

# The Implementation of Enterprise Risk Management (ERM) Frameworks in Small and Medium Enterprises (SMES): A Literature Review

Siti Aminah Ahmad, Poh-Chuin Teo

Azman Hashim International Business School, Universiti Teknologi Malaysia

54100 Kuala Lumpur, Malaysia

Email: sitiaminah.a@graduate.utm.my

To Link this Article: <http://dx.doi.org/10.6007/IJARBS/v14-i9/22353>

DOI:10.6007/IJARBS/v14-i9/22353

*Published Date:* 04 September 2024

## Abstract

This literature review examines the implementation of Enterprise Risk Management (ERM) frameworks within Small and Medium Enterprises (SMEs), emphasizing the distinctive challenges and advantages for these organizations. SMEs often encounter obstacles such as limited financial resources, informal business processes, and a lack of specialized risk management expertise, which can impede effective risk management. Despite these challenges, the adoption of ERM frameworks can offer significant benefits, including improved risk identification and mitigation, enhanced decision-making capabilities, better resource allocation, and increased stakeholder confidence. The review identifies notable research gaps, including a scarcity of SME-focused studies, a lack of longitudinal research, and insufficient exploration of industry-specific ERM practices. The literature reveals contradictions, particularly concerning the complexity of ERM frameworks like COSO and ISO 31000, underscoring the necessity for simplified and tailored models for SMEs. However, there is a consensus on the critical role of leadership commitment, organizational culture, and the integration of ERM into strategic planning for successful implementation. Practical recommendations for SMEs include fostering a risk-aware culture, securing leadership commitment, and leveraging technology to enhance risk management processes. This review aims to contribute to a deeper understanding of ERM practices in SMEs and offers practical recommendations to enhance their resilience, competitiveness, and long-term success in a dynamic business environment.

**Keywords:** Enterprise Risk Management (ERM), Small and Medium Enterprises (SMEs), Risk Management Frameworks, SME Risk Mitigation.

## Introduction

In today's dynamic and increasingly complex business environment, organizations are continually exposed to a wide array of risks that can significantly impact their operations, reputation, and overall sustainability. Enterprise Risk Management (ERM) has emerged as a

holistic and integrated approach to identifying, assessing, and managing risks across an organization (Gordon, Loeb, & Tseng, 2009; Anton & Afloarei Nucu, 2020). Unlike traditional risk management practices that often focus on specific areas or silos, ERM provides a comprehensive framework that aligns risk management with an organization's strategic objectives and enhances its ability to respond to both internal and external challenges. ERM's importance has grown in recent years due to several factors, including heightened regulatory demands, increased market volatility, technological advancements, and the global nature of business operations. Regulatory requirements have become more stringent, compelling organizations to adopt comprehensive risk management strategies to ensure compliance and avoid penalties (Anton & Afloarei Nucu, 2020). Market volatility, driven by economic fluctuations and geopolitical events, necessitates robust risk management to stabilize operations and protect against financial instability (Javaid et al., 2022). Technological advancements have introduced new risks, such as cyber threats and data breaches, while also offering tools for better risk assessment and mitigation. Organizations must continuously update their risk management practices to address these evolving technological risks (Haleem et al., 2022). Additionally, the interconnectedness of global markets amplifies the impact of risks, making an integrated ERM approach essential for identifying and managing risks across different regions and markets (Anton & Afloarei Nucu, 2020). ERM enables organizations to adopt a proactive stance on risk, promoting a risk-aware culture that permeates all levels of the organization. Through ERM, companies can better anticipate potential threats and opportunities, ensuring long-term sustainability and value creation.

This literature review aims to analyze the existing body of knowledge on the implementation of ERM frameworks within Small and Medium Enterprises (SMEs). Small and medium-sized enterprises (SMEs) are crucial for the global economy, significantly contributing to employment, innovation, and economic growth. They drive innovation, enhancing performance and competitiveness, especially during economic uncertainty (Bercovitz & Mitchell, 2007; Ortiz-Villajos, 2014). Furthermore, SMEs support sustainable development and inclusive economic growth, aligning with Sustainable Development Goals (George et al., 2016; Kamal-Chaoui, 2017). However, small and medium-sized enterprises (SMEs) face unique challenges that set them apart from larger organizations. These include limited financial resources, a lack of specialized risk management expertise, and less formalized business processes, which can hinder their ability to effectively manage risks. Financial constraints often limit SMEs' ability to invest in advanced risk management systems and hire skilled professionals, leaving them more vulnerable to economic fluctuations and crises (Brown, Rocha, & Cowling, 2020). Additionally, SMEs typically lack the structured risk management frameworks that larger firms possess, which can further impede their ability to anticipate and mitigate risks effectively (Hiebl, Duller, & Neubauer, 2019). By synthesizing findings from various studies, this review seeks to provide a detailed understanding of how ERM can be effectively implemented in SMEs, the benefits it offers, and the barriers to its adoption. Furthermore, this review will explore the current state of ERM practices in SMEs, the theoretical foundations underpinning ERM, and practical insights drawn from case studies and empirical evidence. The goal is to present a comprehensive overview that can inform both academic research and practical applications in the SME sector.

The scope of this review is specifically focused on SMEs due to their distinct characteristics and the critical role they play in the economic landscape. Unlike larger corporations, SMEs

often operate with limited resources and may lack the sophisticated risk management infrastructure found in bigger firms. Despite these constraints, SMEs are crucial drivers of economic activity, innovation, and employment. Therefore, understanding how ERM can be tailored to suit the needs of SMEs is of paramount importance. This review will explore the specific risks faced by SMEs, such as financial instability, market fluctuations, regulatory compliance issues, supply chain disruptions, and technological risks. It will delve into the advantages of adopting an ERM framework, including improved risk identification and mitigation, enhanced decision-making capabilities, better resource allocation, and increased stakeholder confidence. Additionally, the review will examine both internal and external factors that influence the successful implementation of ERM in SMEs, such as organizational culture, leadership commitment, regulatory requirements, and technological advancements. Furthermore, the review will discuss various theoretical models and frameworks applicable to SMEs, including the COSO ERM framework and ISO 31000. These models provide structured approaches for implementing ERM, offering guidelines and best practices that can be adapted to the SME context. Insights from case studies and empirical evidence will be integrated to illustrate practical examples of ERM implementation in SMEs, highlighting both successes and challenges encountered.

