

Trends and Insights in Supply Chain Risk Management: A Comprehensive Review of Literature

Soukaina Sahab

Laboratory of Studies and Research in Economic Sciences and Management (LERSEM),
The National School of Business and Management, Chouaib Doukkali University El Jadida, Morocco
Email: sahab.s@ucd.ac.ma (*Corresponding Author*)

Salah Oulfarsi

Laboratory of Studies and Research in Economic Sciences and Management (LERSEM),
The National School of Business and Management, Chouaib Doukkali University El Jadida, Morocco
Email: oulfarsi.s@ucd.ac.ma

ABSTRACT

Supply chains are exposed to risk due to their complicated structure; therefore, improving their resilience is a crucial goal. This paper examines risk management studies with an aim to address the most critical issues in supply chain risk management and supply chain resilience. The research employed a systematic literature review approach to examine and categorize a selection of articles published between 2000 and 2023. The analysis of results shows that, over the last decade, supply chain risk management has progressed from an emerging to an established practice. Indeed, six main themes have been emerged as hot research areas. Additionally, significant research gaps have been pinpointed through a multi-perspective descriptive and content analysis of the data.

Keywords: *risk, supply chain, supply chain resilience, supply chain risk management, systematic literature review*

1. INTRODUCTION

Industry growth, continuous innovation, reducing production times, and client needs for product delivery; combined with the growing complexity of supply chain (SC) networks and the global crisis exposed supply chains to disruptions. As a supply chain becomes more susceptible to disruptions, it becomes more crucial to recognize and control different kinds of risks in order to prevent supply chain failure (Morteza Beigi *et al.*, 2024). One illustration is the COVID-19 pandemic, which has hampered interconnected and worldwide supply networks (Ivanov and Das, 2020; Ivanov and Dolgui, 2021). The management of risks and disruptions in the supply chain is still a critical problem that has an impact on how well firms perform today (Altay and Ramirez, 2010; Hendricks and Singhal, 2009).

Supply chain risk management (SCRM) refers to any information flow, raw material, or product risk from the primary supplier to the product's delivery to the final customer. Given the interconnected and dynamic supply chain environment, effective risk management is essential to maintaining operational stability and business continuity. In view of lessening the harmful impacts of disruptions on SC operations, Aqlan and Lam (2015), claim that SCRM is a non-symmetrical technique to recognize, evaluate, and monitor the risks for probable SC network disruptions.

Butner (2010), reports that SCRM is regarded as the second-highly important issue by supply chain executives. Moreover, Supply chain risks can be categorized into operational and disruption hazards as a broad classification proposed by Kleindorfer and Saad (2009), Tang (2006), Chen *et al.* (2013). Unplanned occurrences, that restrict a SC network, are recognized as disruptions; which could be either natural or human-made disasters. Operational hazards are mostly related to coordinating the supply of goods or services with the corresponding demand in a timely and efficient manner; these might arise from insufficient or malfunctioning systems, people, processes, or controls (Christopher and Peck, 2004). Thus, operational risks are usually more manageable than risks associated with disruptions. Besides, it is preferred that supply chain managers have more tactics and procedures to confront and manage risk.

By evolving solutions enabling a supply chain to react to a disturbance when returning to its earlier functioning condition or even better, supply chain resilience (SCRES) lessens the effects of hazards and disruptions. SCRES has drawn increased focus in recent years as a pivotal key trait to enhance adaptability to unanticipated changes in the business landscape (Ponomarov and Holcomb, 2009; Ates and Bititci, 2011; Yilmaz Borekci *et al.*, 2015; Kamalahmadi and Mellat-Parast, 2016). In supply chain field, resilience can be described as the capacity of a company to endure a disruption, return to its initial condition, or even advance toward a more favorable condition following disruption (Christopher and Peck, 2004). Resilience, therefore, goes beyond simply recovering from disruptions and focuses on leveraging crises to create new opportunities. Numerous strategies have been proposed in academic literature to improve SCRES (Tang, 2006; Colicchia *et al.*, 2011; Urciuoli *et al.*, 2014). According to Melnyk *et al.* (2014), SCRES lies at the core of contemporary supply chain management philosophy. Therefore, in recent years researchers have focused more on how businesses might enhance supply chain resilience by implementing appropriate supply chain risk management strategies. These strategies could include diversifying supply sources, developing redundant systems, and building strong partnerships within the supply chain network (Song *et al.*,

2022).

The focus of this study will be on reviewing up to date literature that addresses the most critical issues in SCRM and SCRES. The objective is to present a comprehensive and structured understanding of the current progress in this area through the identification of both achievements and uncovering gaps in existing studies; which will consolidate the current knowledge base regarding the evolution of SCRM and SCRES strategies throughout time. To achieve this, the following two research questions will be answered:

- (1) What is the state of SCRM and SCRES research in the context of supply chain disruptions?
- (2) What are the research gaps that need to be filled by future studies?

To address these questions, a systematic literature review (SLR) process will be used. This rigorous approach ensures the examination of comprehensive and unbiased sample of articles published in scientific journals between the years of 2000 and 2023; through a critical analysis of a wide range of studies, this work synthesizes the collective discoveries to answer the research questions and lays the foundation for future investigations. The remainder of this paper is structured as follows: section 2 provides the literature review; section 3 concerned the SLR methodology employed to ensure a rigorous analysis of the selected studies; section 4 identifies the descriptive and content analysis including the main trends and themes identified from the reviewed literature; section 5 discusses the results; section 6 highlights the research gaps and proposes future directions that require further investigation to advance the field. Finally, section 7 concludes the paper by summarizing the key findings and discussing the research implications.

2. THEORETICAL FRAMEWORK OF SUPPLY CHAIN RISK MANAGEMENT

A claim that our world is unpredictable and constantly changing already appears in practically, all research papers. In empirical and conceptual research in management of operations, the fluctuating nature of a competitive environment which is characterized by technological upheaval, competitive pressure, and customer segmentation have been recognized as a fundamental emergency factor (Fynes *et al.*, 2005). It is evident that many SC circumstances are marked by a significant amount of risk and uncertainty.

The majority of risk definitions include the following elements: the likelihood that a certain incident or outcome will appear; the implications of the specific incident or outcome; and the sequence of causative factors leading to the incident (Ritchie and Brindley, 2007). Drawing from the definitions of supply chain risk provided by a number of authors (e.g. Zsidisin *et al.*, 2004), we define SC risk as an occurrence that negatively impacts SC operations and consequently its intended performance metrics, like cost and service levels across the chain. Risk is always linked to an unwanted loss, or an unfavorable outcome, and uncertainty, regardless of the topic of interest.

Building on this perspective, Zsidisin and Ellram (2003), define supply risk as: “*the probability of an incident associated with inbound supply from individual supplier failure or the supply market occurring, in which its outcomes*

result in the inability of the purchasing firm to meet customer demand or cause threats to customer life and safety”. This definition explicitly links supply chain vulnerabilities to critical operational failures and broader concerns such as customer safety, which reinforce the pressing need for effective risk management strategies. In line with this, current studies have identified a number of new hazards, such as pandemics, climate change, and geopolitical conflicts, emphasizing the increased complexity and interconnectivity of global supply chains. These challenges emphasize the necessity for enterprises to take a comprehensive and proactive approach to SCRM that extends beyond traditional risk managements strategies. The COVID-19 pandemic, in particular, has been a pivotal event that exposed critical vulnerabilities in global supply chains and highlighted the necessity for organizations to be flexible and adaptable in the face of unforeseen interruptions.

In order to anticipate and deal with a variety of risks, including disruptions, effective risk management is essential to supply chain management (Ahmad *et al.*, 2024). Indeed, supply chains are exposed to a diverse array of risks which require a comprehensive and adaptive approach to SCRM. To address these challenges, companies must adopt a thought and proactive strategy for SCRM. This means integrating risk management into core operations, fostering flexibility, and ensuring robust contingency plans are in place. In practice, several businesses have responded by implementing contingency plans and diversified their supply networks (Sodhi and Tang, 2020). Such measures enable companies to respond quickly and effectively to unforeseen risks and maintain operational continuity while preventing critical losses.

SCRM is a recently developed field of study (Nooraie and Mellat Parast, 2015). When it comes to risk, situational crisis management involves being exposed to two elements: an event and the incertitude surrounding its possible outcomes (Bandaly *et al.*, 2014). Lavastre *et al.* (2012), considers that managing risks through a long- and short-term strategic and operational horizon is known as SCRM. Fan and Stevenson (2018), offer a thorough structure of SCRM, including the identification, analysis, treatment, and monitoring of risks in supply chains. Therefore, the aim of SCRM processes is to mitigate the impact of disturbances that impede the interrupted flow of information and material exchanges inside the supply chain (Bode *et al.*, 2011). To achieve this, effective management requires the coordination and collaboration of supply chain partners that would ensure profitability and continuity even in the face of disruptions. In line with this approach, Tang (2006a) defines SCRM as: “*The management of SCRs through coordination or collaboration among the supply chain partners so as to ensure profitability and continuity*” Furthermore, the ultimate goals of effective SCRM involves not only monitoring and supervising unexpected interruptions but also proactively implementing suitable actions to control and minimize SCRs (Jüttner *et al.*, 2003 ; Norrman and Jansson, 2004).

