step maturity-based development of ERM capabilities instead of a 'big-bang' approach (Al-Dosari & Fetais, 2023).

Beyond highlighting the relevance of behavioural determinants, informational determinants also provide a bridge to innovation diffusion perspectives, that is, adoption of innovations is influenced by perceived relative advantage, complexity and compatibility which all depend on adequate knowledge, on tools and on measurement instruments. This suggests that also for the adoption of information systems and innovations for disaster risk management theoretical integration should position information quality and learning routines as crucial variables that mediate between determinants (leadership, etc.) and outcomes (resilience, etc.).

Moreover, a recent synthesis (St-Pierre et al. 2023) supports the view that risk management can be a strategic capability enhancing resilience and performance, but it is very difficult to establish unique and significant causal relationships between risk management and performance due to (1) the use of unsuitable and multiple risk management measures, and (2) the prevalence of cross-sectional research designs. Building better theory, thus, requires a focus on clearer constructs (e.g., adoption depth, sophistication, integration) and mediation mechanisms rather than "positive impact" claims.

More broadly, the findings support the usefulness of the integrated five-category typology proposed in this study, which provides a structured framework for understanding how internal, managerial, external, environmental, and informational determinants interact to shape SME risk management adoption.

5.6. Managerial and policy implications aligned with the supported propositions

Building on the evidence supporting propositions P1–P3, we contend that risk management should be viewed as a capability-building process for SMEs, beginning with simple low-cost methods (e.g. risk registers, scenario planning sessions, supplier dependency mappings) which are feasible within the organization's limited resources, and subsequently escalating formalization as planning sophistication and associated information systems mature.

Complementing P1, P2 underscores the critical dimension of leadership commitment, translating into more than symbolic support, and shaping whether risk culture is actually embodied into practices and daily routines around budgeting, management and decision-making. As such, building managerial capabilities among SME owners and managers (financial, digital, and crisis-management literacy) may generate

substantial benefits by shifting perceptions of risk from a burden to a strategic asset.

Our findings at the contingency level, P3, imply that large-firm ERM models should not be unconditionally transferred to SMEs. There is a need for standards that are SME-oriented, subsidised training, sectoral toolkits, and incentives to adopt a basic reporting system. By addressing these, complexity barriers can be reduced while the potential for better quality and comparability is increased.

Finally, the emerging evidence associated with propositions P4 and P5 highlights the growing importance of environmental and informational determinants in contemporary SME risk environments. Policymakers, industry associations, and support organisations should therefore expand their efforts beyond traditional compliance requirements by promoting cybersecurity awareness, business continuity planning, digital resilience, training programmes, and access to advisory support tailored to SME needs.

6. General Conclusion

This study synthesised evidence from 22 studies published between 2015 and 2025 to identify and explain the determinants influencing the adoption of risk management practices in SMEs. A PRISMA-guided systematic review combined with qualitative meta-synthesis enabled the development of an integrated five-category typology and the assessment of five analytical propositions concerning SME risk management adoption. The core triad of internal readiness (P1), managerial agency (P2), and external pressures (P3) best explain SME risk management practices, as reported by Falkner & Hiebl (2015).

However, it was particularly interesting to note the roles of environmental (P4) and informational (P5) determinants within the reviewed corpus. Such categories featured less frequently in SME risk management studies than the others and therefore were expected to feature less in the reviewed corpus. The particular evidence that did feature, however, indicated that these categories are becoming more influential in the context of today's risk environment faced by SMEs. This is an environment characterized by digitalisation, a whole range of cybersecurity risks, a great deal of climate-related uncertainty and an ever-increasing amount of information on which a business must draw when making decisions.

The main contribution of this paper is an integrated five-category-typology of determinants for SME risk management. The study explains how different categories of determinants interact and how they influence the adoption of risk management in SMEs in various contexts.

From an overall evidence-synthesis perspective, risk management adoption should not be viewed as a simple binary decision but rather as a gradual process that evolves from risk coping to a more integrated, comprehensive, and learning-oriented risk governance system. Determinants of adoption and their interactions differ across contexts, sectors, and institutions and institutions' environments.

The current review has several limitations. Although the final corpus comprised only 22 studies, the objective of the review was analytical depth rather than statistical generalisation. Therefore, the results are more suited to identifying determinant salience and describing explanatory patterns, rather than providing quantified effect sizes.

Second, there is substantial heterogeneity between SMEs with respect to definitions and operationalizations, including within specific industries. Moreover, most studies treat adoption of SMEs not as an either/or proposition but rather as a spectrum or continuous process. Thus, some studies treat the implementation of an ERM framework as adoption, while others may view the adoption of individual tools, such as inventory management, or use of informal SME processes as significant. This variation creates additional conceptual noise when comparing results from multiple studies.

Third, methodological shortcomings persist as most research operates through cross-sectional designs and narrative reviews that, by design, fail to establish temporal linkages or generate evidence on changing relationships post-crisis, thus obstructing potential for drawing causal inferences and stifling learning about gradual changes of determinants over time. As a result, claims about performance outcomes tend to be limited to correlative findings rather than attributing causal effects.