By delving into these aspects, this review paper will contribute to a deeper understanding of ERM practices in SMEs and offer practical recommendations for their effective adoption. Ultimately, this review aims to highlight the importance of ERM in enhancing the resilience and competitiveness of SMEs in an ever-evolving risk landscape. The findings will be valuable for SME owners, managers, policymakers, and researchers interested in advancing risk management practices in the SME sector. Through this comprehensive exploration, the review will underscore the critical role of ERM in fostering sustainable growth and stability for SMEs, enabling them to navigate uncertainties and capitalize on opportunities in a rapidly changing business environment.

### **Defining ERM and SMEs**

#### *Enterprise Risk Management*

Enterprise Risk Management (ERM) is a structured, consistent, and continuous process applied across an entire organization to identify, assess, manage, and monitor risks that may affect the achievement of organizational objectives (Institute of Internal Auditors, 2009; Anton & Nucu, 2020). Enterprise Risk Management (ERM) represents an integrated approach that considers a broad spectrum of risks, including strategic, operational, financial, and compliance risks, aligning risk management with the organization's overall strategy and goals. Unlike traditional risk management practices that often focus on specific areas or silos, ERM ensures a holistic view of risks, promoting a proactive risk-aware culture across the organization (Dafikpaku, 2011; Schiller & Prpich, 2014).

The key components of Enterprise Risk Management (ERM) encompass risk identification, risk assessment, risk response, risk monitoring and reporting, and risk governance and culture. These components are critical for ensuring a holistic and effective approach to managing risks across an organization. Risk identification involves recognizing potential risks that could impact the organization, necessitating a comprehensive understanding of the internal and external environments (Anton & Nucu, 2020; CFO.University, 2024). Risk assessment follows, evaluating the identified risks in terms of their likelihood and impact through both qualitative

and quantitative analyses to prioritize them appropriately (Anton & Nucu, 2020). Risk response involves developing strategies to manage these risks, which may include avoidance, reduction, sharing (e.g., through insurance), or acceptance (CFO.University, 2024). Continuous tracking of identified risks and the effectiveness of management strategies constitutes risk monitoring and reporting, ensuring stakeholders remain informed about risk management activities and outcomes (CFO.University, 2024). Finally, risk governance and culture involve establishing a risk-aware culture and governance structure that supports ERM practices, defining roles and responsibilities, fostering a risk-aware culture, and ensuring top management and board oversight (CFO.University, 2024).

The primary objectives of ERM include enhancing risk awareness, improving decision-making, protecting and creating value, ensuring compliance and governance, and aligning risk management with strategic objectives (Anton & Nucu, 2020; CFO.University, 2024). By cultivating a culture where employees understand the importance of risk management and proactively address risks, ERM enhances the organization's ability to make informed decisions that consider potential risks and opportunities (Anton & Nucu, 2020). This process protects the organization's assets and reputation while identifying opportunities for value creation, ensuring compliance with regulatory requirements, and adhering to best practices in corporate governance (CFO.University, 2024). Ultimately, ERM aligns risk management with the organization's strategic objectives to support overall business goals.

### **Small and Medium Enterprises**

Small and Medium Enterprises (SMEs) are defined differently across countries and regulatory bodies, typically based on the number of employees and financial thresholds. In the European Union, a small enterprise has fewer than 50 employees and an annual turnover of less than €10 million, while a medium-sized enterprise has fewer than 250 employees and an annual turnover of less than €50 million (European Commission, 2015). In the United States, the Small Business Administration (SBA) defines SMEs based on industry-specific standards, typically including firms with fewer than 500 employees and annual receipts below \$7.5 million for most non-manufacturing industries (Kushnir et al., 2010). In Asia, definitions of Small and Medium Enterprises (SMEs) vary widely across countries. In China, SMEs in the industrial sector are defined as having fewer than 1,000 employees and an annual revenue of less than ¥400 million (OECD, 2016). In Japan, SMEs are defined by the number of employees or capital; specifically, they include companies with fewer than 300 employees or capital of less than ¥300 million in the manufacturing sector (EU SME Centre, 2021). In Malaysia, according to SME Corp Malaysia, SMEs in the manufacturing sector are defined as having a sales turnover not exceeding RM50 million or full-time employees not exceeding 200. For the services and other sectors, SMEs are defined as having a sales turnover not exceeding RM20 million or full-time employees not exceeding 75 (Emerald Insight, 2023).

Small and Medium Enterprises (SMEs) play a crucial role in the global economy due to their significant contributions to national and global GDP, employment, innovation, social impact, and supply chain integration. SMEs account for approximately 90% of all businesses and are responsible for more than 50% of employment worldwide, contributing up to 40% of GDP in emerging markets (World Bank, 2021; World Economic Forum, 2021). SMEs drive economic development by fostering innovation and competitiveness. They are often the largest employers in many economies, providing substantial job opportunities that help reduce

unemployment rates and foster economic stability. SMEs are typically more agile and innovative compared to larger corporations, enabling them to quickly adapt to market changes and develop new products and services, thus driving technological and process innovations (Springer, 2023). Moreover, SMEs often have strong ties to their local communities, contributing to social stability and development by supporting local economies and providing opportunities for local suppliers and partners. They play integral roles in global supply chains by supplying goods and services to larger enterprises and operating in niche markets (World Bank, 2021). Understanding the unique characteristics and significance of SMEs is essential for developing effective ERM strategies tailored to their specific needs. Aligning ERM practices with the nature and scale of SMEs enhances their resilience, ensures sustainable growth, and enables these businesses to continue contributing robustly to the economy.

### **Importance of ERM in SMEs**

#### *Risk Exposure*

Small and Medium Enterprises (SMEs) are exposed to a variety of risks that can significantly impact their operations, profitability, and sustainability. These risks can be broadly categorized into financial, operational, strategic, and compliance risks (Kardoš et al., 2023; Jiménez et al., 2024). Financial risks are perhaps the most immediate and impactful for SMEs. These include risks related to cash flow management, credit availability, interest rate fluctuations, and currency exchange rates. Given that SMEs often operate with limited financial reserves and access to capital, financial instability can quickly lead to liquidity crises or insolvency. Additionally, reliance on a limited number of customers or suppliers can exacerbate financial vulnerability. The priority weight for risk criteria was found to be 52% for probability and 48% for consequences, with an increase in bank charges identified as the highest type of risk faced by SMEs (Ahmad, AboAlkhair, & Tork, 2023). Furthermore, the importance of cash flow on SMEs' working capital management (WCM) and performance is demonstrated by findings that WCM has a significantly negative impact on SME performance, while available cash flow has a significantly positive relationship with performance (Afrifa & Tingbani, 2018).