A supply chain needs to have the capability to deal with disruptions, rebound back from them, and ideally improve after they happen in order to be considered resilient. The “four Rs” of resilience are frequently described as robustness, resourcefulness, recovery, and review. To achieve this, several strategies have been identified as critical

organizational competencies for effectively managing supply chain disruptions. Christopher and Peck (2004), recommended including characteristics like supplier flexibility, agility, resource redundancy, and a collaborative planning approach for SCRM to be successful. According to Tukamuhabwa (2023), increasing adaptability, expanding SC agility, developing cooperative SC links, and implementing redundancy are the factors that have the biggest effects on promoting SCRM.

According to some authors (e.g. Rice and Caniato, 2003; Carvalho *et al.*, 2014), firms must make sure to have a resilient SC in light of this interdependency. If a single node is not resilient, the entire supply chain may face disruptions or reduced capacity (e.g. Craighead *et al.*, 2007; Wakolbinger and Cruz, 2011). Christopher and Peck (2004), describe resilience in a SC as the capacity of an organization to cope with disruptions, rebound quickly to its original state, or even advance toward a more ideal scenario. A more comprehensive definition has been provided by Yao and Fabbe- Costes (2018): “*Resilience is a complex collective, adaptive capability of organizations in the supply network to maintain a dynamic equilibrium, react to and recover from a disruptive event, and to regain performance by absorbing negative impacts, responding to unexpected changes, and capitalizing on the knowledge of success or failure*”. According to Pettit *et al.* (2013), supply chain resilience is built on 14 capabilities, the most notable of which are flexibility, collaboration, efficiency, visibility, and anticipation.

3. RESEARCH METHODOLOGY

Our review employs the Systematic Literature Review (SLR) approach to identify the most pertinent articles for inclusion in the review and ensure a comprehensive examination of the field. A systematic approach is essential to guarantee the objectivity and thoroughness of the process. To achieve this, the study adopted the method outlined by Mayring (2014), which emphasizes structured content analysis, combined with the systematic review steps as suggested by Seuring and Müller (2008) to summarize the key studies on the field of SCRM. Limitations of the research will be discussed with a focus on potential gaps in the available literature. In addition, specific features of the studies included in this review, such as common themes, significant trends, and areas where further research is necessary will be highlighted.

3.1 The Selection of Papers

The research questions serve as the foundation for the systematic literature review as they guide the selection and analysis of relevant studies. In order to ensure objectivity and avoid bias in the data collection process, we implemented a set of clear and stringent inclusion and exclusion criteria when assessing and selecting publications. We have designed these criteria to prioritize studies that address directly the questions posed by our research and ensure that only the most pertinent publications are considered. The implemented criteria are the following:

- (1) We examined published English language articles available on the Scopus database in the field of management. We have opted to utilize the Scopus database being the most extensive collection of peer-

reviewed publications. It offers users comprehensive search results, full-length author abstracts, and complete bibliographic data.

- (2) To ensure high quality literature examination, the review was restricted to peer-reviewed publications. Indeed, articles that are published in peer-reviewed journals undergo a tight evaluation process before being accepted for publication (Colicchia and Strozzi, 2012). As a result, book chapters, conference papers and trade journals were not taken into consideration.
- (3) We have included all articles that present findings related to supply chain risk management during the last 23 years.
- (4) According to Pittaway *et al.* (2004), the following search algorithms were combined with “OR” and “AND” in the Scopus database: “Supply chain risk management”, “risk”, “resilience”, “robustness”, “supply chain”, “perturbation” “disruption” as keywords. We limited the search in the first analysis step on the title, abstract, and keywords, which resulted in 719 potentially articles. The number of search results after full text refinement and duplicate removal resulted in 311 relevant articles (**Figure 1**).

3.2 Descriptive and Content Analysis of the Selected Papers

In the descriptive analysis, we describe the chronological development of the selected articles by year, as well as the important contributing journals, sectors, and countries where the research was undertaken. Content analysis was utilized to categorize the key study topics. For this study, we classified the selected publications using thematic analysis, as described by scholars such as Bryman and Bell (2007) and Seuring and Gold (2012). Each article was divided into broad themes, which included SCRM processes, resilience methods, risk factors, and the impact of disruptions like as the COVID-19 pandemic. This thematic classification helped to organize the material into cohesive categories, allowing for the investigation of trends and patterns across topics.

In addition, we conducted a qualitative content analysis using Mayring's (2014) method, which included identifying significant themes, methodologies, and findings in each paper. The purpose of this analysis was to identify similarities and differences in how SCRM is conceptualized and utilized across studies. We also examined the methodology utilized in each research, such as case studies, surveys, and literature reviews, to determine how the field has addressed the study of risk management in supply chains.

4. ANALYSIS OF THE RESULTS

In this section we present the descriptive analysis of the findings obtained from the SLR and the categorization of thematic areas of the research on SCRM and SCRES. The significant contributions across different time periods, journals, and geographical regions are discussed. Furthermore, the selected studies are organized into major areas of focus. The aim is to highlight recurring themes in the literature and provide a solid foundation to identify existing research gaps. The content analysis would also identify emerging research trends which are crucial for directing future research efforts.

4.1 Descriptive Analysis

A descriptive analysis of the papers included in this paper is conducted in this sub-section. The chronological evolution of literature is examined to track the progression

of research overtime. In addition, the analysis shed light on the publication landscape to identify the journals that have contributed significantly to the field. Methodologies, countries and industry sectors employed in the reviewed papers are also identified to examine the methodological diversity employed to address SCRM within the literature.

