Article

The Science of Organisational Resilience: Decoding Its Intellectual Structure to Understand Foundations and Future

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Abstract

This study aims to decode the intellectual structure of organisational resilience (OR) and provide a comprehensive overview of its conceptual development, key intellectual shifts and emerging research directions. We apply bibliometric co-citation analysis using CiteSpace on the scientific production on OR indexed in the Web of Science—Social Sciences Citation Index. The analysis identifies clusters, turning points and citation bursts, enabling the mapping of the field's main themes and intellectual foundations. The findings reveal eight major clusters of OR research, with distinctive yet interconnected areas: crisis management, disaster management, conceptualisation, supply chain management, influencing factors, strategy and planning, evaluation and community resilience. Key turning points and burst papers highlight the evolution of the field from conceptual foundations to strategic approaches shaped by global crises. The study advances theory by demonstrating how OR research is structured across clusters and by identifying conceptual gaps that require integration, which are addressed through a proposed research agenda. For scholars, it provides a roadmap to navigate the most influential works and theories, while for practitioners and policymakers, it highlights actionable directions to strengthen resilience in organisations facing volatile and uncertain environments.

Keywords: organizational resilience; research agenda; bibliometrics; crisis management; strategy

1. Introduction

The landscape of modern business is increasingly defined by instability, encapsulated by the paradigms of VUCA (Volatile, Uncertain, Complex and Ambiguous) and BANI (Brittle, Anxious, Nonlinear & Incomprehensible) environments (Godoy & Ribas Filho, 2021; Murugan et al., 2020; Urbano-Carazo, 2022). Random disruptions significantly impact organisational performance, profits, production and customer satisfaction (Sheffi & Rice, 2005). The COVID-19 pandemic exemplified this, exposing systemic vulnerabilities across industries while simultaneously showcasing how some organisations not only survived but thrived, demonstrating resilience by leveraging crises as catalysts for growth and transformation (Cardoso et al., 2025; Salanova, 2020; Zhang et al., 2020).

In this context, Organisational Resilience (OR) emerges as a critical capability, enabling companies to navigate chaos, adapt to disruption and sustain long-term competitive advantage (Lytras et al., 2025; Bronzo et al., 2024; Bueno Campos et al., 2019; Dressler, 2020; Teixeira & Werther, 2013). According to Sutcliffe and Vogus (2003), Schepers et al. (2021), Meneghel et al. (2013), Hedner et al. (2011) and Erol et al. (2010), OR can be defined as the capacity to respond, adapt and react to unexpected and unforeseen changes. The concept has gained recognition as a cornerstone of competitive advantage, with researchers highlighting its role in fostering adaptability, learning and recovery (Sanchís Gisbert & Poler Escoto, 2014; Teixeira & Werther, 2013). Robb (2000) argues that resilient companies are characterised by their ability to create and dissolve structures, provide security amid change, manage the emotional consequences of change, learn, develop and grow in the face of difficulties, be self-critical, moral, creative, have a sense of humour, independence and optimism. Resilient companies are thus able to adapt to crises, draw lessons from adversity and maintain a constructive outlook when confronted with complexity (Mafimisebi et al., 2025).

The theoretical framework of OR draws on two complementary perspectives. Organisational learning theory posits that the only lasting competitive advantage is the ability to learn, which enables organisations to survive by adapting to a changing world (Argyris, 1993). Meanwhile, ecological systems theory frames organisations as dynamic entities capable of achieving equilibrium in the face of external shocks (Adger, 2000; Greene, 2014). These theoretical perspectives complement one another, underscoring the multifaceted nature of OR (Sutcliffe & Vogus, 2003).

Classic and systematic reviews primarily analyse the content of papers within a specific topic, while bibliometric co-citation analysis delves deeper by examining their references to uncover the "intellectual structure" of the field, as termed in bibliometric research. This paper aims to advance understanding of OR through mapping its intellectual structure via an analysis of cited papers referenced in OR studies. By identifying key research clusters, influential works and emerging trends, it provides a structured overview of how the field has evolved and where it currently stands. In addition, by proposing a research agenda, it highlights theoretical gaps and outlines promising avenues for future inquiry.

Publishing a structured overview of this fragmented field provides more than an academic mapping exercise. Without such consolidation, researchers risk duplicating efforts and overlooking the seminal contributions that have shaped the study of consumer legitimacy. Conversely, by making visible the intellectual structure of the field, this paper delivers a practical roadmap that will save scholars valuable time in future literature reviews, foster cumulative knowledge and guide the design of more impactful research. For practitioners and policymakers, these insights also provide evidence-based references to better align organisational strategies with consumer expectations.

This paper is organised as follows: Section 2 outlines the methodology, detailing the bibliometric co-citation analysis and its application in this study. Section 3 presents the results, focusing on the identification of key clusters, intellectual turning points and burst papers within the field of OR. Section 4 proposes a comprehensive research agenda to guide future investigations. Finally, Section 5 concludes the paper, summarising the key findings and their implications for both academic and practical advancements in the field.

2. Methodology

The growing volume of scientific publications has made it increasingly difficult to stay current with the entire body of research, even within specialised fields. While reviewing the majority of publications was once feasible, it has become essential to focus on key works for a qualitative understanding of the field. Due to the overwhelming amount of literature,

bibliometric methodologies now play a crucial role in facilitating large-scale quantitative analysis, providing a more comprehensive overview of the field (Ball, 2018; Wallin, 2005).

Bibliographic references reveal the relationships between citing and cited authors. Conducting a bibliometric analysis of this corpus of references provides a valuable complement to traditional literature reviews, offering insights into the intellectual structure underpinning the field. This approach enables a deeper understanding of the origins and evolution of the field, identifies both established and emerging research areas that have attracted substantial scholarly attention and pinpoints potential research gaps that may warrant further exploration to advance the discipline (Trujillo & Long, 2018; Zhao & Strotmann, 2015).

Co-citation analysis is a bibliometric method used to achieve a comprehensive understanding of a scientific field (Trujillo & Long, 2018; Zhao & Strotmann, 2015; Zupic & Cater, 2015). This method involves determining how frequently two papers are co-cited in the references of a set of citing papers (Small, 1973). By identifying pairs of frequently co-cited papers, it is possible to construct a network of clusters that reveal the interrelationships driving the development of the field, identify influential studies and uncover the intellectual structure underpinning it (Trujillo & Long, 2018; Zhao & Strotmann, 2015). The visualisation of these networks through bibliometric maps enhances co-citation analysis (Chen & Song, 2019; Moral-Muñoz et al., 2020). In this study, CiteSpace software was used for both co-citation analysis and visualisation (Chen, 2017; Chen et al., 2010). CiteSpace has been applied in various social science studies (Díez-Martín et al., 2020; Torres-Pruñonosa et al., 2021) and offers valuable features, such as detecting papers significantly cited during a specific period (burst papers) or those that represent turning points in the field's development.