Operational risks stem from the day-to-day activities of running a business. For SMEs, these risks can include disruptions in supply chains, production issues, equipment failures, and human error. Since SMEs may lack the redundancy and backup systems that larger firms possess, operational disruptions can cause significant delays and financial losses. Furthermore, reliance on key personnel can create vulnerabilities if these individuals become unavailable or leave the company. SMEs face unique challenges in supply chain resilience, requiring strategies like lean management and IT utilization to mitigate risks (Safari et al., 2024). Effective operational resilience involves the ability to absorb and recover from disruptions, crucial for SME survival and performance (Liu et al., 2023).

Strategic risks involve the potential for adverse outcomes resulting from business decisions or the external environment. These can include changes in market demand, competitive pressures, technological advancements, and shifts in consumer preferences. SMEs often face strategic risks due to their limited market presence and resources to adapt to rapid changes. Poor strategic planning or failure to innovate can lead to loss of market share and profitability. Research shows that SMEs need to manage strategic risks effectively to maintain

sustainability and competitiveness. For example, in the manufacturing sector, strategic risk management contributes significantly to the economic, social, and environmental pillars of sustainability (Jiménez et al., 2024). Furthermore, adopting market-driven strategies and understanding competitive intensity and technological dynamics are crucial for SMEs to achieve competitive growth (Hai et al., 2014).

Compliance risks arise from the need to adhere to laws, regulations, and industry standards. SMEs, particularly those operating internationally, must navigate a complex landscape of regulatory requirements. Non-compliance can result in legal penalties, financial losses, and reputational damage. SMEs often struggle with compliance due to limited expertise and resources dedicated to understanding and implementing regulatory changes. Research indicates that the extent of internal compliance programs in SMEs can vary significantly. Effective compliance management typically includes senior management commitment, formal codes of conduct, systematic checks for sanctions, and regular compliance training and audits (Elgammal et al., 2015). Compliance programs are essential for avoiding penalties and maintaining good business practices (Elgammal et al., 2015; Hauser & Hogenacker, 2014). Additionally, compliance management helps SMEs adapt to regulatory changes and avoid potential non-compliance issues (Safari et al., 2024).

### **Benefits of ERM**

Implementing an Enterprise Risk Management (ERM) framework offers numerous benefits for SMEs, enhancing their ability to manage risks and improve overall performance. ERM provides a systematic approach to identifying risks across all areas of the business, allowing SMEs to uncover potential threats that might otherwise go unnoticed. This proactive identification enables timely intervention and mitigation, reducing the likelihood of significant disruptions (Tan & Lee, 2022). ERM integrates risk management into the strategic decision-making process. With a clearer understanding of the risks associated with various options, SMEs can make more informed decisions, leading to better strategic alignment and resource allocation. This ensures that risks are considered in every major business decision, ultimately improving overall business performance (Gordon et al., 2009). Through ERM, SMEs can prioritize risks based on their potential impact and likelihood. This prioritization allows for a more efficient allocation of resources, focusing efforts on the most critical areas. As a result, SMEs can avoid over-allocating resources to low-impact risks while ensuring that high-impact risks are adequately managed (Crovini et al., 2021). Implementing an ERM framework also demonstrates a commitment to robust risk management, which can enhance the confidence of stakeholders, including investors, customers, suppliers, and regulators. This increased confidence can lead to stronger relationships, improved reputation, and greater opportunities for growth and investment. Stakeholders are more likely to trust a business that has clearly defined processes for managing risks (Harper, 2018).

ERM contributes to the development of business continuity plans and resilience strategies. By identifying potential disruptions and planning responses, SMEs can ensure that they are better prepared to handle crises and recover more quickly from adverse events. This resilience is crucial for maintaining operations and protecting the business in the long term (Hida, 2017). ERM also helps SMEs navigate complex regulatory environments by providing a framework for compliance and governance. This ensures that the business adheres to relevant laws and standards, reducing the risk of legal penalties and enhancing corporate

governance. Strong compliance and governance practices contribute to the overall integrity and ethical standards of the business (Gordon et al., 2009). An effective ERM framework can serve as a competitive advantage. SMEs that manage risks well are better positioned to seize opportunities and adapt to changes in the market. This proactive approach to risk management can differentiate the business from competitors who may be less prepared for uncertainties (Hoyt & Liebenberg, 2011). In summary, the importance of ERM in SMEs cannot be overstated. By addressing a wide range of risks through a structured and integrated approach, ERM enhances the ability of SMEs to navigate uncertainties, make informed decisions, allocate resources efficiently, and build stakeholder trust. Ultimately, ERM contributes to the long-term sustainability and success of SMEs in a volatile business environment.

### **Challenges in Implementing ERM in SMEs**

The successful implementation of Enterprise Risk Management (ERM) within Small and Medium Enterprises (SMEs) is often significantly hampered by resource constraints, particularly financial and human resources. SMEs typically operate with tighter budgets and fewer staff members compared to larger organizations, making it challenging to allocate the necessary resources for comprehensive ERM practices. Financial limitations can restrict the ability of SMEs to invest in advanced risk management tools, hire specialized personnel, or provide extensive training to existing staff (Tan & Lee, 2022). This lack of investment impairs the capability to perform thorough risk assessments, develop robust risk mitigation strategies, and maintain continuous monitoring of risk factors (Crovini et al., 2021). Consequently, the adoption of ERM in SMEs can be superficial and fragmented, reducing its overall effectiveness and leaving the organization vulnerable to unforeseen risks (Gordon et al., 2009).

Another significant barrier to the adoption of ERM in SMEs is the lack of awareness and understanding of its benefits and processes among SME owners and managers. Many SME leaders may not fully grasp the strategic value that ERM brings in terms of safeguarding the business against potential risks and enhancing decision-making processes. This knowledge gap can result in a lower prioritization of ERM initiatives, as it may be perceived as a non-essential activity rather than a critical component of the business strategy. Without adequate awareness, there is often insufficient commitment to integrating ERM into the organizational framework, leading to minimal or inconsistent application of risk management principles (Hida, 2017).

