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Artificial intelligence algorithms for supply chain resilience and performance: Bibliometric and thematic analysis (2015 – April 2026)

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ABSTRACT

Artificial intelligence is increasingly seen as a catalyst for designing resilient and sustainable supply chains in the context of shocks (pandemics, geopolitical crises, price spikes). The main types of algorithms and systems used are: machine learning, supervised learning algorithms, unsupervised learning algorithms, deep learning, reinforcement learning, and natural language processing algorithms.

The main objective of this paper is to map artificial intelligence algorithms, following a methodology in the form of a systematic review covering the period 2015 – April 2026. It is based on a quantitative approach using the R bibliometrix package, in a corpus of 288 documents referenced in Scopus.

The results show through bibliometric analyses: keyword co-occurrence analysis the emergence of four clusters: machine learning and prediction techniques, artificial intelligence and supply chain resilience, risk management, decision-making, sustainable logistics, and the circular economy. The thematic analysis presents five main themes: decision-making behavioral research, decision support systems, machine learning systems, logistic regression, decision support systems, deep learning risk assessment, artificial intelligence, and supply chain management.

Keywords: Bibliometric Analysis, Artificial Intelligence, Supply Chain Resilience, Supply Chain Performance.

1. Introduction

Today's supply chains face increasingly frequent and severe disruptions, whether caused by geopolitical, climatic, or health-related factors. In this unstable environment, the ability to anticipate, absorb shocks, and reorganize quickly — in other words, resilience — has become a strategic imperative. Artificial intelligence algorithms offer unprecedented potential in this regard: early detection of weak signals, dynamic simulation of crisis scenarios, and real-time reconfiguration of flows. However, these technologies also introduce new vulnerabilities, such as dependence on opaque models whose failures in critical situations remain difficult to anticipate.

Logistics organizations operate under competitive pressure that compels them to constantly seek ways to optimize costs, lead times, and service levels. Artificial intelligence algorithms — advanced demand forecasting, dynamic route optimization, and predictive equipment maintenance — promise unprecedented performance gains in this regard. However, this race for algorithmic efficiency raises critical questions: the risk of over-optimization at the expense of robustness, the difficulty of auditing automated decisions, and tensions between local and overall supply chain performance.

Supply chains are caught in a fundamental tension: the demand for performance — that drives rationalization, the reduction of redundancies, and the optimization of flows — and the imperative of resilience — that, on the contrary, requires flexibility, excess capacity, and strategic redundancy. Artificial intelligence algorithms, by promising to reconcile these two objectives long considered antagonistic, open up a new path. However, is this promise tenable? There is no guarantee that models trained under normal conditions will remain effective in a crisis, nor that algorithmic efficiency does not silently sacrifice adaptability. The central question of this review is therefore: under what conditions do AI algorithms make it possible to move beyond the traditional trade-off between resilience and performance?

The existing literature tends to treat the contributions of AI algorithms to logistics performance (optimization, forecasting, cost reduction) and to resilience (disruption detection, reconfiguration, crisis management) as separate issues. The central gap lies in the lack of an integrated understanding of the cross-effects, synergies, and trade-offs between these two objectives when AI is deployed. The question of the trade-off or complementarity between resilience and performance under the influence of algorithms remains largely untheorized and even less empirically investigated.

The Interdependencies amplify vulnerabilities while creating opportunities for adaptive and resilience strategies, thereby requiring a multidimensional understanding of systemic risk and resilience (Berger et al., 2025; Yang et al., 2023). This complexity creates a challenging situation in which many disciplines promote resilience as a tool for adaptation (Alikhani et al., 2025). The field of supply chain management also recognizes the importance of resilience, and substantial knowledge has been generated regarding the factors contributing to resilience and its impact on performance (Wieland & Durach, 2021).

In terms of research approaches, the literature from 2015 to 2026 is characterized by:

• A predominance of modeling and simulation using synthetic or historical data.

• A marked lack of empirical research in real-world contexts, particularly longitudinal studies capable of capturing the effects of AI before, during, and after actual disruptions.