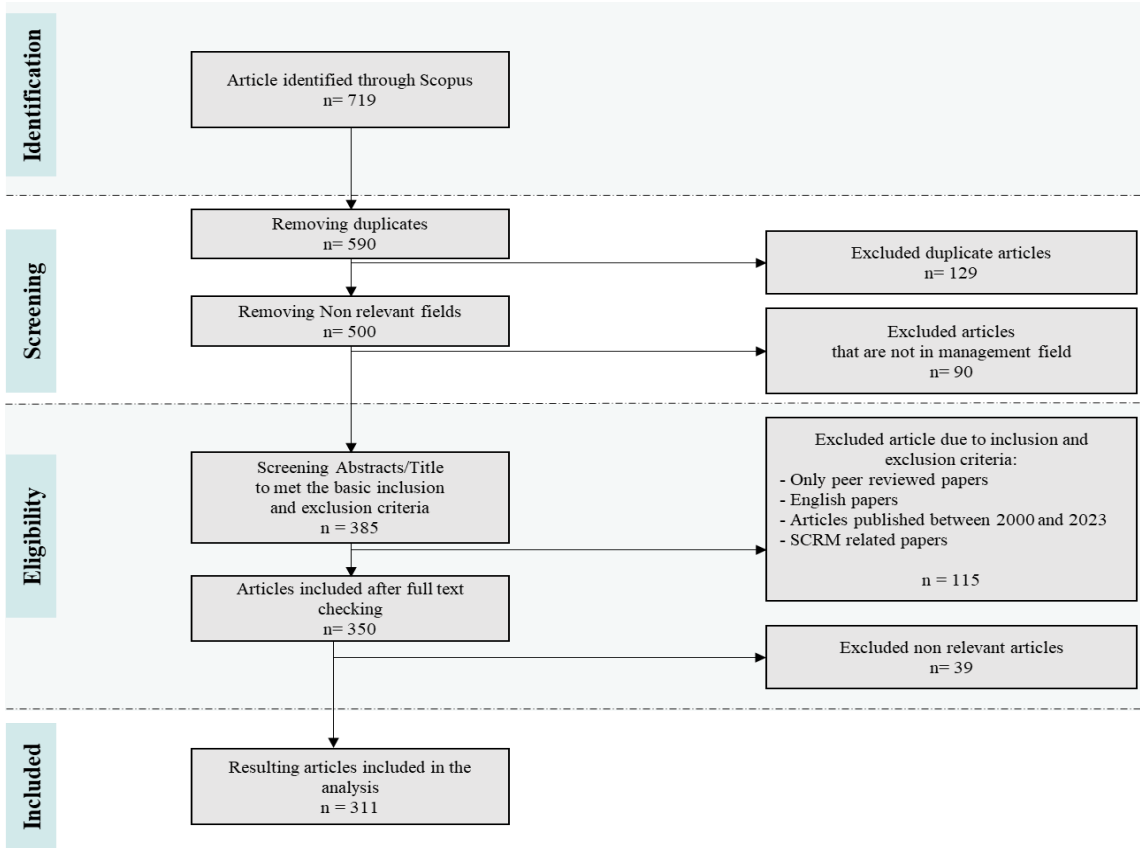


Figure 1 Literature selection process

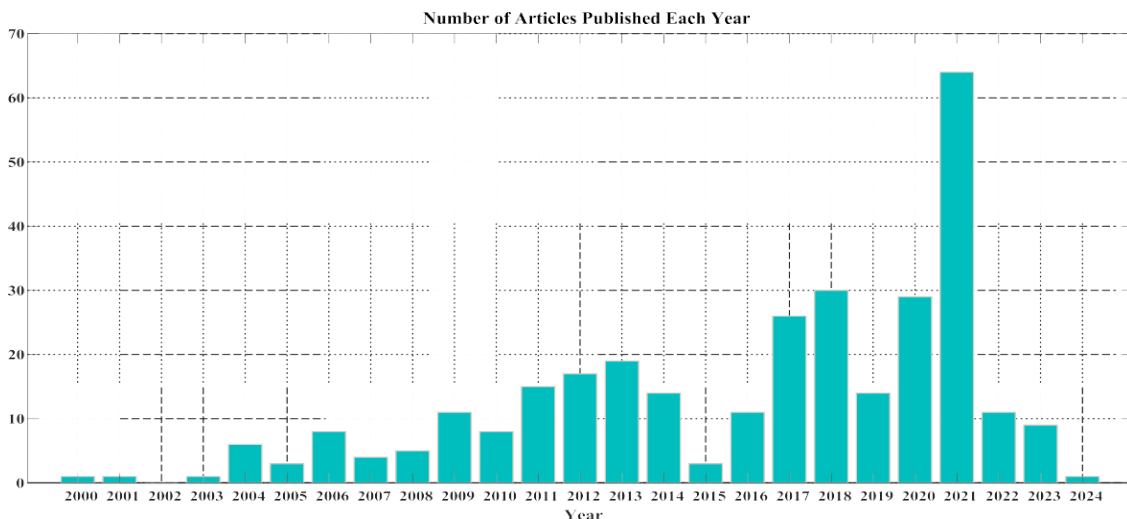


Figure 2 Distribution of papers over time

4.1.1 Chronological Evolution of Literature

Figure 2 illustrates the chronological distribution of publications on the topic between 2000 and 2023. A clear upward trend is observable, with a significant rise in the number of publications over the years, especially from 2015 onward. Between 2000 and 2010, the number of publications remained relatively modest and consistent, indicating that

supply chain risk management (SCRM) was still emerging as a defined topic of research. From 2011 to 2018, there was a continuous increase in publications, demonstrating that SCRM's value was becoming more well recognized. This period may coincide with the increasing complexity of global supply chains, the advent of new technologies, and a growing awareness of globalization-related vulnerabilities. During

these years, severe supply chain interruptions, such as natural disasters (for example, the 2011 Japanese earthquake), increased research interest in risk mitigation.

The period from 2019 to 2021 shows a significant rise in publication number, particularly in 2021, when the number of papers nearly doubles compared to previous years. This rise is directly related to the global impact of the COVID-19 outbreak, which highlighted fundamental flaws in global supply networks. Scholars responded by examining the dimensions, implications, and dynamics of pandemic-

related supply chain disruptions. The 2021 surge, the greatest in the observed era, highlights the critical need for research into how to manage supply chain risks during major global disruptions and crises. After 2021, there is a minor decline in publications in 2022 and 2023, but the total remains greater than before the epidemic. This shows that, while the acute shock of the pandemic has passed, academic interest in developing resilient and robust supply chains remains a major research priority.



Figure 3. Most contributing journals in the field of SCRM

4.1.2 Papers by Journals

The distribution of papers among publications demonstrates the diversity of journals covering the topic of SCRM and SCRES. Notably, this analysis shows that multiple journals have significantly contributed to the academic discussion in this domain. Figure 3 depicts the most influential journals in the examined field. Specifically, seven journals have emerged as key contributors with a total of publications exceeding ten articles on SCRM. The Journal of Supply Chain Management stands as the most productive one. It has published a total of 26 articles dedicated to SCRM. It is followed by the International Journal of Production Economics (20 articles) and the International Journal of Production Research (18 articles). Other journals such as the International Journal of Physical Distribution and Logistics Management, International Journal of Logistics Management, and International Journal of Operations and Production Management have also made promising contribution with 13, 12 and 11 published articles respectively. The analysis shed light on the diversity among the journals addressing SCRM and SCRES; which emphasize the interdisciplinary of the subjects and the robust engagement of the academic community with these topics as evidenced by the important research volume across multiple journals.

4.1.3 Papers by Research Methodologies

The examination of the breakdown of articles by research methodology reveals the orientation of academic investigations in SCRM field. Table 1 presents the divers research methodologies that have been employed in literature to address the SCRM topic. This demonstrates the

flexibility and adaptability of academic inquiries to meet the complexities of this field. Furthermore, it reflects the development of a multidimensional body of literature which include diverse approaches to address SCRM and SCRES. The prevalence of empirical research including qualitative, quantitative, and mixed methods reflects the maturity of the literature and indicates the orientation of numerous papers. Moreover, it reflects the effort made by researchers to harmonize theoretical concepts with practical application. Notably, among empirical studies, quantitative method emerges as the most employed approach. This demonstrates the emphasis on statistical and numerical data analysis to reveal and understand the relationships between SCRM and SCRES domains.

Almost 89 papers adopted a single case study approach which shows the academic orientation toward specific contexts or organizations. These studies are particularly valuable as they provide detailed insights and practical lessons that can be extrapolated and adapted to broader contexts. In addition, the ongoing exploration of the different facets related to SCRM and SCRES, is demonstrated by the utilization of conceptual studies represented in 12 publications which mainly contribute to advancing the understanding and refining theoretical frameworks.

4.1.4 Papers by Sector

Regarding the industry sector of study, figure 4 shows that the distribution of papers by sector in the dataset reveals a strong concentration on the manufacturing industry, which accounts for the most publications (48), indicating its complex supply networks and high vulnerability to shocks.

Other well-represented sectors are the food and automotive industries, which include 13 and 14 publications, respectively, underlining their importance in global supply networks. Furthermore, businesses such as healthcare, pharmaceuticals, and electronics are covered by five articles apiece, most likely due to their increased importance in recent years, particularly during the COVID-19 epidemic. However, several sectors, such as chemical, clothing, and petroleum, are underrepresented with only 1-3 papers each, indicating potential gaps for future research.

4.1.5 Papers by Country

Investigating the distribution of publications over the different countries is crucial to gain a thorough understanding of the geographical distribution on the topic's interest. Figure 5 illustrate the diversity in research contributions worldwide reflected by the number of papers divided by country of study. The results show that the majority of empirical studies on SCRM were predominantly carried out in Asian nations, including China, India, Malaysia, and Taiwan. Other developing Asian economies, like Vietnam and Turkey, were also subject of examination. These results demonstrate how SCRM research is

increasingly concentrating on developing nations in South America and Asia.

Table 1 Categorization of papers based on research method

Applied Methodology		Number of papers
Literature review		77
Interpretive structural modeling		1
Conceptual/Theoretical studies		12
Empirical studies	Single case study	89
	Multiple case study	8
	Longitudinal case study	2
	Quantitative method	113
	Mixed method	7
Not specified		2
Total		311