Cultural factors within SMEs can also pose significant challenges to the implementation of ERM. Many SMEs have established ways of operating and may exhibit resistance to change, particularly when it involves adopting new and unfamiliar practices such as ERM (Gordon et al., 2009). This resistance can stem from a deeply ingrained risk-averse culture, where the focus is predominantly on immediate business operations rather than long-term strategic planning. Employees and managers may be reluctant to embrace ERM due to a fear of the unknown or skepticism about its relevance to their specific business context. Overcoming these cultural barriers requires not only education and training but also a shift in mindset to appreciate the value of proactive risk management (Crovini et al., 2021).

The perception of ERM as a complex and intricate process is another significant impediment for SMEs. ERM involves systematic identification, assessment, and management of risks,

which can appear daunting to smaller organizations lacking the expertise and experience in this domain (Tan & Lee, 2022). The comprehensive nature of ERM, with its requirement for detailed documentation, continuous monitoring, and regular updates, can be overwhelming for SMEs. This complexity can discourage SME leaders from pursuing ERM, fearing that the process may be too cumbersome and not aligned with the streamlined operations typical of smaller businesses (Crovini et al., 2021).

In conclusion, the successful implementation of ERM in SMEs is impeded by multiple challenges, including resource constraints, lack of awareness, cultural barriers, and the perceived complexity of the process. Addressing these challenges requires a multi-faceted approach that includes tailored ERM frameworks, targeted education and training programs, and efforts to foster a risk-aware culture within SMEs. By overcoming these barriers, SMEs can enhance their resilience, improve strategic decision-making, and ensure sustainable growth in an increasingly uncertain business environment.

### **Factors Influencing ERM Adoption in SMEs**

The adoption of Enterprise Risk Management (ERM) in Small and Medium Enterprises (SMEs) is shaped by a myriad of factors that either drive or hinder its implementation. Understanding these factors is essential for SMEs to develop effective ERM strategies that enhance their resilience and competitiveness. This section explores the key factors influencing ERM adoption in SMEs, including regulatory requirements, internal dynamics, external pressures, and technological advancements.

The impact of regulatory requirements and compliance obligations plays a crucial role in the adoption of Enterprise Risk Management (ERM) within SMEs. Regulations often mandate specific risk management practices to ensure the stability and integrity of businesses within various industries. Compliance with these regulations can drive SMEs to adopt ERM frameworks to avoid legal penalties, financial losses, and reputational damage (Tan & Lee, 2022). Regulatory bodies may require detailed risk assessments, reporting, and mitigation plans, compelling SMEs to integrate ERM into their operational processes. Adherence to regulatory requirements can enhance the credibility and trustworthiness of SMEs in the eyes of customers, investors, and other stakeholders, providing a competitive edge in the market (Gordon et al., 2009).

Internal factors such as organizational culture, leadership commitment, and internal capabilities significantly influence the extent of ERM adoption in SMEs. An organizational culture that values proactive risk management and continuous improvement can facilitate the integration of ERM practices. Leadership commitment is paramount; when top management demonstrates a strong commitment to ERM, it sets a tone that encourages the entire organization to prioritize risk management (Ogutu et al., 2018). Internal capabilities, including the availability of skilled personnel and adequate resources, also play a vital role. SMEs with a dedicated risk management team and sufficient financial resources are more likely to implement ERM effectively. Additionally, internal communication and collaboration across departments can enhance the identification and management of risks (Crovini et al., 2021).



External stakeholders, market conditions, and competitive pressures significantly influence ERM adoption in SMEs. Stakeholders such as investors, customers, suppliers, and insurers often demand robust risk management practices to ensure the sustainability and reliability of business operations. Market conditions, including economic volatility, technological advancements, and regulatory changes, can create new risks and opportunities that necessitate a comprehensive risk management approach (Tan & Lee, 2022). Competitive pressures also drive SMEs to adopt ERM to maintain a competitive advantage. Businesses that effectively manage risks are better positioned to capitalize on opportunities, mitigate threats, and achieve long-term success. External audits and assessments by industry bodies can further motivate SMEs to implement ERM by highlighting areas for improvement and benchmarking against best practices (Crovini et al., 2021).

The adoption of advanced risk management software and tools is a critical factor facilitating ERM implementation in SMEs. Technological advancements have made it easier for SMEs to access and utilize sophisticated risk management solutions that were previously affordable only to larger organizations. Risk management software can automate various aspects of ERM, such as risk identification, assessment, monitoring, and reporting, reducing the burden on human resources and increasing efficiency (Gordon et al., 2009). These tools provide real-time data and analytics, enabling SMEs to make informed decisions and respond swiftly to emerging risks (Ogotu et al., 2018). Additionally, technology can enhance communication and collaboration across the organization, fostering a risk-aware culture and ensuring that risk management practices are integrated into daily operations (Tan & Lee, 2022).

The adoption of ERM in SMEs is influenced by a combination of regulatory requirements, internal factors, external pressures, and technological advancements. Understanding and addressing these factors can help SMEs overcome barriers to ERM implementation and build a robust risk management framework that supports sustainable growth and resilience in a dynamic business environment. By leveraging regulatory mandates, fostering a supportive organizational culture, engaging with external stakeholders, and embracing technological innovations, SMEs can effectively manage risks and capitalize on opportunities for long-term success.

### **Case Studies and Empirical Evidence**

Enterprise Risk Management (ERM) is a critical component in the operations of small and medium-sized enterprises (SMEs), and understanding its practical application is essential for successful implementation (Bettanti & Lanati, 2023). Real-world case studies and empirical evidence offer valuable insights into the challenges and successes faced by SMEs when implementing ERM frameworks (Bettanti & Lanati, 2023). Analyzing these examples allows organizations to gain a deeper understanding of the complexities involved in ERM implementation and learn from the experiences of others to enhance their risk management practices (Bettanti & Lanati, 2023).

One illustrative case study of successful ERM implementation involves a mid-sized European manufacturer specializing in high-precision components for the automotive and aerospace industries (Bettanti & Lanati, 2023). This manufacturer encountered various risks, such as supply chain disruptions, regulatory compliance issues, and technological advancements, leading them to adopt a comprehensive ERM framework (Bettanti & Lanati, 2023). The

success of this implementation was attributed to strong leadership commitment, aligning with studies emphasizing the significance of top management support in effective ERM adoption (Bettanti & Lanati, 2023). Additionally, the company's focus on tailored risk mitigation strategies aligned with best practices observed in successful ERM case studies, highlighting the importance of proactive risk management and compliance systems (Bettanti & Lanati, 2023).