Despite a growing body of research on AI in supply chains, the existing literature (2015–2026) remains fragmented: it examines performance gains and resilience benefits in isolation, without exploring their interactions, potential contradictions, or the conditions under which they can work together effectively. This systematic review aims to fill this gap by mapping, through the Scopus literature, the mechanisms by which AI algorithms simultaneously affect the performance and resilience of supply chains, and by identifying the conditions — technical, organizational, and inter-organizational — under which a synergy between these two objectives can emerge.

Baha M. Mohsen (2023) conducts a literature review using the Scopus database (2012-2023) to identify AI techniques, the most promising SCM sub-domains and relevant performance indicators, especially from the agile and lean perspectives. The bibliometric profile shows that AI in SCM is an emerging interdisciplinary research area, mainly driven by perspectives from computer science and engineering, but with strong ties to business management. Journals are the primary publication channel, but conferences are important for early-stage ideas. Geographically, India has the highest research output, whereas the Western countries (UK, USA, France) have stable contributions. The rapid increase of publications since 2012 shows that AI has shifted from theoretical exploration to applied SCM research.

In light of the above, this study has two main objectives. First, it aims to provide a critical and analytical mapping of scientific publications on supply chain resilience and performance during the 2015–2025 period, in order to identify emerging trends, influential researchers, leading institutions, and the countries that have contributed the most. Second, the study seeks to highlight persistent gaps in the literature and propose promising research directions that could broaden the conceptual and empirical scope of this field.

To achieve these objectives, the following research questions are addressed:

RQ1: How has scientific output on artificial intelligence algorithms in supply chain resilience and performance evolved over time and across different regions?

RQ2: Which sources, countries, institutions, and collaboration networks structure the field?

RQ3: Which conceptual clusters and thematic positions emerge from the scientific literature?

RQ4: What forms of scientific collaboration are observed, and how could they be strengthened to promote more inclusive and interdisciplinary research?

To answer the above questions, a quantitative methodology based on bibliometric analysis was adopted. The Scopus database, recognized for the quality of its indexing and citation coverage, was selected for this analysis.

2. The conceptual, theoretical, and empirical foundations

This part presents the conceptual basis of the study, drawing on the main theoretical and empirical contributions concerning resilience, artificial intelligence and supply chain performance.

The global supply chain landscape has seen remarkable transition in recent years, marked by growing complexity, volatility, and exposure to multiple disruptions ranging from geopolitical conflicts to pandemic-induced disruptions. In this regard, artificial intelligence (AI) has become a game-changing technology that completely changes how businesses handle production, distribution, transportation, inventory, and procurement (Ghouati et al. 2026).

Organizations utilizing AI-driven supply chain solutions saw quantifiable benefits across key performance measures, according to recent empirical data. Research from a variety of industries, including manufacturing, retail, healthcare, and food, consistently demonstrates that the use of AI improves forecast accuracy by 15–31%, lowers operating costs by 10–20%, and greatly improves recovery capacities after disruptions (Mishu et al. 2026). Unprecedented chances to optimize end-to-end supply chain processes while simultaneously enhancing resilience and adaptability have been made possible by the confluence of machine learning, deep learning, reinforcement learning, and developing generative AI technologies (Abaku.2024).

2.1. Supply chain resilience

In classical terms, supply chain resilience (SCRes) is defined as the logistics system's ability to anticipate, absorb, and respond to disruptions effectively, by regaining its initial performance level or evolving towards a more robust state (Christopher & Peck, 2004; Hendry et al., 2019).

In this context, many recent studies seek to quantify the level of algorithmic resilience even before the development of response and recovery capabilities (Hosseini et al., 2019; Ivanov, 2023).

Ponomarov and Holcomb (2009) suggest that the algorithmic resilience of a supply chain can be described as the ability of the decisioning AI system to: - anticipate unforeseen situations (through adversarial simulations or stress tests); - react effectively (through learned reconfiguration policies). To recover from this while ensuring the continuity of operations (through mechanisms for switching, redundancy of models, or automatic correction of conceptual drifts). The algorithmic resilience of a supply chain is the capacity of a decision-making system driven or assisted by AI algorithms.