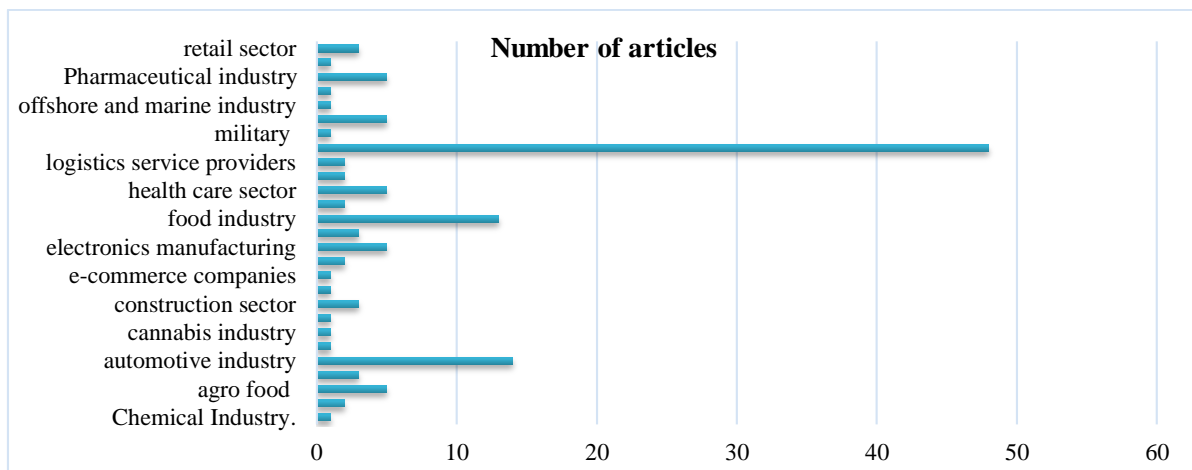


Figure 4 Distribution of papers by sector

The increasing interest in SCRM associated with Asian countries, Particularly, China can be attributed to the expansion of the Chinese economy and the complexity of supply chains within the region. This clearly explain the significant quantity of empirical research carried out in this country. This increased interest led scholars to look at risk management solutions to address these concerns. Meanwhile, developed countries in Europe, such as France and Germany, and Brazil in North America contribute with a lower number of publications on SCRM. Arabic countries including, Egypt and Morocco, are also represented in those statistics even though with a modest number of studies. This fact does not suggest that academics in such nations ignore this topic but rather reflects the need for broader research engagement to address regional supply chain challenges. Overall, the studies distribution highlights the dynamic interest in SCRM worldwide and particularly the diverse needs of developed and developing economies.

4.2 Content Analysis

The reviewed papers cover a variety of geographical contexts, industries, and supply chain structures, which offers a comprehensive understanding of how supply chain risks are perceived and managed across different regions and sectors. This section presents an in-depth content analysis of the 311 articles published over the past 23 years, aiming to uncover the major trends, themes, and insights within the field of risk management in the supply chains. To achieve this objective, a thematic analysis has been used to find recurring themes in the selected literature. Articles were coded (in Excel) according to common keywords, subjects, and objectives. Following data extraction, we found six significant clusters that served as the basis for our theme analysis: (1) The SCRM process; (2) supply chain risk management and performance; (3) supply chain resilience; (4) supply chain risk factors; (5) sustainability and risk management; and (6) SCRM following and during the COVID-19 crisis. The themes were then combined to create a structured summary of the current state of SCRM research.

Each of these topics is crucial for understanding the present status of supply chain risk management research and identifying research needs. **Figure 6** depicts these themes, organized by the number of papers on each topic.

The first theme is “Supply chain risk management (SCRM) process”, this topic covers the entire SCRM process, from risk identification to risk control. Studies in this category typically focus on the operationalization of risk

management frameworks as well as the development of strategies for efficiently detecting and managing hazards. Since 2017, the number of studies on this issue has significantly increased. Indeed, **Figure 6** demonstrates that it has emerged as one of the areas in the literature that is discussed the most. Conversely, before 2015, research addressing this theme was almost low, which highlight a relatively recent increase of interest and focus in this area.

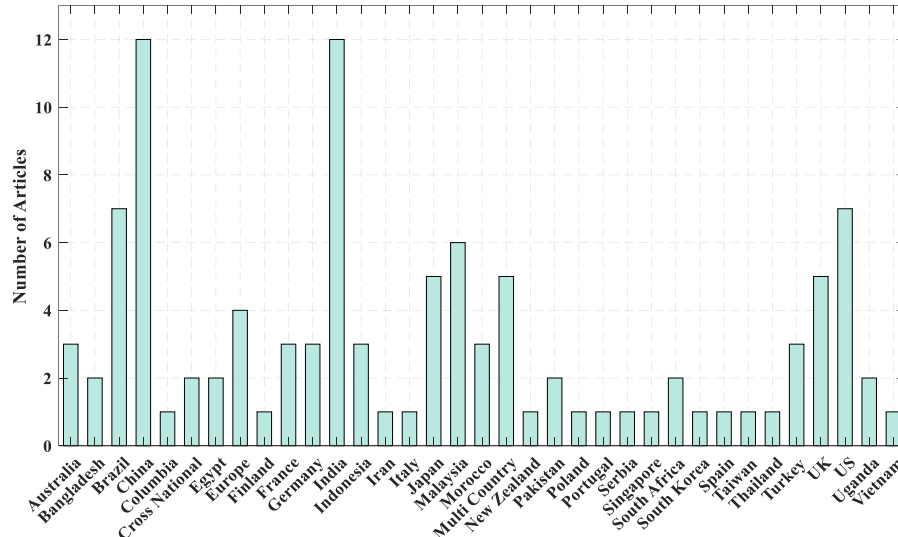


Figure 5 Papers divided by country of study

The second theme is “Supply chain risk management and performance”. The papers in this cluster investigate the relationship between risk management and supply chain performance metrics. The focus is on how risk management affects key performance indicators (KPIs) such lead times, cost efficiency, and service levels. Due to organizations' growing interest in supply chain performance, this issue has attracted a lot of attention. Effective risk management is one way to accomplish this. Furthermore, this issue is a crucial field for research because disruptions occur frequently. The large number of publications in this cluster during and after the Covid-19 outbreak may serve as evidence of this outcome (**Figure 6**). Organizations will be able to gain greater agility while retaining optimal performance with the advancement of knowledge in this field.

The third theme is “Supply chain resilience”, has been a consistent and stable area of interest within the academic literature. As depicted in **Figure 6**, it has contributed significantly over the years, with a notable growth in interest over the last decade. This cluster covers research on strategies and procedures for increasing supply chain resilience. These articles address issues such as redundancy, flexibility, agility, and how businesses adjust to lessen the effects of disruptions. Studies addressing this theme are increasingly essential given the complexity and interdependency of current SCs.

The fourth theme is “Sustainability and risk management”, sustainability is increasingly being included into risk management processes, particularly in terms of long-term hazards to the environment, society, and governance. This theme encompasses research that connects risk management to sustainable supply chain strategy. Prior to 2015, this issue was not well explored (**Figure 6**).

However, the growing awareness of environmental issues among enterprises has compelled the realization that sustainable business practices, including in the SC field, are critical to long-term success. As a result, this field would become a popular one for future research.

The fifth theme is “Supply chain risk factors”, this cluster includes papers on specific risk factors, such as natural catastrophes, geopolitical risks, and market risks. Various factors can have an impact on supply networks. These studies frequently provide insights into risk factors and how different businesses are susceptible to specific types of disruptions.

The sixth theme is “SCRM during and after the COVID-19 crisis”, the COVID-19 pandemic has had a substantial impact on supply chain risk management according to current study. This cluster includes papers that discuss both rapid responses and long-term modifications made by businesses in the wake of the epidemic. The investigations revealed the pandemic's complex effects and the vulnerability of global supply chains. The majority of studies come to the conclusion that companies must modify and rethink their approach to risk management in order to improve resilience over time.

The selected studies, shown in **Table 2**, represent contributions from each of the six themes and demonstrate how supply chain risk management has evolved in response to varied crisis, including the COVID-19 pandemic. The 30 papers shown in **Table 2** were chosen for their methodological diversity, applicability to the six subject clusters, and the use of a variety of approaches (surveys, case studies, and conceptual models) and cover a wide range of industries, offering a thorough picture of how SCRM has grown in practice and theory.