Bibliometric methods have been applied in OR, as shown by searches of the WoS and Scopus databases, although most studies rely primarily on descriptive analysis and word co-occurrence analysis. For instance, research has examined OR in general (Hillmann, 2021; Y. Y. G. López-López et al., 2022), business models (Otola & Knop, 2023), risk management (Márquez-Tejón et al., 2022), the COVID-19 pandemic (Das & Roy, 2022; Krishnan et al., 2022; Lamhour et al., 2023; Paeffgen, 2023; Pérez Martínez et al., 2022), sustainability (Abdullahi et al., 2023; Corrales-Estrada et al., 2021; Mehta et al., 2024), digital technologies (Spagnoletti & Za, 2021) and the Internet of Things (Chonsawat & Sopadang, 2020; Radanliev et al., 2022), among others. Only a limited number of papers have conducted co-citation analyes (Annarelli & Nonino, 2016; Hussain et al., 2023; Khin Khin Oo & Rakthin, 2022; Moura & Tomei, 2021; Silva-Santos & Mueller, 2022). In comparison with previous OR studies, this paper contributes to the field (see Table 1) by clustering different sub-disciplines within the OR field, enabling the visualisation of its intellectual structure, identifying turning points and burst papers, and proposing a research agenda.

Table 1. Summary of the main existing studies conducting systematic literature reviews or bibliometric analyses on Organisational Resilience.

References	Main Study Objectives	Research Method	Analysis Research Areas	Intellectual Turning Points	Burst Detection	Paper Co-Citation Analysis	Research Agenda
Silva-Santos and Mueller (2022)	Identify, organise and integrate resilience knowledge in business management, focusing on challenges such as COVID-19 and examining its role in organisational adaptation and recovery from disruptions.	Bibliometric analysis, using co-citation counts, historiography, bibliometric coupling and cartography.	No	Partial (Descriptive analysis identifying most cited papers but lacks in-depth turning point analysis)	No	Partial (descriptive co-citation counts)	Yes
Khin Khin Oo and Rakthin (2022)	Explore the role of absorptive capacity in enhancing OR	Author co-citation bibliometric analysis and scoping review	Yes	No	No	No (only author co-citation analysis)	No
Hussain et al. (2023)	Analyse the evolution, trends, publication patterns and key subthemes of OR, while mapping the contributions of regions, countries, institutions and leading authors.	Authors co-citation analysis, co-citations counts and bibliographing coupling.	Yes	No	No	No (only author co-citation analysis)	No
Annarelli and Nonino (2016)	Investigate the resilience literature focusing on the strategic and operational management of OR.	Systematic literature and co-citation analysis based on multi-dimensional scaling and factor analysis.	No	No	No	Yes	Yes
Moura and Tomei (2021)	Propose a framework for managing OR, particularly in response to crises such as COVID-19.	Literature review	Yes	No	No	No	No
This study	Aims to map the intellectual structure of OR by identifying key research clusters, influential works and emerging trends, while proposing future research directions to address literature gaps and to highlight areas for further exploration.	Paper bibliometric co-citation analysis	Yes	Yes	Yes	Yes	Yes

The search strategy, using the Social Science Citation Index (SSCI) database, was designed to capture as many records as possible from this emerging area of knowledge: (TS = ("organi* resilien*" or "resilien* organi*" or "strateg* resilien*" or "resilien* strateg*") AND PY = (1992–2022)). Even though Scopus generally contains a larger volume of research papers than WoS, the use of SSCI as a data source in bibliometric analyses within the social sciences is well established, providing strong support for the robustness of the results in this study (Díez-Martín et al., 2020; Jordan-Vallverdú et al., 2024; D. López-López et al., 2025; Torres-Pruñonosa et al., 2021). Prior research indicates that in business and economics the degree of overlap between the two databases is quite high, with relatively few unique citations in either source (Martín-Martín et al., 2018; Díez-Martín et al., 2024). Furthermore, there is no clear agreement among scholars in scientometrics as to which database should be considered superior (Pranckutė, 2021). WoS, however, offers a long-standing and consistent citation structure with broad historical coverage, which makes it particularly reliable for citation-based studies. For these reasons, the present analysis draws exclusively on WoS data.

The objective of this article is to analyse the intellectual structure of OR prior to the disruptive element introduced by the COVID-19 pandemic. For this reason, we selected 30 April 2022 as the cut-off date. By then, scientific production on OR related to COVID-19 was already highly significant (49% of OR-related publications in 2021 and 48% in 2022). However, since our aim was to examine the intellectual structure of the field before the pandemic, this date ensured that the analysis would not be disproportionately dominated by COVID-19 literature. Due to the usual time lag between publication and the accumulation of citations, no articles from 2021 or 2022 appear in the co-citation network. Among the publications from 2020, only 20 deal with COVID-19 and none of them were identified as burst papers or turning points. In contrast, one 2020 article unrelated to COVID-19 (Duchek, 2020) did emerge as a burst paper. Therefore, the chosen cut-off date successfully fulfilled its purpose: to capture the evolution of the intellectual structure of OR up to the point at which the pandemic began to reshape the field.

A total of 954 citing references were initially retrieved, of which 948—after removing 2 meeting abstracts and 4 book reviews—were finally processed in CiteSpace; these records contained 48,968 cited references, forming the basis for the bibliometric co-citation analysis that represents the intellectual structure of the OR field. Table 2 presents the parameters used in CiteSpace for the bibliometric analysis. The g-index criterion (Egghe, 2006) was applied to select nodes, with the aim of creating the most cohesive network possible, in which clusters are both distinct and homogeneous. Additionally, different networks were tested by varying the control factor (k) and two criteria were considered to determine the most appropriate configuration: (1) the cluster silhouette values, which must range between 0.7 and 1.0 according to Chen et al. (2010), assessing clustering quality by combining cohesion (similarity within a cluster) and separation (distinctiveness from other clusters); and (2) the modularity Q indicator, evaluating the quality of the overall network division. After observing that both values were optimised when k ranged between 10 and 18, we decided to set k = 14, as this configuration produced two articles with centrality above 0.10, whereas the alternative networks (k = 10 and k = 18) yielded only one.