2.2. AI algorithms for supply chain

Artificial intelligence (AI) refers to algorithms capable of learning, reasoning, and solving problems (McCarthy, 2004). These algorithms improve supply chain performance through the automation of inventory management, route optimization, and production planning, thereby reducing costs and lead times (Temitayo Oluwadamilola Adesoga et al., 2024).

AI algorithms allow for rapid and adaptive decision-making in the face of uncertainty, which enhances supply chain resilience (SCRes) (Baryannis et al., 2019). Important methodologies include machine learning, multi-agent modelling, and automated reasoning. AI algorithms can learn and act alone unlike Big Data Analytics (BDA), which is oriented towards knowledge extraction and serves as a strategic lever to confront disruptions (Dubey, Gunasekaran, Childe et al., 2020; Ivanov et al., 2019).

3. Fundamental theories

This study draws on three complementary theoretical perspectives — Agency Theory, Stakeholder Theory, and the Resource-Based View (RBV) — to provide a conceptual lens for understanding the relationship between artificial intelligence (AI), supply chain resilience, and supply chain performance. These perspectives are not used as coding frameworks for the bibliometric analysis; rather, they provide an interpretive foundation for positioning the emerging themes identified in the literature.

Agency Theory. Originally developed by Jensen and Meckling (1976), Agency Theory focuses on relationships involving delegation, information asymmetry, monitoring, opportunism, and conflicts of interest between principals and agents. In AI-enabled supply chains, algorithmic decision-support and autonomous systems introduce new questions regarding the delegation of decision-making, human oversight, accountability, and control. AI algorithms may therefore be examined as technological mechanisms that influence decision processes and information flows, rather than being considered equivalent to human agents. From this perspective, the literature on multi-agent systems and intelligent decision-making raises broader questions concerning the distribution of decision authority between human actors and algorithmic systems (D'Alessandro, 2024; Abaku et al., 2024; Ghouati et al., 2022).

Stakeholder Theory. Building on Freeman (1984), Stakeholder Theory emphasizes that organizational decisions should consider the interests of multiple stakeholders rather than those of shareholders alone. Applied to AI-enabled supply chains, this perspective highlights the importance of considering the effects of algorithmic decision-making on suppliers, customers, employees, regulators, and other actors across the supply chain. AI applications may contribute to efficiency and resilience, but their implementation also raises issues related to transparency, fairness, information sharing, and the distribution of risks and benefits among stakeholders. Recent research has begun to examine AI-related interactions among multiple supply chain actors, although the integration of stakeholder-oriented perspectives with AI and supply chain resilience remains relatively limited (Condé & Münch, 2025).

Resource-Based View. The Resource-Based View, associated with Barney (1991), argues that sustainable competitive advantage can emerge from resources and capabilities that are valuable, rare, difficult to imitate, and non-substitutable. Within AI-enabled supply chains, AI technologies, data, analytical capabilities, and organizational competencies can be considered potentially strategic resources that support the sensing, anticipation, absorption, and adaptation of supply chain disruptions. Existing research provides empirical indications of the contribution of machine learning, predictive analytics, and other AI-enabled technologies to forecasting, responsiveness, and resilience outcomes (Belhadi et al., 2021; Fatima Zahra & Benazzi, 2025; Balan et al., 2025). However, these contributions should be interpreted as evidence of the potential strategic relevance of AI-related capabilities rather than as proof that AI automatically generates competitive advantage.

Taken together, these three perspectives provide complementary lenses for interpreting the research domain. Agency Theory draws attention to delegation, control, and accountability; Stakeholder Theory emphasizes the interests and interactions of multiple supply chain actors; and the RBV focuses on AI-related resources and capabilities as potential sources of resilience and performance. Importantly, these theoretical perspectives are used in this study as interpretive lenses rather than as predefined coding categories or causal models. The bibliometric and thematic analyses are therefore conducted independently of these theoretical classifications, while the theories are subsequently used to contextualize and discuss the patterns emerging from the scientific literature.

4. Research Methodology

This study aims to conduct a comprehensive bibliometric analysis of the scientific literature on artificial intelligence algorithms related to supply chain resilience and supply chain performance, using Scopus as the sole data source due to its broad coverage of high-impact, peer-reviewed journals.