Furthermore, the manufacturer's investment in fostering a risk-aware culture through extensive training programs and open communication about risks significantly contributed to the success of their ERM adoption (Bettanti & Lanati, 2023). Research indicates that a supportive organizational culture plays a crucial role in enhancing ERM implementation (Bettanti & Lanati, 2023). By utilizing advanced ERM software for real-time risk monitoring and reporting, along with leadership commitment and a conducive culture, the company achieved notable improvements in operational efficiency and cost reduction within the first year of ERM adoption (Bettanti & Lanati, 2023). These outcomes underscore the value of technology integration in ERM processes and its impact on organizational performance (Bettanti & Lanati, 2023).

Conversely, a case study of a small retail chain in the USA serves as an example of failed ERM implementation due to inadequate support from top management and a lack of comprehensive risk assessment (Bettanti & Lanati, 2023). The retail chain's superficial risk assessment and absence of key stakeholder engagement led to an incomplete understanding of risks, emphasizing the importance of thorough risk assessment in ERM initiatives (Bettanti & Lanati, 2023). The company's failure to invest in employee training and resistance from staff further impeded the ERM implementation, highlighting the critical role of employee buy-in and proper training in successful ERM adoption (Bettanti & Lanati, 2023).

Additionally, the retail chain's reliance on manual processes without advanced ERM tools resulted in ineffective risk management and continued challenges with supply chain disruptions and cybersecurity threats (Bettanti & Lanati, 2023). This case study demonstrates the negative consequences of overlooking technological integration in ERM projects and its impact on organizational performance (Bettanti & Lanati, 2023). Ultimately, the retail chain's decision to abandon the ERM initiative due to significant financial losses underscores the importance of addressing critical success factors in ERM implementation to avoid detrimental outcomes (Bettanti & Lanati, 2023).

The contrasting experiences of the manufacturing company and the retail chain underscore the critical factors influencing the success or failure of ERM implementation in SMEs. Leadership commitment, comprehensive risk assessment, employee engagement, technology integration, and a supportive organizational culture are key elements contributing to the effectiveness of ERM adoption (Bettanti & Lanati, 2023). By drawing lessons from these real-world examples and integrating best practices into their ERM frameworks, SMEs can navigate risk management complexities more effectively and drive sustainable growth.

### **Theoretical Models and Frameworks**

Implementing Enterprise Risk Management (ERM) in SMEs requires a solid understanding of various theoretical models and frameworks that guide risk management practices. These

frameworks provide structured approaches to identifying, assessing, and managing risks, ensuring that organizations can effectively mitigate potential threats and capitalize on opportunities. This section explores the most widely recognized ERM frameworks, including the COSO ERM Framework and ISO 31000, as well as other models that may be suitable for SMEs.

### **COSO ERM Framework: Overview and Applicability to SMEs**

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) ERM Framework is one of the most prominent risk management frameworks, offering a comprehensive and integrated approach to risk management. It emphasizes aligning risk management with an organization's strategy and performance, making it highly relevant for various business contexts, including SMEs. The COSO ERM Framework is built on five core components: governance and culture, strategy and objective-setting, performance, review and revision, and information, communication, and reporting (COSO, 2023).

- **Governance and Culture:** This component focuses on establishing a robust governance structure and fostering a risk-aware culture within the organization. It involves defining the roles and responsibilities of the board and management in risk management, and promoting ethical behavior and risk awareness among employees (Groepe, 2015). By creating a culture that values risk management, organizations can ensure that risk considerations are integrated into daily operations and strategic planning (Herrinton, 2012).
- **Strategy and Objective-Setting:** Risk management is embedded into the strategic planning process, ensuring that risk considerations are incorporated into strategic decisions and that objectives align with the organization's risk appetite. This proactive approach helps organizations anticipate and manage potential risks that could impact their strategic goals (Lundqvist, 2014). Integrating risk management into strategy setting allows for better alignment and more informed decision-making (Jordan et al., 2013).
- **Performance:** This component involves identifying and assessing risks that could impact the achievement of objectives, evaluating the likelihood and impact of risks, developing risk responses, and monitoring performance against objectives. This ongoing process ensures that risks are managed effectively to support the organization's goals (Hair et al., 2014). Regular performance reviews help in adjusting risk responses and maintaining alignment with strategic goals (Hoyt & Liebenberg, 2011).
- **Review and Revision:** Continuous monitoring and reviewing of the ERM process are essential to ensure its effectiveness. This component involves assessing changes in the internal and external environment and making necessary adjustments to the risk management process. Regular reviews help organizations stay adaptive and responsive to new risks (Jordan et al., 2013). Periodic revisions ensure the ERM framework remains relevant and effective (Lundqvist, 2014).
- **Information, Communication, and Reporting:** Ensuring that relevant risk information is communicated across the organization and to external stakeholders is crucial. This component maintains transparent and timely reporting of risk information to support decision-making. Clear communication channels help maintain an informed and cohesive approach to risk management (Hoyt & Liebenberg, 2011). Effective

communication enhances risk awareness and supports a proactive risk management culture (Groepe, 2015).

### **Applicability to SMEs**

The flexibility and scalability of the COSO ERM Framework make it particularly applicable to SMEs. SMEs can adapt the core principles of the COSO framework to fit their specific needs and context. Simplifying governance structures and focusing on critical risks that have the most significant impact on their operations can make the framework more accessible (Herrinton, 2012).

- **Flexibility:** SMEs can tailor the COSO principles to their size and industry, ensuring that risk management efforts are appropriately scaled. This flexibility allows SMEs to implement ERM without the need for extensive resources, making it more accessible and manageable (Henschel, 2007).
- **Cost-Effective Methods:** Given the budget constraints of SMEs, cost-effective methods for risk assessment and monitoring can be employed. This can include leveraging existing resources and technologies to manage risks effectively, ensuring that the implementation is feasible and sustainable (Groepe, 2015). Utilizing cost-effective tools helps SMEs achieve robust risk management without straining their financial resources (Hoyt & Liebenberg, 2011).
- **Scalability:** The scalable nature of the COSO ERM Framework means it can grow with the organization. As SMEs expand, they can incrementally enhance their ERM processes to address increasingly complex risks, ensuring long-term resilience and stability (Lundqvist, 2014). This scalability ensures that the ERM framework remains relevant as the organization evolves (Jordan et al., 2013).
- 

In summary, the COSO ERM Framework provides a robust structure for risk management that can be effectively applied to SMEs. By adapting the framework to their specific contexts, SMEs can enhance their risk management capabilities, ensuring better alignment with their strategic goals and improving overall organizational resilience.