Table 2. Parameters included in CiteSpace to conduct the bibliometric analysis.

Parameters	Description	Selection
(1) Timeline	Analysed period	From 1992 to 2022 (30 April 2022)
(2) Source of terms	Processed text fields	Title/abstract/author key-words/keywords plus (all)

Parameters	Description	Selection
(3) Type of node	Type of network selected for analysis	Cited reference (the networks are made up of co-cited references)
(4) Pruning	It is systematically processed to remove excessive connections	None
(5) Selection of criteria	How to sample reports to form final networks	g-index (k = 14)

3. Results and Discussion

Research in OR, which averaged 35.33 articles per year between 1992 and 2022, has experienced marked growth in the last decade, particularly since 2018 (Figure 1). Nonetheless, publication activity was minimal during the first 14 years of the study period (1992–2009). In contrast, the most recent period (2018–2022) recorded the highest number of publications, with 661 articles, representing 69.29% of the total output over the entire period.
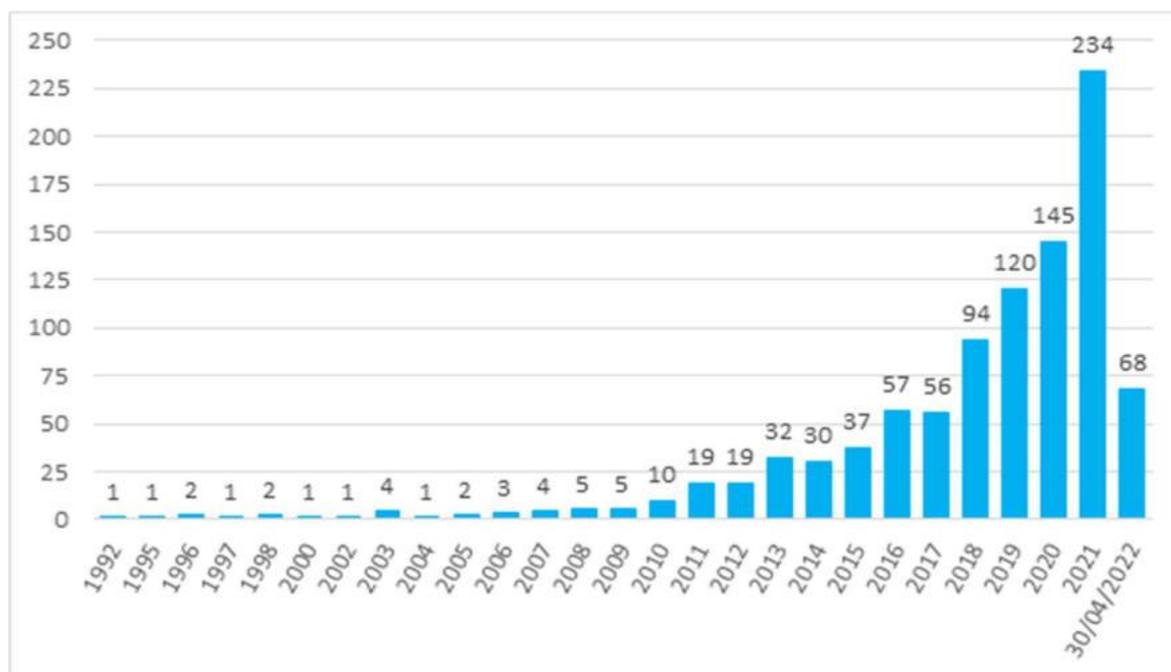

Figure 1. Distribution of the number of publications over the period under study.

3.1. Main Areas of Research in OR

Table 3 presents the key research domains within OR. The network is organised into eight primary co-citation clusters (1 to 8), with each cluster representing a distinct thematic framework.

The eight primary clusters identified exhibit silhouette values exceeding 0.87, suggesting a high degree of homogeneity. Additionally, the modularity Q-value of 0.84734 indicates that the network is well-structured, with clearly delineated clusters. Figure 2 depicts the knowledge network of OR.

Nonetheless, a key limitation of co-citation analysis is that the interpretation of clusters and the identification of central thematic structures heavily rely on the domain knowledge and expertise of the researchers. This reliance makes it challenging to distinguish between evidence-based findings and interpretations that are speculative or heuristic in nature.

To enhance the robustness of cluster labelling, the common links between researchers within each cluster, along with their citations, have been analysed to capture the essence of each cluster.

Table 3. Main areas of research in OR.

Cluster	Size	Silhouette	Year	Label	Description
1	58	0.945	2016	Crisis management	Exploring how resilient organisations cope effectively with a crisis
2	48	0.876	2018	Disaster management	Integrated approach for effective disaster resilience
3	46	0.929	2009	Conceptualisation	Development of OR concept
4	36	0.922	2018	SCM	The focus is on aspects related to organisational and supply chain resilience
5	32	0.954	2013	Influencing factors	Identifying factors that contribute to OR
6	22	0.972	2015	Strategy and planning	Strategy and planning actions to build effective OR
7	22	0.963	2013	Evaluation	Assessment of the level of resilience in organisations
8	11	0.99	2014	Community Resilience	They seek to explore and integrate resilience approaches to adapt them to communities

Silhouette: Quality of a cluster configuration (Rousseeuw, 1987), suggested parameter > 0.7 (Chen et al., 2010).
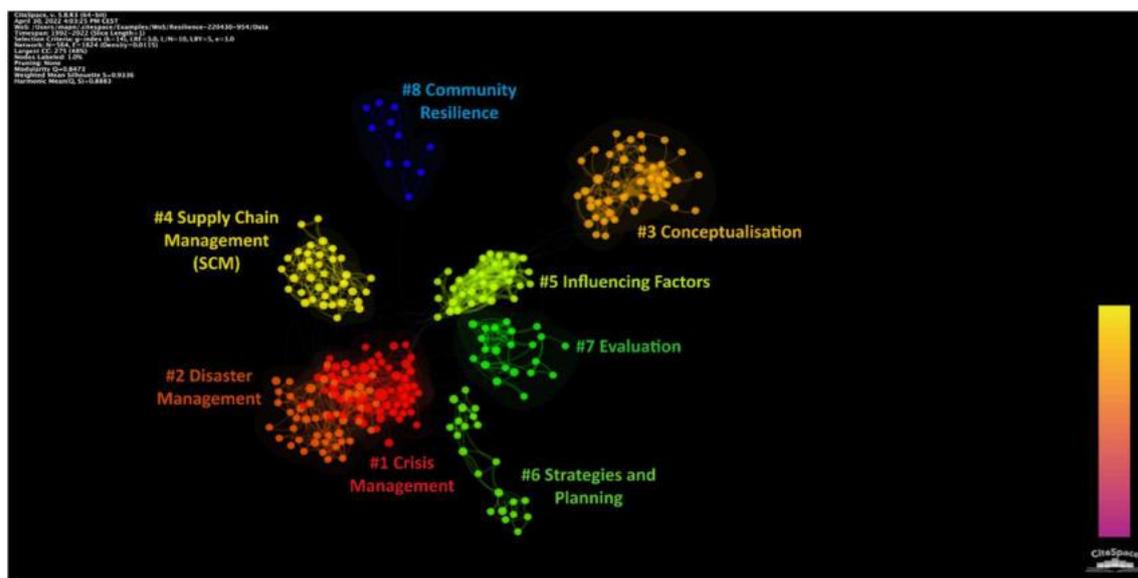