"To ensure maximum rigor, comprehensiveness, and accurate extraction of studies addressing the core themes of artificial intelligence algorithms, supply chain resilience, and performance over the 2015 – April 2026 period, the following advanced search query was deployed in the Scopus database: TITLE-ABS-KEY (("artificial intelligence" OR "AI" OR "machine learning" OR "deep learning" OR "reinforcement learning" OR "natural language processing" OR "NLP" OR "LLM") AND ("supply chain" OR "logistics" OR "supply chain management" OR "SCM") AND ("resilience" OR "supply chain resilience" OR "disruption" OR "risk management") AND ("performance" OR "operational efficiency" OR "agile" OR "lean")). The objective is to trace the evolution of academic interest in this field, identify key trends and contributions, and highlight the factors that have shaped research over time.

The study is structured around three main objectives: (1) to analyze trends in publication patterns; to explore collaboration networks among researchers; and to identify the most influential works in this field. Particular attention is given to mapping scientific networks and collaborations, an area that remains largely unexplored in the current literature.

The analysis is structured around the following research questions:

▪ How can the distribution of publications on algorithms intelligence artificial supply chain over time be characterized?

▪ Which researchers have made the most significant contributions to this field?

▪ Which countries and institutions are at the forefront in terms of output and influence in algorithms intelligence artificial supply chain research?

These questions form the foundation of the analytical framework and aim to:

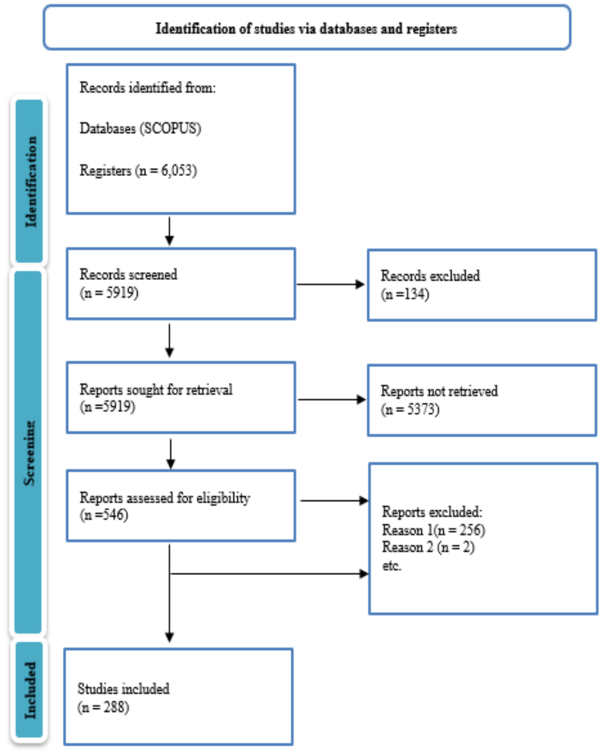

Figure 1: PRISMA flow diagram illustrating the selection process for studies identified in the Scopus database

Source: Authors' elaboration

5. Results and discussion

The data extraction from the Scopus database for this study was conducted in April 2026, which explains why the publication metrics for 2026 reflect only the first four months of the year.

5.1. Criteria for study selection and eligibility

The following table summarizes all the criteria eligible in our study in the one database.

Table 1: criteria for study selection and eligibility

Criterion	Inclusion	Exclusion	Detailed Description
Keywords (Query)	AI, Machine Learning, Supply Chain, Resilience, Performance	Irrelevant keywords or those not aligned with the research stream	Query targeting AI (ML, DL, NLP, LLM), logistics, disruption management (SCRM), and operational efficiency.
Time Period	2015–2026	Publications outside the defined period	Year range selected to cover recent advances in AI.
Document Type	Article	Conference proceedings, books, internal reports, news articles, non-peer-reviewed articles	Only peer-reviewed scientific articles.
Subject Area	Business, Management and Accounting	Irrelevant domains (e.g., Medicine, Arts, Social Sciences)	Focus on management and the business aspect of supply chains.
Language	English	French, Spanish, German, or other languages	Limited to publications written in English.
Database and Results	Scopus (288 documents)	Duplicates or inaccessible full texts	Results obtained from the Scopus database after applying filters.