It is also important to highlight that the review employed an indexed, predominantly English language search which potentially oversums the volume of relevant, regionally specific, 'grey' literature available particularly for SMEs operating in emerging economies where formal publishing is patchy at best.

In future research, it would be useful to focus more on designs that are longitudinal or quasi-experimental in nature to gain a better understanding of how the various drivers (leadership commitment, culture, learning) have a causal impact on the adoption and persistence trajectories in post-crisis periods. This would move the field from determinant identification to mechanism -based validation.

More sectoral and regional diversity is needed. Service SMEs, informal-sector SMEs and SMEs in underrepresented regions have not received sufficient attention to ensure generalisability and to inform intervention design. Comparative multi-country studies can help to disentangle the effects of institutional strength, enforcement, and value-chain integration.
Evidence also exists to support the closer integration of digital transformation and cybersecurity considerations

into SME risk adoption models. The need for frameworks which are specifically designed for, and empirically validated on, SMEs, is clearly articulated, and there is particular interest in models that incorporate both behavioural and organisational and technical elements, especially as it relates to how small organisations utilise AI-enabled technologies to mitigate the impact of limited resources and capabilities.

Heinze & Henschel (2021) also recommend finally equipping researchers with standardised instruments to measure risk management sophistication and the depth of adoption. With such instruments lacking, comparative analysis is highly tentative and even potentially impossible, and meta-analyses are unable to reach their full potential when it comes to risk management practices. Ultimately, the development of standardised measures and longitudinal evidence would significantly strengthen future research on SME risk management adoption and support the design of more effective managerial and policy interventions.

Declarations

Author Contributions

Conceptualization, R.I. and A.R.; methodology, R.I. and A.R.; search strategy and data collection, R.I.; study selection and screening, R.I. and S.M.; data extraction, R.I.; qualitative synthesis, R.I.; validation, S.M. and A.R.; writing - original draft preparation, R.I.; writing - review and editing, R.I., S.M. and A.R.; supervision, A.R. All authors have read and agreed to the published version of the manuscript.

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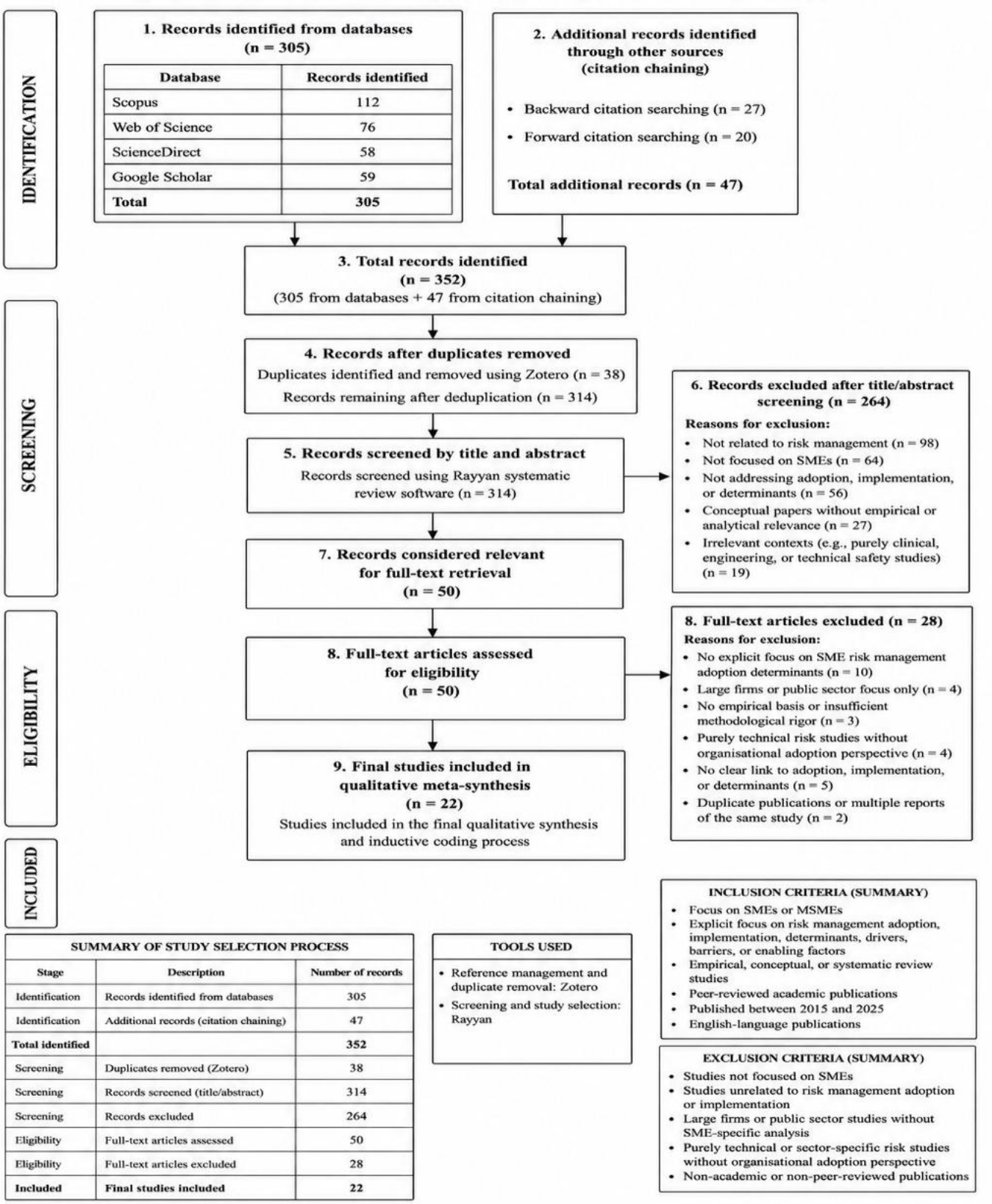
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APPENDIX