### **ISO 31000: Overview and Relevance to SME Risk Management**

ISO 31000 is an international standard for risk management, providing guidelines and principles to manage risk effectively across any organization, regardless of size, industry, or sector. Key principles of ISO 31000 include integration, a structured and comprehensive approach, customization, inclusiveness, dynamism, using the best available information, recognizing human and cultural factors, and a commitment to continual improvement (ISO, 2018).

Integration involves embedding risk management into all organizational processes, including strategic planning and operational activities. This ensures that risk management is a fundamental part of the organization's decision-making process. The structured and comprehensive approach ensures consistent and systematic identification, assessment, and treatment of risks, providing a reliable framework for managing uncertainties (ISO, 2018).

Customization allows the framework to be tailored to the specific needs and context of the organization, considering its external and internal environment, risk appetite, and objectives.

This flexibility is particularly beneficial for SMEs, which can adapt the guidelines to focus on their most critical risks using simplified methods (Hiebl, 2014). Inclusiveness ensures that relevant stakeholders are engaged in the risk management process, aligning diverse perspectives with stakeholder expectations (ISO, 2018).

Dynamism in risk management involves continuously monitoring and reviewing risks, responding to changes in the internal and external environment, and making necessary adjustments to strategies. Decisions should be based on the best available information, including historical data, expert judgment, and forward-looking analysis (ISO, 2018). Recognizing human and cultural factors enhances the effectiveness of risk management activities, ensuring that these factors are addressed appropriately. Commitment to continual improvement ensures the ongoing relevance and effectiveness of the risk management framework and practices, fostering a culture of proactive risk management (ISO, 2018).

ISO 31000 is particularly relevant to SME risk management due to its emphasis on customization and scalability. SMEs can adapt the guidelines and principles of ISO 31000 to their specific needs, focusing on critical risks and using cost-effective methods for risk assessment and monitoring (Al-Tarawneh & Al-Smadi, 2018). The standard's emphasis on integration and inclusiveness helps SMEs embed risk management into their organizational culture and engage relevant stakeholders in the process.

#### **Other Models: Discussion on Alternative ERM Frameworks and Their Suitability for SMEs**

Besides the COSO ERM Framework and ISO 31000, SMEs can consider several other ERM frameworks and models, each offering unique approaches and focus areas. The Risk Management Standard, developed by the Institute of Risk Management (IRM), Association of Insurance and Risk Managers (AIRMIC), and National Forum for Risk Management in the Public Sector (ALARM), provides a practical guide to risk management. It emphasizes establishing a risk management process, defining responsibilities, and integrating risk management into organizational activities (ISO, 2018).

The RIMS Risk Maturity Model (RMM) assesses the maturity of an organization's risk management practices, identifying key attributes of a mature risk management program, and providing a roadmap for enhancement. This model helps SMEs benchmark their practices and identify areas for improvement (ISO, 2018). The FERMA Risk Management Standard, developed by the Federation of European Risk Management Associations, emphasizes a structured and consistent approach to risk management, providing guidelines for risk identification, assessment, treatment, and monitoring (Chen et al., 2019).

For SMEs facing significant cybersecurity risks, the NIST Cybersecurity Framework offers a comprehensive approach to managing and reducing cybersecurity risks, including guidelines for identifying, protecting, detecting, responding to, and recovering from cybersecurity incidents. This framework is particularly relevant for SMEs in technology-driven industries or those with critical digital assets (FERMA, 2019).

Each of these frameworks offers unique insights and approaches to risk management that can benefit SMEs. The choice of framework depends on the specific needs, context, and risk profile of the organization. SMEs should evaluate these frameworks based on their relevance,

scalability, and alignment with organizational objectives to determine the most suitable approach for their ERM practices.

### **Critical Analysis of Literature**

#### *Gaps in Research*

The literature on Enterprise Risk Management (ERM) in Small and Medium Enterprises (SMEs) reveals some significant gaps that need to be addressed. One major issue is the lack of studies that specifically focus on SMEs. Much of the existing research tends to generalize findings from larger companies to SMEs without considering their unique characteristics and constraints, such as limited financial resources, less formalized business processes, and a lack of specialized risk management expertise. This generalization often leads to ERM strategies that are not effective when applied to smaller businesses. Another notable gap is the absence of longitudinal studies that look at the long-term effects of ERM implementation in SMEs. Most research provides only a snapshot of ERM practices at a particular point in time, which doesn't capture the evolving nature of risk management in smaller businesses. Additionally, there is insufficient research on industry-specific ERM practices. While sectors like finance and healthcare have been studied extensively, industries such as manufacturing, retail, and technology, particularly within the SME context, remain underexplored.

### **Contradictions and Consensus**

The literature also highlights some contradictions and areas of consensus regarding ERM in SMEs. One key contradiction is the perceived complexity of ERM frameworks. Some studies argue that frameworks like COSO and ISO 31000 are too complex and resource-intensive for SMEs, potentially discouraging their adoption. On the other hand, some research suggests that these frameworks can be adapted and simplified to suit smaller organizations, indicating a need for further studies to develop and validate these simplified models. Despite these contradictions, there is a general agreement on certain critical factors for successful ERM implementation in SMEs. Leadership commitment and organizational culture are consistently emphasized as essential elements. Effective ERM requires strong support from top management and a culture that promotes proactive risk management. Additionally, integrating ERM into strategic planning and decision-making processes is widely recognized as crucial, ensuring that risk considerations are factored into all major business decisions.