Source: Authors' elaboration

The table provides a structured set of inclusion and exclusion criteria for a literature review of the role of Artificial Intelligence (AI) in supply chain resilience and performance. Here follows a critical analysis of each criterion:

- The question focuses on the relationship between supply chain management (logistics, disruption management, operational efficiency) and AI approaches (ML, DL, NLP, LLM). Given the post-COVID-19 emphasis on supply chain robustness, the addition of "resilience" to "performance" is especially pertinent. However, the exclusion criterion may induce subjectivity due to its ambiguous definition ("irrelevant keywords"). Reproducibility would be strengthened by a more detailed list of banned terms (such as "finance," "healthcare," and "agricultural").

- The year 2015 marks the beginning of the fast adoption of big data analytics and deep learning in corporate settings. The review may contain early-access or upcoming articles because the end year (2026) is forward-looking. Although it is uncommon for a retroactive evaluation, this can be warranted in order to identify new patterns. However, there are risks associated with future years, such as non-peer-reviewed or preprint materials.

- Academic rigor and dependability are ensured by restricting to peer-reviewed literature. Nevertheless, cutting-edge research that hasn't finished the more drawn-out journal publication process can be missed if conference proceedings are excluded. A time-lag bias could be introduced by this exclusion, given the rapid pace of AI. Because they lack peer evaluation, news stories and internal reports are appropriately omitted.

- This emphasis is suitable for a study on the effectiveness of supply chain management. But as the previous bibliometric analysis demonstrated, supply chain AI research frequently occurs in engineering and computer science journals. Technically rich studies may be unintentionally left out if these domains are excluded. A multidisciplinary strategy, such as incorporating engineering, would be more thorough.

- The universal language of worldwide academic publishing is English, which guarantees wide accessibility and uniformity. This criterion, however, creates a geographic and linguistic bias, possibly omitting pertinent studies published in other languages (such as Chinese, German, or French) that might provide distinctive insights, particularly from non-Anglophone research leaders like China or Germany.

Strong coverage of peer-reviewed literature can be found in Scopus, a reliable and extensive database. A workable corpus for systematic review is suggested by the reported yield of 288 documents. However, content exclusive to Web of Science, Google Scholar, or IEEE Xplore is excluded when relying solely on one database. Although eliminating duplicates is common practice, "inaccessible complete texts" (such as paywalled or older articles) may induce availability bias.

For possible inclusion in this review, 6053 articles were identified. All documents were retrieved only from Scopus database. In the initial phase, the identification, the predefined inclusion criteria were used (keywords (artificial intelligence, machine learning, supply chain management, resilience, performance), document type (peer-reviewed articles), language (English), subject area (Business, Management and Accounting) and period of publication (2015-2026)). At this point we found no duplicate records.

In the first screening stage, 134 articles were eliminated. Based on an evaluation of the abstract and title, the exclusion was made. Documents that did not relate to the main subject of supply chain management applications of artificial intelligence were eliminated. Studies addressing AI in unrelated fields (such as healthcare, finance, or pure computer science without a business context) or those without a clear connection to supply chain performance results were frequently excluded.

After the screening of titles and abstracts, 290 papers were evaluated in full. During this stage, the complete text was thoroughly examined to confirm each study's eligibility in relation to the predetermined inclusion criteria. The full-text review of all 290 reports was completed with success. Since all evaluated documents satisfied the predetermined standards for methodological quality and subject relevance, no more exclusions were made at this point.

For the full literature evaluation, 288 studies made up the final selection. This corpus is the collection of data compiled to investigate how artificial intelligence affects supply chain management performance, with a focus on agile and lean methodologies.

Figure 2: Summary of Scientific Indicators Extracted from the Scopus Database

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

The Scopus data covering the period from 2015 to 2026 indicate that research at the intersection of artificial intelligence algorithms, supply chain resilience, and supply chain performance has expanded in recent years. The corpus comprises 288 documents published across 152 sources, with an annual growth rate of 34.47%. This growth coincides with a period characterized by major disruptions affecting global supply chains, including the COVID-19 pandemic, geopolitical tensions, and climate-related disruptions, as well as continued developments in artificial intelligence technologies. However, the bibliometric data alone do not allow a direct causal relationship to be established between these developments and the observed publication growth.