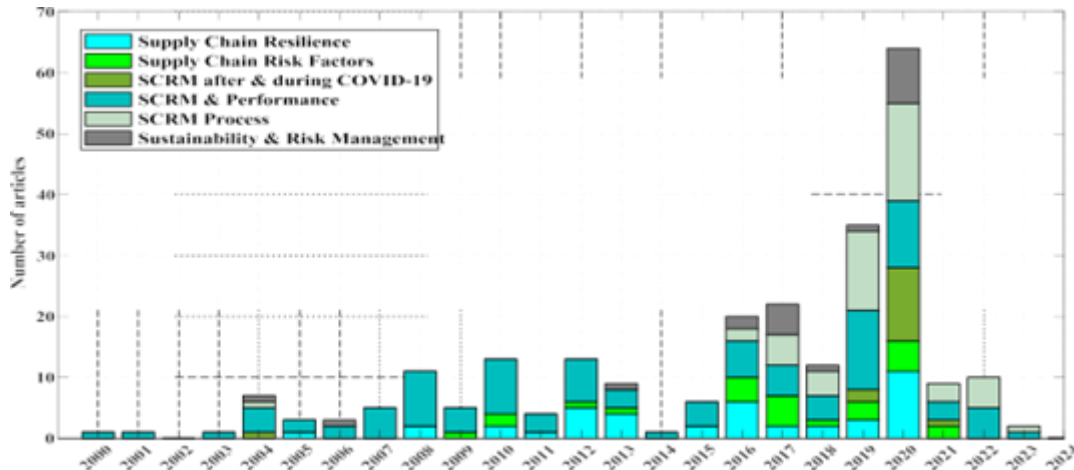


Figure 6 Classification of papers by theme

Table 2 Data extraction from reviewed papers

Authors	Title	Year	Cluster	Methodology	Sector	Country
Jat et al.	Manufacturer's contexts, supply chain risk management, and agility performance	2023	Supply chain risk management process	Survey	Multi-industry	Multi-country
Jegan joseph jerome et al.	Achieving competitive advantage through technology-driven proactive supply chain risk management: an empirical study	2023	Supply chain risk management process	Survey	Manufacturing industry	India
Besma et al.	For an effective management of the functional capacities of companies: a study of pharmaceutical companies	2021	Supply chain risk management process	Case study	Pharmaceutical industry	Algeria
Sumarliah et al.	An examination of halal fashion supply chain management risks based on the fuzzy best-worst approach	2021	Supply chain risk management process	Literature review	-	-
Ekanayakee et al.	Identifying supply chain capabilities of construction firms in industrialized construction	2021	Supply chain risk management process	Literature review	-	-
Uk et al.	weighted interpretive structural modeling for supply chain risk management: an application to logistics service providers in turkey	2022	Supply chain risk factors	interpretive structural modeling	Logistics service providers	Turkey
De oliveira et al.	Medication supply chain risk management for a brazilian home care provider: a business sustainability study	2022	Supply chain risk factors	Case study	Health services company	Brazil
Yaacob et al.	Risk categories in halal food transportation: a preliminary findings	2018	Supply chain risk factors	Case study	Food industry	Malaysia
Prakash et al.	A critical analysis of supply chain risk management content: a structured literature review	2017	Supply chain risk factors	Literature review	-	-
Salehi heidari et al.	A model for supply chain risk management in the automotive industry using fuzzy analytic hierarchy process and fuzzy topsis	2018	Supply chain risk factors	Conceptual	-	-
Tse y et al.	Managing quality risk in supply chain to drive firm's supply chain performance risks: the roles of control mechanisms	2019	Supply chain risk management and performance	Survey	Manufacturing industry	China

Table 2 Data extraction from reviewed papers (cont'd)

Authors	Title	Year	Cluster	Methodology	Sector	Country
Andersson and pardillo-baez	The six sigma framework improves the awareness and management of supply-chain risk	2020	Supply chain risk management and performance	Literature review	-	-
Foli et al.	Supply chain risk management in young and mature smes	2022	Supply chain risk management and performance	Survey	Multi-sector	Turkey
Asrol et al.	Risk management for improving supply chain performance risks of sugarcane agroindustry	2021	Supply chain risk management and performance	Case study	Agro-industry	Indonesia
Hove-sibanda et al.	Supply chain risks, technological and digital challenges facing grocery retailers in south africa	2021	Supply chain risk management and performance	Case study	Retail sector	South Africa
Kaeo-tad et al.	Resilient manufacturing: case studies in thai automotive industries during the covid-19 pandemic	2021	Supply chain risk management during and after covid 19 crisis	Case study	Automotive industry	Thailand
Dohale et al.	Covid-19 and supply chain risk mitigation: a case study from india	2021	Supply chain risk management during and after covid 19 crisis	Case study	-	India
Naz et al.	Is artificial intelligence an enabler of supply chain resiliency post covid-19? An exploratory state-of-the-art review for future research	2022	Supply chain risk management during and after covid 19 crisis	Literature review	-	-
Schiele et al.	Synchronicity management: mitigating supply chain risks by systematically taking demand changes as starting point-a lesson from the covid-19 crisis	2021	Supply chain risk management during and after covid 19 crisis	Case study	Manufacturing industry	Central european region
Abu hatab et al.	Risk perception and determinants in small- and medium-sized agri-food enterprises amidst the covid-19 pandemic: evidence from egypt	2021	Supply chain risk management during and after covid 19 crisis	Survey	Agri-food	Egypt
Shishodia et al.	Supply chain resilience: a review, conceptual framework and future research	2021	Supply chain resilience	Literature review	-	-
Rajesh	A fuzzy approach to analyzing the level of resilience in manufacturing supply chains	2019	Supply chain resilience	Case study	Electronics manufacturing	-
Habibi rad et al.	The integration of lean and resilience paradigms: a systematic review identifying current and future research directions	2021	Supply chain resilience	Literature review	-	-
Zineb et al.	The impact of SCRM strategies on supply chain resilience: a quantitative study in the moroccan manufacturing industry	2017	Supply chain resilience	Survey	Manufacturing industry	Morocco
Tukamuha bwa et al.	Supply chain resilience in a developing country context: a case study on the interconnectedness of threats, strategies and outcomes	2017	Supply chain resilience	Case study	Manufacturing industry	Uganda
Tavakoli haji abadi and avakh darestani	Evaluation of sustainable supply chain risk: evidence from the iranian food industry	2021	Sustainability and risk management	Case study	Agri-food	Iran

Table 2 Data extraction from reviewed papers (cont'd)

Authors	Title	Year	Cluster	Methodology	Sector	Country
Nobanee <i>et al.</i>	A bibliometric analysis of sustainability and risk management	2021	Sustainability and risk management	Literature review	-	-
Hossan chowdhury and quaddus	Supply chain sustainability practices and governance for mitigating sustainability risk and improving market supply chain performance risks: a dynamic capability perspective	2021	Sustainability and risk management	Survey	Appareal industry	Bangladesh
Shafiq <i>et al.</i>	Exploring the implications of supply risk on sustainability supply chain performance risks	2017	Sustainability and risk management	Survey	-	Us

5. DISCUSSION

The purpose of this work was to address two research questions by conducting a systematic literature review: (RQ1), what is the state of the art of SCRM research? And (RQ2), what are the gaps in current research that should be addressed? By reviewing the literature, six main themes have emerged, allowing us to understand the key areas in the field and the possibilities for future research. To answer the first question, we find the following generative themes: (1) SCRM process; (2) supply chain risk management and performance; (3) supply chain resilience; (4) Supply chain risk factors; (5) sustainability and risk management; and (6) SCRM after and during the COVID-19 crisis. These six themes summarize the state of SCRM research today and offer a starting point for a more thorough examination of both opportunities and challenges in each area. In order to further theory and practice.

5.1 Supply Chain Risk Management Process

First, it is imperative to emphasize that SCRM entails an understanding of the supply chain as a series of procedures and local risks that have the potential to cause problems for the chain as a whole (Tummala and Schoenherr, 2011). Firms often develop specialized SCRM practices, which comprise four interrelated processes: risk identification, risk assessment, risk mitigation, and risk control, in response to the many risks and disruptions that they may encounter. These are the essential stages of organizing a SCRM process (Fan and Stevenson, 2018; Kirilmaz and Erol, 2017; Wieland and Wallenburg, 2012). However, in their paper Tummala and Schoenherr (2011), established a methodical risk management procedure (RMP) including the five phases of identifying risks, measuring risks, assessing risks, mitigating risks, and controlling risk. As highlighted by earlier works, the disruptions risk management process must surpass the individual company's level to a larger network covering the extended supply chain (Kleindorfer and Saad, 2009; Nishat Faisal *et al.*, 2007).

The SCRM process must define not only the scope of its organization but also the resources and capabilities allocated. For instance, the mitigation capabilities definition could be expressed as the procedural practices within an organization that improve the capacity of the supply chain to

promptly recover from an actual disturbance and to recognize an imminent or actual disturbance. It appears that the extent of a disturbance is adversely correlated with the existence of mitigation capacity, which can be reactive, proactive, or even both (Colicchia *et al.*, 2011).

Proactive strategies encompass measures that are implemented before disruptions occur in order to prevent or mitigate their impact. Common strategies include supplier diversification (Chopra and Sodhi, 2004; Ivanov and Dolgui, 2020), strategic stockpiling, and contingency planning (Christopher and Peck, 2004). Improving supplier relationships and supply chain flexibility has also been highlighted (Ponis and Koronis, 2012). While reactive methods are those implemented after a disruption occurs, such as reallocating resources, expediting orders, and using alternate logistical routes (Sheffi and Rice, 2005; Wieland and Wallenburg, 2012). In these instances, agility and reactivity are crucial for mitigating the disruption's impact (Christopher and Towill, 2000).