Figure 2. Co-citation network of OR research. The figure displays the co-citation network generated through CiteSpace. Each node represents a cited reference. Colours denote distinct clusters, each representing a different research theme within the field of OR. Links between nodes represent co-citation relationships, where thicker lines indicate stronger co-citation strength.

Cluster 1, which comprises the largest number of papers, represents the most prominent research area. The unifying theme of this cluster is **Crisis Management** (Williams et al., 2017) within the context of OR. The advancement of theoretical understanding is achieved by moving beyond reactive approaches to crisis and by framing resilience as a dynamic, systemic capability. According to Williams et al. (2017), there has been a shift in organisations from crisis response and containment ('crisis-as-an-event') to proactive anticipation and early warning ('crisis-as-a-process'). Confirming the ecological systems theory, the studies in this cluster explore how organisations can anticipate, adapt to and

overcome adverse situations through effective crisis management strategies or by developing resilient capacities. Pal et al. (2014) examined the relationship between structural robustness and dynamic operational flexibility, finding that the real-time reconfiguration of resources yielded superior outcomes compared to maintaining financial buffers. A central theme in this cluster is the emphasis on building robust resources, capabilities and processes that enable organisations to respond effectively to crises and challenges (Boin & Van Eeten, 2013). Additionally, the integration of crisis management, risk management and OR is highlighted as a critical approach to enhancing OR and sustainability in dynamic and turbulent environments (Williams & Shepherd, 2016). The cluster also underscores the significance of human and systemic factors in determining resilience. Mamouni Limnios et al. (2014) provide a detailed description of the manner in which trust, learning culture and autonomy support resilience in crises. Conversely, Boin and Van Eeten (2013) undertake a distinction between anticipatory and recovery capacities. Ortiz-de-Mandojana and Bansal (2016) demonstrate that the incorporation of environmental and social practices strengthens resilience to systemic crises, positioning it as a distributed capability evolving towards integrated sustainability. Notably, adapting to constant change in disruptive contexts has emerged as a key area of academic focus, reflecting the pressing challenges faced by modern organisations. It is imperative that organisations prepare themselves to effectively confront crises and integrate crisis management with resilience. Crisis management should not be conceived as an isolated process, but rather integrated with OR, ensuring that the lessons learned during crises strengthen the organisation's capacity to confront future challenges. This focus on iterative improvement and adaptation also echoes Organisational Learning Theory, which highlights how organisations transform disruptive experiences into routines and knowledge for enhanced future resilience.

Cluster 2, the second-largest group, focuses on **Disaster Management**, mainly on the tourism sector highlighting an integrated approach to effective disaster resilience (e.g., Orchiston et al., 2016). Brown et al. (2018) discuss how resilience can help deal with the effects of crises in the hotel industry, highlighting the importance of information for all stakeholders. Predictors of disaster resilience are central to the works of Chowdhury and Quaddus (2017), who show relational social capital—unlike structural and cognitive dimensions—acts as a predictor of resilience for tourism organisations and influences business performance. Brown et al. (2017) also examine predictors in the hotel industry and propose a conceptual framework for understanding disaster resilience. Dynamic capabilities represent another key aspect of disaster resilience. Jiang et al. (2019) identify behaviours and strategies that enable tourism businesses to adapt to disasters through routine transformation and resource allocation, while Battisti and Deakins (2017) emphasise the importance of a firm's dynamic capabilities and posture in integrating resources to identify new opportunities in highly volatile and uncertain environments. Barasa et al. (2018) underscore that resilience is an emergent property of complex adaptive systems, where self-organisation and the dynamic interaction of interconnected components enable adaptation to multiple environmental changes. Herbane (2019) complements this perspective by questioning traditional planning-centric approaches to resilience, advocating instead for capability-centric resilience in which crises are treated as routine events that foster adaptation beyond formal planning, while also highlighting emergent resilience whereby, even in the absence of formal crisis management preparation, survival and adaptation arise when resources are challenged. Therefore, an integrated approach to disaster resilience, combining relational social capital and dynamic capabilities, is essential to develop more effective strategies in tourism. All these streams reveal a productive tension: robust relational networks and information flows facilitate rapid coordination, while dynamic capabilities drive proactive adaptation. This synergy suggests that effective disaster resilience in tourism requires an

integrated approach combining social capital, stakeholder communication and dynamic resource realignment.

Cluster 3 refers to the **Conceptualisation** of resilience, exploring different aspects of OR such as its conceptualisation (Bhamra et al., 2011) and the development of conceptual frameworks (Burnard & Bhamra, 2011). The concept of resilience has been extensively analysed from various perspectives, highlighting its intricate nature (Somers, 2009). Fundamentally, resilience is closely related to the ability of an element or system to return to a stable state after a disruption (Burnard & Bhamra, 2011). Bhamra et al. (2011) provide a comprehensive overview of its development, analysing various fields of research and noting that the concept remains essentially constant regardless of its field of enquiry, offering valuable insights for organisation theory, strategy and operations management. Folke (2006) and Bhamra et al. (2011) present the origins of the concept and provide a comprehensive overview of its development, primarily rooted in ecological systems theory. Powley (2009) contributes to the development of the conceptual frameworks that describe the activation of resilience in challenging situations. Burnard and Bhamra (2011) present a conceptual framework for organisational responses to disruptive events, emphasising overlooked elements such as detection and activation, which are crucial for enhancing situational awareness, reducing vulnerabilities and restoring efficacy after disruption. Bhamra et al. (2011) identify a notable gap in empirical research and stress the need for further real-world studies to validate existing theoretical frameworks. Similarly, Ponomarov and Holcomb (2009) examine the relationship between risks and resilience in SCM, underscoring the importance of understanding these dynamics and integrating this dimension into theoretical models. Lengnick-Hall et al. (2011) define OR as a firm's ability to absorb disruptions, develop situation-specific responses, and engage in transformative activities to capitalise on unexpected threats, embedding this capacity in individual knowledge, skills, and abilities as well as in organisational routines and processes that support decisive action and adaptive integration. Vargo and Seville (2011) present a model for crisis strategic planning, while Pettit et al. (2019) develop the Supply Chain Resilience (SCR) Framework, offering insights into organisational strengths and weaknesses in resilience management and contributing to its conceptualisation. The conceptualisation of OR is a thoroughly analysed construct that can be described as the set of capabilities, skills and competencies enabling organisations, regardless of their nature or size, to confront and manage adverse situations, learn from them, and continuously improve.