### **Future Directions**

To address the identified gaps and build on existing research, future studies should focus on several key areas. First, there is a need for more comprehensive and longitudinal research that examines the long-term impacts of ERM implementation in SMEs. These studies should track the progress and outcomes of ERM initiatives over time to provide insights into their sustainability and evolution. Future research should also delve into industry-specific ERM practices, especially in under-researched sectors. This could involve detailed case studies and empirical research that highlight best practices and lessons learned across various industries, thereby providing tailored ERM frameworks for different contexts. Moreover, there is a need to develop and validate simplified ERM models specifically designed for SMEs. These models should balance comprehensiveness with practicality, ensuring they are accessible and manageable for organizations with limited resources. Researchers should also investigate the role of technology in facilitating ERM adoption in SMEs, exploring how digital tools and platforms can enhance risk management processes and outcomes. Another important

direction for future research is exploring cultural and behavioral factors that influence ERM adoption. Understanding how organizational culture, employee attitudes, and leadership styles impact the effectiveness of ERM can provide valuable insights for developing strategies to foster a risk-aware culture within SMEs. Finally, as the business environment continues to evolve with emerging risks such as cybersecurity threats and global supply chain disruptions, future research should focus on the implications of these trends for ERM in SMEs. This includes exploring how SMEs can adapt their risk management strategies to address new and emerging risks, ensuring their resilience and long-term success.

## **Conclusion**

### *Summary*

This literature review has delved into the implementation of Enterprise Risk Management (ERM) frameworks within Small and Medium Enterprises (SMEs). It has become evident that SMEs face unique challenges when adopting ERM, primarily due to limited financial resources, less formalized business processes, and a lack of specialized risk management expertise. Despite these hurdles, the benefits of ERM are significant, offering improved risk identification and mitigation, enhanced decision-making, better resource allocation, and increased stakeholder confidence.

Several gaps in the current research were identified, including a lack of studies specifically focused on SMEs, insufficient longitudinal research, and limited exploration of industry-specific ERM practices. The literature also presents contradictions, particularly regarding the perceived complexity of ERM frameworks, highlighting the need for further studies to develop simplified and tailored models for SMEs. However, there is a clear consensus on the importance of leadership commitment, organizational culture, and the integration of ERM into strategic planning for successful implementation.

## **Implications**

For SMEs considering ERM adoption, this review underscores the practical importance of cultivating a risk-aware culture and securing strong leadership commitment. Implementing ERM can significantly enhance an SME's ability to manage risks proactively, leading to improved operational efficiency and resilience. Integrating ERM into strategic planning ensures that risk considerations are embedded in decision-making processes, enabling SMEs to navigate uncertainties more effectively. The review also suggests that SMEs can benefit from leveraging technology to facilitate ERM processes. Advanced risk management software can provide real-time data and analytics, helping SMEs make informed decisions and respond swiftly to emerging risks. Additionally, engaging with external stakeholders and complying with regulatory requirements can enhance an SME's credibility and competitive advantage.

## **Recommendations**

To effectively implement ERM, SMEs should consider tailoring existing ERM frameworks like COSO and ISO 31000 to fit their specific needs and context. Simplifying governance structures and focusing on critical risks can make these frameworks more accessible and practical. Developing a risk-aware culture is crucial, and SMEs should invest in extensive training programs for employees at all levels to ensure understanding and engagement with ERM processes. Promoting open communication about potential risks can foster a proactive approach to risk management. Utilizing advanced risk management software can enhance the

efficiency and effectiveness of ERM. SMEs should explore digital tools that automate risk identification, assessment, monitoring, and reporting, providing real-time insights and facilitating data-driven decision-making. Actively involving relevant stakeholders, including investors, customers, suppliers, and regulators, in their ERM processes can provide diverse perspectives on risks and enhance stakeholder confidence and support. Viewing ERM as an ongoing process rather than a one-time initiative is essential for long-term sustainability. Continuous monitoring, reviewing, and updating of risk management practices ensure they remain relevant and effective in a dynamic business environment.

In conclusion, while SMEs face unique challenges in implementing ERM, the potential benefits make it a worthwhile endeavor. By addressing the identified gaps in research and adopting these recommended strategies, SMEs can develop robust ERM practices that enhance their resilience, competitiveness, and long-term success. This literature review makes significant theoretical and contextual contributions to the understanding of Enterprise Risk Management (ERM) within Small and Medium Enterprises (SMEs). Theoretically, it synthesizes a wide range of studies to offer a clearer picture of how ERM frameworks can be adapted to suit the unique needs of SMEs. By identifying gaps in the current research, particularly in the areas of industry-specific ERM practices and the applicability of complex frameworks like COSO and ISO 31000, this review provides a foundation for future research to build more tailored and accessible models for SMEs.

Contextually, this review underscores the distinct challenges SMEs face, such as limited financial resources, less formalized processes, and a lack of specialized risk management expertise. It highlights how these factors influence the adoption and effectiveness of ERM in smaller enterprises. By offering practical recommendations and identifying best practices, this review serves as a valuable resource for SMEs seeking to implement ERM in a way that is both feasible and impactful, ultimately contributing to the resilience and competitiveness of these businesses in an increasingly uncertain environment.

## References

- Ahmad, M. A., AboAlkhair, M., & Tork, M. (2023). Managers' perception and attitude toward financial risks associated with SMEs: Analytic hierarchy process approach. *Journal of Risk and Financial Management*, 16(2), 86. <https://doi.org/10.3390/jrfm16020086>
- Afrifa, G. A., & Tingbani, I. (2018). Working capital management, cash flow, and SMEs' performance. *International Journal of Banking, Accounting and Finance*, 9(1), 1-17. <https://doi.org/10.1504/IJBAAF.2018.10010466>
- Anton, S. G., & Afloarei Nucu, A. E. (2020). Enterprise risk management: A literature review and agenda for future research. *Journal of Risk and Financial Management*, 13(11), 281. <https://doi.org/10.3390/jrfm13110281>
- Bettanti, A., & Lanati, A. (2023). Enhancing enterprise risk management (ERM) practices through a risk-driven performance measurement system (PMS): Insights from a SME case study. <https://doi.org/10.21203/rs.3.rs-2817956/v1>
- Crovini, C., Ossola, G., & Britzelmaier, B. (2021). How to reconsider risk management in SMEs? An advanced, reasoned and organised literature review. *European Management Journal*, 39(1), 118-134. <https://doi.org/10.1016/j.emj.2020.11.002>
- Dafikpaku, E. (2011). The strategic implications of enterprise risk management: A framework. In 2011 ERM Symposium. Retrieved from