5.2 Supply Chain Risk Management and Performance

The results demonstrate a lack of empirical research on the linkage between SCRM and its related performance outcomes. The findings of the current review are consistent with those of Kilubi (2016) related to the SCRM-performance linkage. Risks can arise in any supply chain and have the effect of lowering a production line's overall performance. In order to stay ahead of the competition, producers need to be aware of and control risks. Numerous studies in the body of current literature demonstrate the influence of risk variables on organization's logistical performance, including supply, market, operational, financial, and environmental risks (Ali and Gurd, 2020; Asrol *et al.*, 2021). Moreover, the majority of papers offer meaningful guidance for decision-makers on how to compose strategies in order to mitigate risks and enhance supply chain performance. Skipper and Hanna (2009), centered on flexibility and discovered that endorsement from senior management, use of technology, alignment of resources, and collaboration with external parties significantly enhance adaptability and consequently mitigate exposure to supply chain disruption hazards. According to Papadakis (2006) research, supply chain interruptions have an effect on businesses' financial performance. He

demonstrated a decline in the company's share value because of supply chain uncertainties. He contends that exposure to risks complicates companies' ability to predict supply chain disturbances.

5.3 Supply Chain Resilience

Most studies investigate the role of supply chain flexibility, agility, collaboration, and redundancy in mitigating disruptions, providing decision-makers with insights regarding the significance of various supply chain resilience enhancers for reducing disruptions (Pettit *et al.*, 2013; Christopher and Peck, 2004). Therefore, these four dimensions are the most cited in the existing literature. The first dimension; i.e., flexibility, as described by Erol *et al.* (2010), pertains to an enterprise's capacity to adjust to evolving environmental and stakeholder demands with minimal time and effort. Supply chain flexibility, delineated by Swafford *et al.* (2008), encompasses four dimensions: sourcing, product design, manufacturing, and delivery. The authors suggest that flexibility in product creation, procurement, production, and logistics affects a SC's agility. Christopher and Peck (2004), characterize supply chain agility as the capability to swiftly deal with unforeseen fluctuations in supply or demand. As for collaboration, it is evident that managing supply chain risks involves the collaborative and synchronized efforts of partners within the SC. Pettit *et al.* (2013), suggests that SC collaboration is the capability to collaborate with other partners for reciprocal benefits in aspects like forecasting, postponement, and risk sharing. Finally, the fourth dimension refers to redundancy. During a crisis, redundancy refers to the tactical and deliberate deployment of excess capacity and inventory to handle things like supply shortages or demand spikes (Christopher and Peck, 2004). On the other hand, recent research has underlined the crucial importance of digital technology in supporting supply chain resilience, particularly in the face of disruptions such as the COVID-19 pandemic and geopolitical uncertainty. Kang *et al.* (2024) show that the use of digital technologies improves both supply chain resilience and market performance. These technologies increase supply chain visibility, respond more quickly to interruptions, and strengthen the network's overall resiliency.

5.4 Supply Chain Risk Factors

A significant portion of contemporary literature focuses particular attention to SC risk categorizations, for example, distinguished between macro-risk outside the supply chain, which is associated with specific socio-political and environmental failures, and micro-risk linked to the supply chain (upstream side, downstream transport, and infrastructure). Sodhi *et al.* (2011), have suggested catastrophic and operational risks. In their papers, authors such as Tang (2006) and Chen *et al.* (2013) reviewed disruption risks and operational risks, the operational risks are due to strategic restructuring failures inside the system, while incidents with low frequency and significant repercussions are the major focus of disruption risks. Christopher and Peck (2004), propose numerous categorizations of SC risks, encompassing external and internal risks: within the company (process risk and control risk), outside the company but within the supply chain

system (demand risk and supply risk), and beyond the network (environmental risk). However, in the majority of studies, the authors classify the risk factors into five categories: risk associated with demand, risk associated with supply, operational risk, risk related to control, and risk related to the environment.

5.5 Sustainability and Risk Management

Risk management in the sustainable SC, according to Fagundes *et al.* (2020), represents the most growing area of research in the discipline. Sustainability risk management has the role of identifying, analyzing, and providing solutions to control risks. In order to achieve positive outcomes for sustainable supply chain performance, the authors have recently highlighted the contribution of risk management methods in sustainable supply chains and emphasized the significance of harmony among the primary aspects of sustainability ((Tavakoli Haji Abadi and Avakh Darestani, 2021; Nobanee *et al.*, 2021). In fact, when we talk about sustainability risk, three main themes are included: economic, environmental, and social. Recycling, remanufacturing, reverse logistics, credit, and exchange rates are a few examples of the various aspects of economic sustainability. While environmental sustainability covers different issues such as climate change, natural hazards, and renewable energies, social sustainability is associated with humanitarian support, reputation risk, public health, epidemic, and pandemic risks.

5.6 SCRM After and During COVID-19 Crisis

In the past two decades, several studies are conducted to examine and conclude the risk mitigation strategies for handling the Supply chain risks during the COVID-19 crisis. In the majority of papers, the findings show that the epidemic risk is the most critical uncertainty. The findings of the studies involve that the lack of a proactive and preventative approach to risk management reduced the resilience of firms to the risks caused by the pandemic (Dohale *et al.*, 2021; Remko, 2020). This finding supports previous research into this brain area which links supply chain resilience and COVID-19. It is encouraging to compare this figure with that found by Elbaz and Ruel (2020), who argues that the implementation of SCRM techniques enhances SC robustness in the wake of the unexpected Covid-19 outbreak by testing the resource based view and the organizational information processing theories in the French companies. It is interesting to note that SCRM process is sufficiently agile and robust to enable an organization to anticipate potential disruptions and to respond quickly when they do occur.

6. RESEARCH GAPS AND FUTURE DIRECTIONS

Regarding the second question concerning research gaps, despite the extensive literature on SCRM and SCRES, there are avenues for future research that warrant exploration. From a theoretical point of view, this work adds to the continuing discussion about SCRM by emphasizing the importance of a multidimensional approach that takes performance, resilience, and sustainability into account. It also emphasizes the mediated role of disruptive impacts in shaping the effectiveness of SCRM approaches, which has

not been extensively examined in the literature. The findings imply that future study should look into the indirect consequences of disruptions on the SCRM-resilience link, especially in underdeveloped contexts such as emerging economies.

From a practical standpoint. Firstly, the majority of prior studies have employed case studies or literature reviews. Therefore, embracing a more diverse range of research designs could offer richer and more nuanced insights into SCRM. Varied approaches, such as experimental studies or longitudinal analyses, may provide deeper insights on the complexities associated with managing risks in supply chains. Secondly, the geographical distribution of SCRM research has been skewed towards Asia and America. While this focus has yielded valuable insights, it highlights an important research gap: the underrepresentation of studies conducted in other regions, such as Africa, Europe, and South America. Future studies should aim to fill this gap by exploring SCRM on less-studied continents. Addressing this research gap is essential to understand the unique regional factors that influence supply chain risks which can include cultural, economic political or even environmental conditions. Furthermore, this expansion should not be limited to traditional manufacturing supply chains but should extend to emerging fields within the broader scope of supply chain management. Sectors such as e-commerce, renewable energy, and digital services are increasingly dominating global supply chain networks. These emerging industries and services present new risks that demand aligned risk management strategies.

Thirdly, in terms of the SCRM process, introducing two new steps, risk communication and risk recovery could enhance the systematic control of vulnerabilities. The incorporation of these steps acknowledges the dynamic nature of risks and emphasizes the importance of effective communication and recovery strategies in maintaining resilience throughout the supply chain. Fourthly, a close attention should be paid to the incorporation of cutting-edge technologies like blockchain into supply chain risk management (SCRM). Indeed, it's becoming increasingly clear that information tools for SCRM are nowadays essential for gathering and utilizing information effectively and consequently enhancing the effectiveness of SCRM process. Accordingly, in the years ahead, research should focus on understanding the impact that these technologies can have on making SCRM processes more efficient and effective. Precisely, we need to delve into how blockchain and other emerging technologies can be used to identify, communicate, and mitigate risks in real-time. In addition to the aforementioned research areas, the implementation of various strategic approaches is essential for mitigating risks effectively and therefore still need to be further explored. Precisely, diversifying sourcing, optimizing storage and location management, forging strategic partnerships, developing comprehensive business continuity plans, and investing in staff training and awareness are all promising strategies that will have a valuable impact on enhancing the resilience of supply chains by minimizing disruptions and improving overall risk management effectiveness.

In summary, future research in SCRM should consider methodological diversification, global expansion beyond dominant regions, the incorporation of new steps in the SCRM process, and the integration of innovative

technologies. Embracing these directions will not only fill existing research gaps but also foster a more holistic understanding of SCRM in the face of evolving challenges and opportunities.

7. CONCLUSION

This paper provides a comprehensive investigation into the current state of research on supply chain risk management (SCRM) and supply chain resilience (SCRES), offering an extensive overview of the field, identifying critical gaps in the literature, and highlighting emerging areas for further exploration. Through a systematic literature review of studies published between 2000 and 2023, this paper employs a multi-perspective descriptive and content analysis approach to deliver a well-structured examination of SCRM research. This review examines the multifaceted risks affecting supply chain management (SCM). It evaluates the tools and strategies employed to manage these risks and analyzes the conditions and dimensions that contribute to enhancing supply chain resilience. Then, the findings illustrate how, over the past decade, SCRM has matured from an emerging concept into a well-established field. Early frameworks predominantly adopted reactive approaches, but recent developments emphasize proactive and strategic risk management practices that prioritize preparedness and resilience-building.