Cluster 4 examines the application of OR in **Supply Chain Management** (SCM). A central debate in this area concerns the trade-off between resilience—often achieved through redundancies such as multiple suppliers and safety stock (Hosseini et al., 2019; Kamalahmadi & Parast, 2016)—and sustainability, which seeks efficiency through practices like single sourcing and inventory reduction (Hosseini et al., 2019). Ivanov (2018) points to the complex and sometimes contradictory nature of these relationships, noting that sustainable single sourcing can paradoxically increase vulnerability. To address this tension, multi-objective optimisation models have been developed to balance costs, resilience, and sustainability, responding to the acknowledged scarcity of research integrating these dimensions (Hosseini et al., 2019; Jabbarzadeh et al., 2018). Recent trends emphasise integrated approaches, with Jabbarzadeh et al. (2018) advocating the combination of paradigms—lean, agile, resilient, and green—through hybrid methodologies. In addition, relational capabilities and softer organisational factors, such as culture and leadership, are recognised as key enablers of resilience (Kamalahmadi & Parast, 2016). This highlights the increasing complexity of global value chains, where resilience and sustainability are influenced by both internal factors and enhanced relational capabilities within organisations.

Cluster 5 focuses on several key **Influencing Factors** that contribute to the development of OR. Ambulkar et al. (2015) argue that resource reconfiguration is crucial for enhancing OR and that a robust risk management infrastructure enables organisations to anticipate and respond proactively to potential disruptions. A well-structured risk management infrastructure—comprising dedicated departments, information systems and key performance indicators—provides a systematic approach to risk management and is particularly effective in absorbing low-impact disruptions. Gunasekaran et al. (2011) propose that the creation of strategic alliances grounded in core competencies and the effective use of information technologies enables organisations to access external resources and capabilities, thereby enhancing decision-making and strengthening OR. Internal factors lay a strong foundation for effectively adopting enabling factors like strategic alliances and information technology. Scholten et al. (2014) emphasise that an organisational culture that promotes learning, innovation and collaboration is another key enabler of OR. Confirming the organisation learning theory, the capacity to learn from past disruptions is a principal property of resilience, necessitating training for employees, suppliers and customers, as well as a thorough understanding of supply chain structures. Johnson et al. (2013) emphasise the role of social capital in facilitating resilience, defining collaboration as a process that addresses interorganisational issues beyond the capacity of any single organisation. Hohenstein et al. (2015) contribute with a comprehensive framework that highlights the importance of predefined contingency plans for rapid response and effective mitigation to ensure swift recovery. Determining the key influencing factors of OR is crucial for companies to survive within VUCA and BANI contexts.

Cluster 6 focuses on **Strategies and Planning** in different fields and disciplines, such as engineering (Hosseini et al., 2016) and quantitative approaches (Woods, 2015). From an engineering perspective, resilience in industrial processes relies on the ability to adjust functionality under disturbances and unforeseen changes, sustained through elements such as failure minimisation, effect limitation, administrative procedures, flexibility controllability, and early detection (Hosseini et al., 2016). This systemic perspective also resonates with ecological systems theory, which conceptualises resilience as an emergent property of interdependent socio-ecological systems evolving through adaptive cycles and cross-scale interactions (Meerow et al., 2016). Linkov et al. (2018) present a set of levels that guide analysts in selecting resilience assessment and decision support tools to plan management strategies based on risk scope (Aven, 2016), as well as on urgency and resource management capacity, in order to build system resilience. In a broader strategic context, several frameworks have been developed to support decision-making and planning for resilience in diverse systems, including urban environments. The Rockefeller Foundation's City Resilience Framework, for instance, enables cities to understand, analyse and assess their resilience in order to identify opportunities and challenges when formulating strategies (Spaans & Waterhout, 2017). Likewise, comprehensive frameworks for system resilience integrate guiding principles such as threat and hazard assessment, robustness, consequence mitigation, adaptability, risk-informed planning and risk-informed investment, which are essential for designing resilient systems (Hosseini et al., 2016). Through modelling and quantitatively assessing, it is possible to design, plan and implement OR efficient strategic actions. Such systemic approaches are consistent with Ecological Systems Theory, which conceptualises resilience as emerging from interdependent adaptive cycles and cross-scale interactions.

Cluster 7 deals with instruments to carry out an **Evaluation** of resilience. Lee et al. (2013) examine approaches and tools, including surveys, to help companies identify strengths and weaknesses and evaluate resilience plans, proposing a model that operationalises OR as a function of adaptive capacity and planning, while stressing that mea-

surement should draw on knowledge and experience across all organisational levels to reflect actual practices rather than stated intentions. Fahimnia and Jabbarzadeh (2016) propose a paradigm for dynamic sustainability analysis that considers both business-as-usual and disruption situations to ensure that sustainability performance remains stable, presenting a multi-objective mathematical model that integrates sustainability performance scoring with a stochastic fuzzy goal programming approach to design a resiliently sustainable supply chain. Aleksić et al. (2013) propose a fuzzy mathematical model to assess the OR potential of SMEs in the manufacturing sector, arguing that resilience can be analysed as a fuzzy issue due to limited data, and showing that by identifying weak organisational elements the model provides crucial input for enhanced business strategies, enabling firms to learn, improve, report externally, demonstrate compliance and monitor processes. Evaluating resilience makes it possible to design and plan actions to construct resilience in the organisations.