- <https://www.soa.org/globalassets/assets/Files/resources/essays-monographs/mono-2011-m-as11-1-dafikpaku.pdf>
- Elgammal, A., Turetken, O., & Van den Heuvel, W. J. (2015). A systematic literature review on compliance requirements management of business processes. *International Journal of System Assurance Engineering and Management*, 6(1), 1-14. Retrieved from <https://pure.tue.nl/ws/portalfiles/portal/90602425319447.pdf>
- Gordon, L. A., Loeb, M. P., & Tseng, C. Y. (2009). Enterprise risk management and firm performance: A contingency perspective. *Journal of Accounting and Public Policy*, 28(4), 301-327. <https://doi.org/10.1016/j.jaccpubpol.2009.06.006>
- Haleem, A., Javaid, M., Singh, R. P., Suman, R., & Gonzalez, E. S. (2022). Understanding the adoption of industry 4.0 technologies in improving environmental sustainability. *Sustainable Operations and Computers*, 3, 203-217. <https://doi.org/10.1016/j.susoc.2022.01.008>
- Haleem, A. M., Javaid, M. A., & Qadri, R. S. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3, 275-285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Harper, J. (2018). Best practices for proactive enterprise risk management: "Let the (big) data tell you". *KM World*, 27(5), 19-21.
- Herrinton, M. (2012). How mature is your risk management? *Harvard Business Review*. Retrieved from <https://hbr.org/2012/06/how-mature-is-your-risk-manage>
- Hida, E. (2017). Global risk management survey, 10th edn. *Deloitte University Press*. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/risk/global-risk-management-survey-10th-ed.pdf>
- Hoyt, R. E., & Liebenberg, A. P. (2011). The value of enterprise risk management. *Journal of Risk and Insurance*, 78(4), 795-822. <https://doi.org/10.1111/j.1539-6975.2011.01413.x>
- Institute of Internal Auditors. (2009). The role of internal auditing in enterprise-wide risk management. Retrieved from <https://www.theiia.org/en/content/position-papers/2009/the-role-of-internal-auditing-in-enterprise-wide-risk-management/>
- Jiménez, A., Arrieta, Y., Nuñez, M. A., & Villanueva, E. (2024). Management of strategic risks for the sustainability of SMEs in the manufacturing sector in Antioquia. *Sustainability*, 16(5), 2094. <https://doi.org/10.3390/su16052094>
- Jordan, A., Jorgensen, L., & Mitterhofer, H. (2013). Performing risk and the project: Risk maps as mediating instruments. *Management Accounting Research*, 24, 156-174. Retrieved from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2344011](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2344011)
- Javaid, M., Haleem, A., Singh, R. P., & Suman, R. (2022). Understanding the adoption of industry 4.0 technologies in improving environmental sustainability. *Sustainable Operations and Computers*, 3, 203-217. <https://doi.org/10.1016/j.susoc.2022.01.008>
- Kamala-Chaoui, L. (2017). Unlocking the potential of SMEs for the SDGs. *OECD Development Matters*. Retrieved from <https://oecd-development-matters.org/2017/10/04/unlocking-the-potential-of-smes-for-the-sdgs/>
- Kardoš, P., Dvorský, J., Afful, C. R., & Kloudova, J. (2023). Management of operational risk in the context of financial performance of SMEs. *Systems*, 11(8), 408. <https://doi.org/10.3390/systems11080408>
- Kushnir, K., Mirmulstein, M. L., & Ramalho, R. (2010). Micro, small, and medium enterprises around the world: How many are there, and what affects the count. *World Bank/IFC MSME Country Indicators Analysis Note*. Washington, DC: World Bank. Retrieved from [https://www.smefinanceforum.org/sites/default/files/analysis\\_note\\_2010.pdf](https://www.smefinanceforum.org/sites/default/files/analysis_note_2010.pdf)

- Liu, X., Li, Y., Xi, H., & Yang, Y. (2023). Clarifying supply chain disruption and operational resilience. *International Journal of Production Economics*, 252, 108524. <https://doi.org/10.1016/j.ijpe.2024.109314>
- Lundqvist, S. A. (2014). An exploratory study of enterprise risk management: Pillars of ERM. *Journal of Accounting, Auditing and Finance*, 29(3), 393-429. <https://doi.org/10.1177/0148558X14535780>
- Md Rasel Ul Alam, A., Shohel, A., & Alam, M. (2024). Integrating enterprise risk management (ERM): Strategies, challenges, and organizational success. *International Journal of Business and Economics*, 1(2), 10-19. <https://doi.org/10.62304/ijbm.v1i2.130>
- Ogutu, M., Juma, D., & Minja, D. (2018). Exploring the indirect links between enterprise risk management and the financial performance of SMEs. *Risk Management*, 20(4), 302-324. Retrieved from <https://link.springer.com/article/10.1057/s41283-018-0040-2>
- Safari, A., Balicevac Al Ismail, V., Parast, M., Gölgeci, I., & Pokharel, S. (2024). Supply chain risk and resilience in startups, SMEs, and large enterprises: A systematic review and directions for research. *International Journal of Logistics Management*, 35(2), 680-709. <https://doi.org/10.1108/IJLM-10-2022-0422>
- Safari, A., Balicevac Al Ismail, V., Parast, M., Gölgeci, I., & Pokharel, S. (2024). Trade-control compliance in SMEs: Do decision-makers and supply chain position make a difference? *Journal of Business Ethics*, 135(2), 680-709. <https://doi.org/10.1108/IJLM-10-2022-0422>
- Tan, C., & Lee, S. Z. (2022). Adoption of enterprise risk management (ERM) in small and medium-sized enterprises: Evidence from Malaysia. *Journal of Accounting & Organizational Change*, 18(1), 100-131. <https://doi.org/10.1108/JAOC-11-2020-0181>
- Venugopal, C., & Suryaprakasa Rao, K. (2011). Learning from a failed ERP implementation: A case study research. *International Journal of Managing Projects in Business*, 4(4), 596-615. <https://doi.org/10.1108/17538371111164038>
- World Bank. (2021). Micro, small, and medium enterprises: Economic indicators. *World Bank*. Retrieved from <https://documents1.worldbank.org/curated/en/873301627470308867/pdf/Micro-Small-and-Medium-Enterprises-Economic-Indicators-MSME-EI-Analysis-Note.pdf>