The field is characterized by a high degree of collaboration. The 288 documents involve 875 authors, corresponding to an average of 3.32 authors per document. Only 24 documents are single-authored, indicating that research in this area is predominantly conducted through co-authorship. This collaborative structure is consistent with the interdisciplinary nature of the topic, which brings together perspectives from artificial intelligence, computer science, operations research, logistics, and supply chain management. International co-authorship accounts for 36.46% of the publications, indicating a substantial level of cross-country collaboration. However, this indicator alone does not allow the degree of global integration of the research field to be assessed.

The corpus contains 1,055 distinct author keywords. This diversity reflects the broad range of concepts addressed within the literature, including machine learning, deep learning, optimization algorithms, resilience capabilities such as absorption, adaptation, and recovery, and performance dimensions such as cost, lead time, reliability, and agility. The diversity of author keywords indicates the breadth of terminology used to describe the intersection of artificial intelligence, supply chain resilience, and supply chain performance. However, the number of distinct keywords alone does not allow the average number of keywords per document to be determined. If this indicator is required, the average should be calculated separately from the total number of author-keyword occurrences across the documents. Furthermore, a systematic keyword co-occurrence and thematic analysis would be required to examine the conceptual structure and evolution of the field.

The low average document age (1.89 years) indicates that the corpus is concentrated in recent publications. This measure refers to the age of the documents included in the corpus and does not, by itself, indicate the recency of the references cited by these publications. The average number of citations per document is 20.55, indicating a notable level of citation activity within the corpus. Nevertheless, the interpretation of this indicator should take into account the publication years of the documents, since citation accumulation is influenced by publication age. Comparisons with other research fields or bibliometric studies covering similar periods would be necessary to determine whether this citation level is comparatively high.

The corpus contains a total of 2,586 references, corresponding to an average of approximately 8.98 references per document. This descriptive indicator provides information about the volume of references associated with the publications in the corpus. However, this figure alone does not demonstrate that older literature is being neglected or that conference proceedings are preferentially cited. Such interpretations would require an additional analysis of the publication years and document types of the cited references. Therefore, the reference count should primarily be interpreted as a descriptive characteristic of the corpus.

Overall, the intersection of artificial intelligence algorithms, supply chain resilience, and supply chain performance represents a research area characterized by recent publication activity, substantial author collaboration, diverse terminology, and considerable citation activity. The 288 documents identified in the Scopus dataset provide an empirical basis for examining the development and intellectual structure of this research domain. Further analysis could investigate the relationships between specific AI techniques and different dimensions of supply chain resilience and performance, including forecasting, absorption, adaptation, recovery, and operational performance. Keyword co-occurrence analysis, thematic evolution, co-citation analysis, and comparisons with other databases such as Web of Science or IEEE Xplore could further contribute to understanding the intellectual, conceptual, and thematic structure of the field.

Table 2: Number of Articles Published per Year in the Scopus Database

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Production	1	2	0	3	6	7	8	7	12	56	160	26

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

Table 2 presents the annual scientific production of publications retrieved from the Scopus database between 2015 and 2026. The distribution shows an overall increase in publication activity over the period, although the annual production varies considerably. In 2015, only one publication was recorded, followed by two publications in 2016. No publication was identified in 2017, while publication activity resumed in 2018 with three documents. The number of publications subsequently increased to six in 2019, seven in 2020, and eight in 2021, before slightly decreasing to seven publications in 2022. Publication output then increased to 12 documents in 2023 and 56 documents in 2024.

The highest annual production was recorded in 2025, with 160 publications. In 2026, 26 publications were identified in the dataset. However, this figure should be interpreted with caution because 2026 represents a partial publication year at the time of data collection. Therefore, the lower number of publications recorded in 2026 should not be interpreted as a decline in research interest or publication activity. Rather, it reflects the incomplete coverage of the 2026 publication year. Consequently, the 2026 publication count reflects only records indexed up to April 2026 and is therefore not directly comparable with complete annual counts for previous years.