Cluster 8 explores OR in non-business context and particularly in **Community Resilience** from different perspectives. Weichselgartner and Kelman (2015) emphasise the need to compare ecosystems and societies and to address inclusion and exclusion when defining the boundaries of OR, arguing that in the social world resilience is as much about shaping challenges as responding to them, while noting that although shared responsibility for disaster resilience is increasingly recognised, its practical meaning is often framed by expert knowledge rather than by the practices of those most at risk. Some papers use socio-ecological systems, developmental psychology and mental health (Berkes & Ross, 2013) to promote community resilience in science, politics (MacKinnon & Derickson, 2013) and disaster practice (Chewning et al., 2013). Berkes and Ross (2013) employ the concept of panarchy to understand community resilience by highlighting the interconnectedness between different organisational levels, emphasising how local social-ecological systems are influenced by both lower-level actions and higher-level drivers, thereby contributing to sustainability science and policy. OR is not only applicable to enterprises but also to non-business environments, particularly among communities that need to develop resilience in order to endure over time.

Synthesis and Inter-Cluster Relationships

While each cluster represents a distinct intellectual stream, the field of OR cannot be fully understood without considering how these domains intersect. Exploring such inter-cluster relationships reveals how the literature evolves beyond isolated debates, highlighting complementarities and tensions that shape the intellectual structure of the field.

A first example is the connection between Crisis Management (Cluster 1) and Influencing Factors (Cluster 5). Crisis management research consistently emphasises the need for rapid anticipation and effective response to disruptions (Williams & Shepherd, 2016; Boin & Van Eeten, 2013), yet these capabilities depend on deeper enabling factors such as trust, organisational culture, and learning orientation (Scholten et al., 2014). The capacity to transform disruptions into knowledge and routines is not merely supportive, but constitutive of crisis resilience.

A second conceptual relationship emerges between Supply Chain Management (Cluster 4) and Influencing Factors (Cluster 5). The relevance of dynamic capabilities, information technologies, and collaborative networks is a key foundation for developing SCR (Gunasekaran et al., 2011; Ambulkar et al., 2015; Hohenstein et al., 2015). These elements reflect broader organisational factors that enable firms to absorb shocks and reorganise resources effectively (Kamalahmadi & Parast, 2016; Ivanov, 2018). This interconnection illustrates how general principles of OR are operationalised in one of the most exposed and globally interconnected systems.

Different intersections can be seen in Strategy and Planning (Cluster 6), which functions as a transversal bridge across multiple areas (in particular, Clusters 1, 2, 7, and 8). Strategic frameworks and quantitative models provide the tools through which organisations integrate crisis response, influencing factors, and sectoral applications into coherent approaches. In this sense, Cluster 6 articulates how dispersed insights from other clusters can be translated into proactive and adaptive strategies.

Taken together, these examples show that OR is not confined to isolated domains but emerges from the interaction between them. The connections highlighted above are only a subset of the potential inter-cluster relationships. Additional intersections, such as those between Clusters 1, 2 and 6; Clusters 1 and 2; Clusters 6 and 7; and Clusters 1, 6 and 8, are further developed in the research agenda.

3.2. Intellectual Turning Points in OR

Connections between different clusters can be considered key intellectual turning points (Chen & Song, 2019). Node centrality reflects how frequently a node, representing an article, serves as a link in the shortest path between two other nodes, highlighting its role in connecting various nodes. A node with elevated centrality is considered a crucial connector between multiple nodes. In bibliometrics, the centrality of these connections has been associated with the paper's future citation potential (Shibata et al., 2007).

Turning points are defined as papers exhibiting a centrality value exceeding 0.10 (Chen et al., 2009). Gunasekaran et al. (2011) and Ambulkar et al. (2015) both report a centrality value of 0.12, indicating that these articles are central to research on the field of OR.

Gunasekaran et al. (2011) analyse the influencing factors of resilience and competitiveness of Small and Medium-sized Enterprises (SMEs) through theoretical and empirical analysis. Positive internal factors, such as agility, responsiveness, product quality and innovation, play a crucial role in SMEs. Nevertheless, SMEs often struggle with marketing, capital generation, technology and finance.

Ambulkar et al. (2015) aim to understand how firms can develop resilience to supply chain disruptions, by applying structural equation modelling. The findings show that companies with the ability to reshape assets and implement risk management strategies are more resilient. Companies with a strong supply chain focus are better equipped to reconfigure resources and recover from disruptions. The study offers recommendations for enhancing resilience, such as active managerial involvement and formal risk management infrastructure, particularly in the case of low-impact disruptions.

Both papers identified as intellectual turning points (Ambulkar et al., 2015; Gunasekaran et al., 2011) are part of Cluster 5, which focuses on the factors influencing OR. Understanding the elements that contribute to OR has been a pivotal theme, driving the dissemination of knowledge and fostering the emergence of new sub-disciplines within the field of OR.

3.3. Burst Detection in OR

The citation burst detection algorithm developed by Kleinberg (2003) is designed to identify temporal changes in a variable by comparing it with others in the same population. A citation burst occurs when a publication experiences a notable increase in citations within a specific timeframe, signalling rapid attention from the academic community. Table 4 presents the papers with the most significant citation bursts.

Table 5 presents the burst papers categorised by cluster, displaying the number of burst papers, the starting year (Min (Year)) and ending year (Max (Year)) of publication, along with the average year, mean strength value, and the years when the trend began (Min (Begin)) and concluded (Max (End)).

Table 4. Burst cited papers in Organisational Resilience Research.

Cluster [a]	References	Strength [b]	Begin [c]	End [d]	2009–2022 [e]
3	Somers (2009)	4.4	2011	2013	
3	Lengnick-Hall et al. (2011)	10.38	2013	2016	
3	Burnard and Bhamra (2011)	5.7	2014	2016	
3	Bhamra et al. (2011)	4.56	2014	2016	
7	Lee et al. (2013)	6.97	2015	2018	
1	Pal et al. (2014)	7.42	2016	2019	
1	Mamouni Limnios et al. (2014)	5.32	2016	2018	
1	Boin and Van Eeten (2013)	4.35	2016	2018	
5	Scholten et al. (2014)	4.05	2016	2017	
5	Johnson et al. (2013)	3.47	2016	2017	
5	Hohenstein et al. (2015)	4.55	2017	2019	
1	Van der Vegt et al. (2015)	8.88	2018	2020	
1	Ortiz-de-Mandojana and Bansal (2016)	7.29	2019	2022	
6	Meerow et al. (2016)	5.27	2019	2020	
1	Linnenluecke (2017)	4.12	2019	2022	
1	Williams and Shepherd (2016)	3.82	2019	2020	
6	Hosseini et al. (2016)	3.49	2019	2022	
1	Williams et al. (2017)	7.93	2020	2022	
1	Duchek (2020)	6.64	2020	2022	
2	Barasa et al. (2018)	4.4	2020	2022	

[a] Cluster number to which the paper belongs. [b] Burst strength, calculated using Kleinberg's (2003) algorithm. [c] First year in which the paper becomes a burst. [d] Last year in which the paper becomes a burst. [e] Timeline showing the burst duration. The red line segment marks the time span during which a paper experienced a burst, indicating the start (Begin column) and end (End column) years.