APPENDIX 1

Figure 1. PRISMA 2020 flow diagram illustrating the identification, screening, eligibility assessment, and inclusion process of studies related to SME risk management adoption (Source: Developed by authors).



SUMMARY OF STUDY SELECTION PROCESS		
Stage	**Description**	**Number of records**
Identification	Records identified from databases	305
Identification	Additional records (citation chaining)	47
Total identified		**352**
Screening	Duplicates removed (Zotero)	38
Screening	Records screened (title/abstract)	314
Screening	Records excluded	264
Eligibility	Full-text articles assessed	50
Eligibility	Full-text articles excluded	28
Included	**Final studies included**	**22**

TOOLS USED

- Reference management and duplicate removal: Zotero
- Screening and study selection: Rayyan

INCLUSION CRITERIA (SUMMARY)

- Focus on SMEs or MSMEs
- Explicit focus on risk management adoption, implementation, determinants, drivers, barriers, or enabling factors
- Empirical, conceptual, or systematic review studies
- Peer-reviewed academic publications
- Published between 2015 and 2025
- English-language publications

EXCLUSION CRITERIA (SUMMARY)

- Studies not focused on SMEs
- Studies unrelated to risk management adoption or implementation
- Large firms or public sector studies without SME-specific analysis
- Purely technical or sector-specific risk studies without organisational adoption perspective
- Non-academic or non-peer-reviewed publications

APPENDIX 2

Table 7. General Information Extracted from the Validated Corpus of 22 Articles 2015–2025 (Source: Developed by authors)

Authors	Year	Country & Study Context	Type of company studied	Methodology used
Falkner & Hiebl	2015	Austria & Europe – Literature review	SMEs (general)	Systematic literature review
Chemlal, Mrabet & Benazzou	2017	Morocco – National SMEs	Moroccan SMEs	Exploratory / State of the art
Afolabi & James	2018	Nigeria – SMEs in Osun State	SMEs (various sectors)	Quantitative survey
Lima & Verbano	2019	Italy – Case study context	Italian SME (project-based)	Case study
Ferreira de Araújo Lima, Crema & Verbano	2020	Italy & International	SMEs (general)	Systematic literature review
Baloyi & Ozumba	2020	South Africa – Construction sector	Small enterprises (construction SMEs)	Case study
Vallée-Tourangeau & Vallée-Tourangeau	2020	UK – Psychology applied to management	SMEs (managerial cognition)	Narrative review
Crovini, Ossola & Britzelmaier	2021	Europe – Management perspective	SMEs (general)	Advanced literature review
Chakabva, Tengeh & Dubihlela	2021	South Africa – Emerging market SMEs	SMEs (general)	Qualitative
Mohamad Fauzi et al.	2022	Malaysia – SMEs	SMEs (general)	Narrative review
Mthiyane, Van Der Poll & Tshehla	2022	South Africa – Developing countries	SMEs (general)	Conceptual framework
Rodríguez-Espíndola et al.	2022	UK & International – Digital manufacturing	Manufacturing SMEs	Quantitative
Tajer, Benyaich & Rigar	2022	Morocco – SMEs resilience	Moroccan SMEs	Qualitative
Buganová, Hudáková, Šimíčková & Mošková	2023	Slovakia – SMEs	SMEs (general)	Quantitative
Chakabva & Tengeh	2023	South Africa – SMEs	SMEs (general)	Quantitative
Ahmad & Teo	2024	Malaysia – SMEs ERM adoption	SMEs (general)	Literature review
Bin-Husayn, Abdullah & Rimmel	2024	Middle East – SMEs	SMEs (general)	Systematic literature review
Glowka, Hule & Zehrer	2024	Austria – Family businesses	Family SMEs	Qualitative
Ulupui, Zairin, Musyaffi & Sutanti	2024	Indonesia – SMEs	SMEs (general)	Quantitative
Yuwono & Rachmawati	2024	Indonesia – SMEs	SMEs (general)	Systematic literature review
Dioubate	2025	West Africa – SMEs	SMEs (general)	Conceptual / Case-based
Sotamaa, Reiman & Kauppila	2025	Finland – Manufacturing & digitalisation	Manufacturing SMEs	Systematic literature review