The analysis identifies six major themes as central to the existing body of work: SCRM process, supply chain risk management and performance, supply chain resilience, sustainability and risk management, supply chain risk factors, and SCRM during and after the COVID-19 crisis. It categorizes risk sources into environmental, network-related, and organizational factors, highlighting the importance of risk mitigation practices such as identification, assessment, mitigation, and control. Furthermore, the findings emphasize the role of flexibility, agility, collaboration, and redundancy in bolstering supply chain resilience against disruptions, such as those experienced during the COVID-19 crisis.

Despite the contributions of this study, several limitations and areas for future research remain. First, there is a need to reassess and refine the four phases of the SCRM process to enhance their effectiveness in mitigating risks and fostering resilience. Second, the majority of the methodological approaches used in SCRM research have been restricted to case studies, literature reviews, and surveys, which provide static views of occurrences. Future studies should incorporate experimental designs and longitudinal analyses to provide deeper and more dynamic insights. Third, the geographical distribution of research has been excessively focused on regions such as Asia and America, highlighting the need to explore underrepresented contexts, including Africa and the Middle East. Also, the integration of emerging technologies, such as blockchain, artificial intelligence, and Internet of things, holds immense potential for real-time risk identification, communication, and mitigation, demanding further investigation. Additionally, while this study analyzed 311 articles from the Scopus database, future research could include data from additional databases, such as Web of Science, to provide a broader and richer perspective.

The findings not only confirm prior research but also expand the current understanding of SCRM and SCRES,

offering critical insights into their evolving dimensions. This paper serves as a foundational resource for scholars, providing a roadmap for addressing the identified gaps and advancing research in this field. By following these recommendations, future studies can contribute to the development of more robust and resilient supply chain management practices.

REFERENCES

- Ahmad, F., Shamayleh, A., Daghfous, A., Al Khatib, I., Al Salloum, G. and Elabed, S. (2024). Healthcare Supply Chain Disruption Risks. *Operations and Supply Chain Management: An International Journal*, 17(2), pp.264-283.
- Ali, I. and Gurd, B. (2020). Managing Operational Risks through Knowledge Sharing in FOOD Supply Chains. *Knowl. Process Management*, 27, pp. 322–331.
- Altay, N. and Ramirez, A. (2010). Impact of Disasters on Firms in Different Sectors: Implications for Supply Chains. *Journal of Supply Chain Management*, pp. 46, 59– 80.
- Aqlan, F. and Lam, S.S. (2015). Supply chain risk modelling and mitigation. *International Journal of Production Research*, 53, pp.5640–5656.
- Asrol, M., Marimin, M., Machfud, M., Yani, M. and Taira, E. (2021). Risk Management for Improving Supply Chain Performance of Sugarcane Agroindustry. *Industrial Engineering & Management Systems*, 20, pp. 9–26.
- Ates, A. and Bititci, U. (2011). Change Process: A Key Enabler for Building Resilient Smes. *International Journal of Production Research*, 49, pp. 5601–5618.
- Bandaly, D., Satir, A. and Shanker, L. (2014). Integrated Supply Chain Risk Management Via Operational Methods and Financial Instruments. *International Journal of Production Research*, 52, pp. 2007–2025.
- Bode, C., Wagner, S., Petersen, K. and Ellram, L. (2011). Understanding Responses to Supply Chain Disruptions: Insights from Information Processing and Resource Dependence Perspectives. *The Academy of Management Journal*, 54, pp. 833–856.
- Bryman, A. and Bell, E. (2007). The Ethics of Management Research: An Exploratory Content Analysis. *British Journal of Management*, 18(1), pp. 63-77.
- Butner, K. (2010). The Smarter Supply Chain of the Future. *Strategy Leadership*, 38, pp. 22–31.
- Carvalho, J.C.D., Vilas-Boas, J. and Neill, H.O. (2014). Logistics and Supply Chain Management: An Area with a Strategic Service Perspective. *American Journal of Industrial and Business Management*, 04, pp. 24–30.
- Chen, J., Sohal, A.S. and Prajogo, D.I. (2013). Supply Chain Operational Risk Mitigation: A Collaborative Approach. *International Journal of Production Research*, 51, pp. 2186–2199.
- Chopra, S and Sodhi, M.S. (2004). Managing Risk to Avoid Supply-Chain Breakdown. *MIT Sloan Management Review*, 46 (1), pp. 53-61.
- Christopher, M. and Peck, H. (2004). Building the Resilient Supply Chain. *The International Journal of Logistics Management*, 15, pp. 1–14.
- Colicchia, C., Dallari, F. and Melacini, M. (2011). A Simulation-Based Framework to Evaluate Strategies for Managing Global Inbound Supply Risk. *International Journal of Logistics Research and Applications*, 14, pp. 371– 384.
- Colicchia, C. and Strozzi, F. (2012). Supply Chain Risk Management: A New Methodology for A Systematic Literature Review. *Supply Chain Management: International Journal*, 17, pp. 403–418.
- Craighead, C., Blackhurst, J., Rungtusanatham, M. and Handfield, R. (2007). The Severity of Supply Chain Disruptions: Design Characteristics and Mitigation Capabilities. *Decision Sciences*, 38, pp. 131–156.
- Dohale, V., Verma, P., Gunasekaran, A. and Ambilkar, P. (2021). COVID-19 and Supply Chain Risk Mitigation: A Case Study from India. *The International Journal of Logistics Management*, 34(2), pp. 417-442.
- Elbaz, J. and Ruel, S. (2020). Can Supply Chain Risk Management Practices Mitigate the Disruption Impacts on Supply Chains' Resilience and Robustness? Evidence From an Empirical Survey in A COVID-19 Outbreak Era. *International Journal of Production Economics*, 233, pp.1-12.
- Fagundes, M.V.C., Teles, E.O., Vieira de Melo, S.A.B. and Freires, F.G.M. (2020). Supply Chain Risk Management Modelling: A Systematic Literature Network Analysis Review. *IMA Journal of Management Mathematics*, 31, pp. 387–416.
- Fan, Y. and Stevenson, M. (2018). A Review of Supply Chain Risk Management: Definition, Theory, and Research Agenda. *International Journal of Physical Distribution & Logistics Management*. 48, pp. 205–230.
- Fynes, B., Voss, C. and Búrca, S. (2005). The Impact of Supply Chain Relationship Quality on Quality Performance. *International Journal of Production Economics*, 96, pp. 339–354.
- Hendricks, K.B. and Singhal, V.R. (2009). An Empirical Analysis of the Effect of Supply Chain Disruptions on Long-Run Stock Price Performance and Equity Risk of the Firm. *Production and Operations Management*, 14, pp. 35–52
- Ivanov, D. and Das, A. (2020). Coronavirus (COVID-19/SARS-CoV-2) and Supply Chain Resilience: A Research Note. *International Journal of Integrated Supply Management*, 13(1), pp. 90-102.
- Ivanov, D. and Dolgui, A. (2021). A Digital Supply Chain Twin for Managing the Disruption Risks and Resilience in the Era of Industry 4.0. *Production Planning and Control*, 32, pp. 775–788.
- Ivanov, D. and Dolgui, A. (2020). Viability of Intertwined Supply Networks: Extending the Supply Chain Resilience Angles Towards Survivability. A Position Paper Motivated by COVID-19 Outbreak. *International Journal of Production Research*, 58(10), pp.2904–2915.
- Jüttner, U., Peck, H. and Christopher, M. (2003). Supply Chain Risk Management: Outlining an Agenda for Future Research. *International Journal of Logistics Research and Applications*. 6(4), pp. 197–210.
- Kamalahmadi, M. and Mellat-Parast, M. (2015). Developing A Resilient Supply Chain Through Supplier Flexibility and Reliability Assessment. *International Journal of Production Research*, 54(1), pp. 302–321.
- Kang, M., Robb, C., Kim, S., and Stephens, A. (2024). Digital Technology Adoption for Building Supply Chain Resilience Amid the COVID-19 Pandemic: Evidence from South Korean Manufacturers. *Operations and Supply Chain Management: An International Journal*, 17(1), pp. 65-76.
- Kilubi, I. (2016). The Strategies of Supply Chain Risk Management – A Synthesis and Classification. *International Journal of Logistics Research and Applications*, 19(6), pp. 604–629.
- Kırlmaz, O. and Erol, S. (2017). A Proactive Approach to Supply Chain Risk Management: Shifting Orders Among Suppliers to Mitigate the Supply Side Risks. *Journal of Purchasing and Supply Management*, 23 (1), pp. 54–65.
- Kleindorfer, P.R. and Saad, G.H. (2009). Managing Disruption Risks in Supply Chains. *Production and Operations Management*, 14(1), pp. 53–68.
- Lavastre, O., Gunasekaran, A. and Alain, S. (2012). Supply Chain Risk Management in French Companies. *Decision Support Systems*, 52(4), pp. 828–838.
- Mayring, P. (2014). *Qualitative Content Analysis - Theoretical Foundation, Basic Procedures and Software Solution*, Klagenfurt, Austria.