Table 5. Burst paper per cluster in OR.

Cluster	Cluster label	Number of Papers [a]	Min (Year) [b]	Max (Year) [c]	Mean (Year) [d]	Mean (Strength) [e]	Min (Begin) [f]	Max (End) [g]	2009–2022 [h]
3	Conceptualisation	4	2009	2011	2011	6.26	2011	2016	
5	Influencing Factors	3	2013	2015	2014	4.02	2016	2019	
1	Crisis Management	9	2013	2020	2016	6.20	2016	2022	
6	Strategy and planning	2	2016	2016	2016	4.38	2019	2022	
2	Disaster management	1	2018	2018	2018	4.40	2020	2022	

[a] Number of papers in the cluster that experienced a citation burst. [b] Publication year of the first burst paper in the cluster. [c] Publication year of the last burst paper in the cluster. [d] Mean publication year of the burst papers in the cluster. [e] Mean burst strength of the cluster's papers, calculated using Kleinberg's (2003) algorithm. [f] Year in which the first paper of the cluster began to experience a burst. [g] Year in which the last paper of the cluster ceased to experience a burst. [h] Timeline showing the burst duration. The red line segment marks the time span during which a paper in the cluster experienced a burst, indicating the start [Min (Begin) column] and end [Max (End) column] years.

A chronological analysis of the results in Table 5 provides insight into the evolution of research trends over time. Early studies primarily focused on the conceptualisation of OR (Cluster 3). Subsequently, attention shifted to examining the factors influencing OR

(Cluster 5) and crisis management (Cluster 1), with the latter remaining a prominent area of study. Two additional trends have also persisted: OR strategies and planning (Cluster 6) and resilience in disaster management (Cluster 2). Given that Clusters 1, 2 and 6 currently feature burst papers, indicating heightened academic interest in these sub-disciplines, future research could further advance and consolidate these research domains.

4. Research Agenda

Based on the findings presented in this study and the identified clusters, we propose the following OR research agenda.

At the intersection of Clusters 1, 2 and 6, a substantial body of literature exists on natural disaster management (Cluster 2). Nonetheless, one area for further exploration is digital disaster management through Digital Operational Resilience. Cyber-attacks are becoming increasingly common and there are certain business sectors, such as the finance industry, where crises (Cluster 1) resulting from cyber-attacks can be devastating to society. Several countries are developing legislation in this area (Bygrave, 2025), such as the Digital Operational Resilience Act (European Union, 2022) and the Cybersecurity Act (European Union, 2019), in the European Union. Their design and implementation outcomes should be examined to develop strategic action plans (Cluster 6) for integrating digital operational resilience into organisations.

- RQ1: Under what conditions can organisations integrate digital operational resilience into their strategic planning to mitigate the societal impact of cyber crises?

These issues should be examined under specific boundary conditions, since the integration of digital operational resilience into strategic planning is likely to differ across industries, being critical in sectors such as banking and finance, while less stringent in others, and across regulatory contexts, where national and supranational frameworks may either strengthen or constrain organisational responses.

Despite this increasing attention, a fundamental conceptual contradiction emerges between the proactive anticipation inherent in crisis management (Cluster 1) and reactive disaster recovery (Cluster 2), particularly in the digital domain. This temporal paradox manifests in how organisations balance the need for early warning systems and "crisis as process" approaches with the imperative for agile post-disruption recovery through relational social capital and stakeholder communication. This tension reveals a critical knowledge gap regarding the optimal balance between anticipatory and reactive capabilities. Therefore, future research should address this temporal paradox by investigating under what conditions proactive crisis anticipation capabilities complement or conflict with reactive disaster recovery mechanisms, and how organisations can develop "temporal resilience" that maintains both early warning systems and agile post-disruption recovery without resource cannibalisation. These issues can be fruitfully examined through the lenses of Dynamic Capabilities Theory and Complexity Theory, which provide suitable foundations for analysing how organisations adapt and reconfigure under conditions of uncertainty. Building on this, the following research questions emerge:

- RQ2: Under what conditions do proactive crisis anticipation capabilities complement or conflict with reactive disaster recovery mechanisms, and how does this interaction vary across different types of disruptions and organisational contexts?
- RQ3: How do organisations develop "temporal resilience," the capacity to simultaneously maintain early warning systems and preserve reactive recovery capabilities without resource cannibalisation?

The balance between anticipatory and reactive capabilities is also likely to vary across contexts, being particularly critical in highly regulated sectors such as finance and health, whereas community-level organisations may rely more on relational capital and social trust.

Within the intersectional domain of Clusters 6 and 7, a critical step involves advancing the rigorous measurement (Cluster 7) of OR to facilitate the development of effective intervention strategies aimed at strengthening resilience (Cluster 6). This is particularly essential in addressing systemic risks, which are characterised by their complexity, interdependence and cascading effects, such as global financial crises and natural disaster–related crises. Further validation of resilience measurement tools (surveys, scales, indices), as well as the development and validation of new metrics and indicators of OR (Cluster 7), especially those that capture dynamic and adaptive resilience, is needed (Bueno Campos et al., 2019). Methodological research in this field is crucial and relatively scarce compared to conceptual or qualitative studies of resilience. To enhance OR, it is essential to strengthen empirical evidence assessing the effectiveness, efficiency and efficacy of existing approaches. In this regard, it is recommended to conduct studies employing robust research designs (e.g., quasi-experimental or action research) to evaluate the effectiveness of training programs, simulations and diagnostic tools in enhancing OR. Furthermore, it is recommended to examine the ethical implications of resilience in complex systems (Akpinar & Özer-Çaylan, 2022), particularly in relation to the deployment of Artificial Intelligence systems for failure recovery and the adaptation of organisations to unforeseen disruptive events (Viguri Axpe, 2024). Moreover, the study of OR must address the inherent contradiction between resilience and sustainability, an unresolved theoretical dilemma that is particularly relevant in supply chain management. While resilience often relies on redundancy, sustainability prioritises efficiency, creating a tension that multi-objective optimisation models have yet to integrate conceptually in depth. This gap underscores the need for further research to clarify how these two paradigms can be reconciled in both theory and practice. This paradox can be further examined through the lens of the Resource-Based View, which provides a solid foundation for analysing how organisations balance redundancy and efficiency. Building on this, the following research questions arise:

- RQ4: How can organisations resolve the inherent tension between resilience redundancies and sustainability efficiency, and what dynamic capabilities enable the co-evolution of both objectives?
- RQ5: What role do "soft" influence factors play in mediating the paradox between resilience and sustainability?

Boundary conditions should be acknowledged, since the resilience–sustainability tension is likely to play out differently in large multinational corporations, small and medium-sized enterprises, and public-sector organisations.

At the cross-section of Clusters 1, 6 and 8, another line of research explores the effectiveness of crisis management strategies in sectors where the ability to adapt to abrupt fluctuation is essential, such as health, finance, sports and tourism, and the implications for OR. For example, future studies could examine how sport organisations adapt to and withstand crises (Cluster 1), as well as the practices that optimise their organisational performance. The analysis of resilience in sports entities as a new context within the framework of the resilience community (Cluster 8) could provide valuable insights into whether more resilient organisations manage crises (Cluster 1) more effectively, particularly in highly turbulent contexts. The proposed model (Cluster 6) could be implemented to examine the efficiency of such organisations not only in the sports context but also in the economic and social spheres. The evaluation of the resilience of sports entities could be carried out through indicators such as the number of years a coach remains in post (coaching tenure), which may reflect an organisation's ability to endure adverse outcomes with re-

silence. In this same line of research, the intersection between crisis management, strategic planning, and community resilience offers a novel theoretical opportunity to explore how OR influences legitimisation processes with diverse stakeholders. This conceptual gap underscores that organisations operating in socially charged environments, such as sports entities, provide ideal empirical contexts where stakeholder perceptions directly determine crisis outcomes and organisational survival. This line of inquiry can be grounded in Stakeholder Theory and Organisational Legitimacy Theory, which provide a robust framework to examine how resilience interacts with legitimisation processes in socially visible contexts. Building on this foundation, the following research questions arise:

- RQ6: How does OR influence legitimisation processes with diverse stakeholders during prolonged crises, particularly in highly visible social contexts, such as sports organisations?
- RQ7: What resilience practices enable organisations to maintain or enhance their legitimacy when operating simultaneously in multiple institutional contexts?

Alternative explanations must also be considered, since the role of resilience in shaping legitimacy may be more visible in socially exposed contexts such as sport or tourism organisations, while in less visible industries the mechanisms may differ or remain less evident.

A crucial emerging direction is the role of artificial intelligence (AI) and advanced analytics in predictive resilience, as well as its intersection with global governance and geopolitics. Emerging technologies promise to revolutionise predictive resilience capabilities for failure recovery and adaptation to unforeseen disruptive events. However, the ethical implications and governance challenges (such as algorithmic bias, transparency and human oversight) need to be sufficiently explored. Furthermore, it is imperative to analyse resilience within the framework of global governance and geopolitics, considering how macro factors influence organisational capacity for resilience. These issues can be further examined through the lenses of Sociotechnical Systems Theory and Institutional Theory, which offer valuable foundations to analyse how technology, ethics, and governance intersect in predictive resilience. Building on this, the following research questions emerge:

- RQ8: How can AI-driven predictive models improve early warning systems while maintaining ethical standards, organisational legitimacy, and human agency in crisis decision-making?
- RQ9: What governance frameworks can balance the efficiency gains of automated resilience systems with the ethical imperatives of transparency, accountability, and stakeholder inclusion?

These challenges should also be analysed under varying boundary conditions, as the governance of AI-driven resilience systems will differ across jurisdictions and sectors, depending on regulatory regimes, cultural norms, and geopolitical factors.

5. Conclusions

To map the intellectual structure of OR, we conducted a bibliometric co-citation analysis that grouped the knowledge domain into eight clusters: (1) crisis management, (2) disaster management, (3) conceptualisation, (4) SCM, (5) influencing factors, (6) strategy and planning, (7) evaluation and (8) community resilience. The analysis also identified the most central and influential works, with Ambulkar et al. (2015) and Gunasekaran et al. (2011), which show the highest centrality, standing out as the backbone of the field. Moreover, clusters related to crisis management (Cluster 1), disaster management (Cluster 2), conceptualisation (Cluster 3), influencing factors (Cluster 5) and strategy and planning (Cluster 6) include several burst papers, signalling the main trends and emerging directions in OR research.

We acknowledge certain limitations in this study. First, it relies solely on SSCI data, which narrows coverage, although SSCI is a well-established source for bibliometric research in the social sciences and ensures robust results (Díez-Martín et al., 2020; Jordan-Vallverdú et al., 2024; D. López-López et al., 2025; Torres-Pruñonosa et al., 2021). Future studies could broaden the scope by incorporating other databases such as Scopus or Dimensions, or complementary approaches like Webometrics or Altmetrics. Second, the analysis was restricted to publications up to the selected date; while this choice avoided the disproportionate influence of COVID-19 (still present in around 30% of the 2024 literature), it limits the view of more recent developments, which should be examined once the pandemic is less prominent in the scholarly output. Third, the study cannot be fully replicated, as WoS is a constantly updated database and the dataset reflects a specific moment in time, meaning subsequent searches may yield slightly different results (Pranckutė, 2021; Zupic & Cater, 2015).

The findings of the study underscore critical implications for practitioners and policy makers in enhancing OR. Practitioners are encouraged to integrate resilience-building strategies within crisis management frameworks, emphasising proactive planning in VUCA and BANI environments (Godoy & Ribas Filho, 2021; Murugan et al., 2020). The necessity for robust evaluation tools to assess resilience levels is emphasised, enabling organisations to identify vulnerabilities and strengths (Márquez-Tejón et al., 2022). Policy makers should facilitate intersectoral collaboration to address systemic challenges, as demonstrated during the COVID-19 pandemic (Salanova, 2020). Additionally, they must create supportive regulatory environments that encourage innovation and digital transformation, providing incentives for organisations to adopt new technologies and practices (Mehta et al., 2024). Furthermore, policy makers should invest in training and resources to improve workforce digital literacy and ensure employees are prepared to leverage technological advancements (Meerow et al., 2016).

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