- Martin, C. and Towill, D.R. (2000). Supply Chain Migration from Lean and Functional to Agile and Customized. *Supply Chain Management*, 5(4), pp. 206-213.
- Melnyk, S., Closs, D.J., Griffis, S., Zobel, C. and Macdonald, J. (2014). Understanding Supply Chain Resilience. *Supply Chain Management Review*, 18, pp. 34–41.
- Morteza Beigi, L., Hassini, E., and Soltani, N. (2024). A Review of Models for Dependency of Risks: Extension and Applications to Supply Chains. *Operations and Supply Chain Management: An International Journal*, 17(2), pp.316-329.
- Nishat Faisal, M., Banwet, D.K. and Shankar, R. (2007). Information Risks Management in Supply Chains: an Assessment and Mitigation Framework. *Journal of Enterprise Information Management*, 20 (6), pp. 677–699.
- Nobanee, H., Al Hamadi, F.Y., Abdulaziz, F.A., Abukarsh, L.S., Alqahtani, A.F., AlSubaey, S.K., Alqahtani, S.M. and Almansoori, H.A. (2021). A Bibliometric Analysis of Sustainability and Risk Management. *Sustainability*, 13 (6), pp.1-16.
- Nooraie, S.V. and Mellat Parast, M. (2015). A Multi-Objective Approach to Supply Chain Risk Management: Integrating Visibility With Supply and Demand Risk. *International Journal Production Economics*, 161, pp. 192–200.
- Norrman, A. and Jansson, U. (2004). Ericsson's Proactive Supply Chain Risk Management Approach After a Serious Sub-Supplier Accident. *International Journal of Physical Distribution & Logistics Management*, 34(5), pp. 434–456.
- Papadakis, I. (2006). Financial Performance of Supply Chains After Disruptions: an Event Study. *Supply Chain Management: International Journal*, 11(1), pp. 25–33.
- Pettit, T.J., Croxton, K.L. and Fiksel, J. (2013). Ensuring Supply Chain Resilience: Development and Implementation of an Assessment Tool. *Journal of Business Logistics*, 34 (1), pp. 46–76.
- Ponis, S.T. and Koronis, E. (2012). Supply Chain Resilience: Definition Of Concept and Its Formative Elements. *Journal of Applied Business Research*, 28(5), pp.921-929
- Ponomarev, S.Y. and Holcomb, M.C. (2009). Understanding the Concept of Supply Chain Resilience. *The International Journal of Logistics Management*, 20(1), pp. 124–143.
- Remko, van H. (2020). Research Opportunities for A More Resilient Post-COVID-19 Supply Chain – Closing the Gap Between Research Findings and Industry Practice. *International Journal of Operations & Production Management*, 40(4), pp.341–355.
- Rice, J. and James Caniato, F. (2003). Building A Secure and Resilient Supply Network. *Supply Chain Management Review*, 7, pp. 22–30.
- Ritchie, R. and Brindley, C. (2007). An Emergent Framework for Supply Chain Risk Management and Performance Measurement. *Journal of the Operational Research Society*, 58(11), 1398–1411.
- Seuring, S. and Müller, M. (2008). From A Literature Review to A Conceptual Framework for Sustainable Supply Chain Management. *Journal of Cleaner Production*, 16(15), 1699–1710.
- Seuring, S. and Gold, S. (2012). Conducting Content-Analysis Based Literature Reviews in Supply Chain Management. *Supply Chain Management*, 17(5), pp. 544–555.
- Sheffi, Y. and Rice, J.B. (2005), A Supply Chain View of the Resilient Enterprise. *MIT Sloan Management Review*, 47 (1), pp. 41-48.
- Skipper, J.B. and Hanna, J.B. (2009). Minimizing Supply Chain Disruption Risk Through Enhanced Flexibility. *International Journal of Physical Distribution & Logistics Management*, 39(5), pp. 404–427.
- Sodhi, M., Son, B.-G. and Tang, C. (2011). Researchers' Perspectives on Supply Chain Risk Management. *Production and Operations Management*, 21(1), pp.1-13.
- Sodhi, M. and Tang, C. (2020). Supply Chain Management for Extreme Conditions: Research Opportunities. *Journal of Supply Chain Management*, 57(1), pp.7-16.
- Song, M., Ma, X., Zhao, X. and Zhang, L. (2022). How to Enhance Supply Chain Resilience: A Logistics Approach. *The International Journal of Logistics Management*, 33 (4), pp. 1408-1436.
- Swafford, P., Ghosh, S. and Murthy, N. (2008). Achieving Supply Chain Agility Through IT Integration and Flexibility. *International Journal of Production Economics*. 116(2), pp. 288–297.
- Tang, C.S. (2006). Perspectives in Supply Chain Risk Management. *International Journal of Production Economics*, 103(2), pp.451–488.
- Tavakoli Haji Abadi, Y. and Avakh Darestani, S. (2021). Evaluation of Sustainable Supply Chain Risk: Evidence from the Iranian Food Industry. *Journal of Science and Technology Policy Management*, 14(1), pp.127-156.
- Tukamuhabwa, B.R. (2023). Supply Chain Orientation and Supply Chain Risk Management Capabilities: Mechanisms for Supply Chain Performance of Agro-Food Processing Firms in Uganda. *Journal of African Business*, 24(4), pp. 649–672.
- Tummala, R. and Schoenherr, T. (2011). Assessing and Managing Risks Using the Supply Chain Risk Management Process (SCRMP). *Supply Chain Management: International Journal*, 16, pp. 474–483.
- Urciuoli, L., Mohanty, S., Hints, J. and Boekesteijn, E. (2014). The Resilience of Energy Supply Chains: A Multiple Case Study Approach on Oil and Gas Supply Chains to Europe. *Supply Chain Management: International Journal*, 19(1), pp.46-63.
- Wakolbinger, T. and Cruz, J. (2011). Supply Chain Disruption Risk Management Through Strategic Information Acquisition and Sharing and Risk-Sharing Contracts. *International Journal of Production Research*, 49(13), pp. 4063–4084.
- Wieland, A., Wallenburg, C.M., 2012. Dealing with Supply Chain Risks: Linking Risk Management Practices and Strategies to Performance. *International Journal of Physical Distribution & Logistics Management*, 42(10), pp.887–905.
- Yao, Y. and Fabbe-Costes, N. (2018). Can You Measure Resilience If You Are Unable to Define It? The Analysis of Supply Network Resilience (SNRES). *Supply Chain Forum: An International Journal*, 19(4), pp. 1–11.
- Yilmaz Borekci, D., Rofcanin, Y. and Gürbüz, H. (2015). Organizational Resilience and Relational Dynamics in Triadic Networks: A Multiple Case Analysis. *International Journal of Production Research*, 53(22), pp. 6839– 6867.
- Zsidisin, G. and Ellram, L. (2003). An Agency Theory Investigation of Supply Risk Management. *Journal of Supply Chain Management*. 39(3), pp.15–27.
- Zsidisin, G.A., Ellram, L.M., Carter, J.R. and Cavinato, J.L. (2004). An Analysis of Supply Risk Assessment Techniques. *International Journal of Physical Distribution & Logistics Management*, 34(5), pp.397–413.

Soukaina Sahab is currently a PhD candidate in Management Sciences, specializing in Supply Chain Management at the National School of Business and Management (ENCG) of El Jadida, Chouaib Doukkali University. She holds a Master's degree in Logistics and Platform Management. Her research focuses on risk management in supply chains during crisis periods, with

a particular emphasis on the Moroccan context. She has presented her work at several international conferences and is committed to contributing to the advancement of knowledge in the field of supply chain risk management.

Salah Oulfarsi received his PhD in Management Sciences. He is currently a professor at the National School of Business and Management (ENCG) of El Jadida, Chouaib Doukkali University. His research focuses on supply chain management, sustainability, green supply chain management, and transportation. His work has been published in various academic journals such as *Acta logistica*, *Logforum*, *Cleaner logistics and supply chain*, *Environment and Social Psychology*, and he has presented his research at numerous international conferences. He is also an active member of the LERSEM Laboratory, contributing to the advancement of knowledge in management sciences.