Overall, the annual distribution indicates a marked increase in publication activity, particularly from 2023 onward, with substantial growth in 2024 and 2025. The number of publications increased from 12 in 2023 to 56 in 2024 and 160 in 2025. These descriptive results indicate that the literature addressing the intersection of artificial intelligence algorithms, supply chain resilience, and supply chain performance has expanded considerably in recent years. However, the observed annual variations should be interpreted descriptively, without attributing them to specific causal factors unless supported by additional evidence.

Figure 3: Top 10 journals by number of publications indexed in Scopus (2015–2026)

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

The image presents a ranked list of academic journals and the number of publications recorded for each, presumably within a particular research area (probably logistics, production, engineering, and technology management).

Top Journals: The International Journal of Production Economics and the International Journal of Production Research have the highest counts, with 11 publications each. Second Tier: International Journal of Computing and Digital Systems and Transportation Research Part E: Logistics and Transportation Review each have 9 publications, matching the number for Technological Forecasting and Social Change (9). Mid-Tier: IEEE Transactions on Engineering Management has 8 publications, while Knowledge-Based Systems and International Journal of System Assurance Engineering and Management each have 7. Lower Tier (included in this list): Industrial Management and Data Systems 6 publications, Logistics 5.

This looks like a chart showing the number or frequency of publications for:

- ✓ Determine the journals that are most active or preferred in a researcher's portfolio, a department's publications, or a particular bibliometric investigation.
- ✓ Showing where the most papers (from a particular dataset, author, or institution) have been published.
- ✓ It suggests that the field of study is interdisciplinary, encompassing production economics, logistics, transportation, technological forecasting, engineering management, knowledge-based systems, and computing.

Table 3: Leading Sources by Number of Published Articles

Sources	**Articles**
International journal of production economics	11
Logistics	11
International journal of production research	10
International journal of computing and digital systems	8
Technological forecasting and social change	8
Transportation research part e: logistics and transportation review	8
Ieee transactions on engineering management	7
Knowledge-based systems	7
International journal of system assurance engineering and management	6
Industrial management and data systems	5

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

The distribution of the most productive sources shows a relatively concentrated publication pattern within the corpus. Logistics and the International Journal of Production Economics lead the corpus with 11 documents each, followed by the International Journal of Production Research with 10 documents. Three sources record eight documents each: the International Journal of Computing and Digital Systems, Technological Forecasting and Social Change, and Transportation Research Part E: Logistics and Transportation Review. The IEEE Transactions on Engineering Management and Knowledge-Based Systems each account for seven documents, followed by the International Journal of System Assurance Engineering and Management with six and Industrial Management & Data Systems with five documents. Overall, the distribution indicates that publications on artificial intelligence algorithms, supply chain resilience, and supply chain performance are spread across journals covering production economics, logistics, operations management, information systems, engineering management, and technological forecasting, reflecting the interdisciplinary scope of the research domain.

5.2. Analyses of affiliations

Table 4: Analysis of affiliations

Affiliation	Articles
Hochschule für wirtschaft und recht berlin	6
o.p. jindal global university	6
Chulalongkorn university	5
School of management	5
The hong kong polytechnic university	5
Universiti sultan zainal abidin	5
University of tehran	5
College of engineering	4
Marwadi university	4
Settat	4

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

Table 4 presents the most frequently represented affiliations in the Scopus corpus. Based on the affiliation metadata, Hochschule für Wirtschaft und Recht Berlin and O.P. Jindal Global University are the two most represented identifiable institutions, with six documents each. Chulalongkorn University, The Hong Kong Polytechnic University, Universiti Sultan Zainal Abidin, and University of Tehran each account for five documents. Marwadi University is represented by four documents. However, several entries in the original Scopus affiliation data, including "School of Management," "College of Engineering," and "Settat," are not sufficiently specific to be considered standardized institutional affiliations. These entries may correspond to organizational units or geographical information rather than distinct institutions. Therefore, the affiliation data should be normalized and disambiguated using the original Scopus metadata before drawing conclusions from the ranking.

Following normalization, institutional name variants should be merged and generic organizational units or geographical locations should be linked to their corresponding parent institutions where this information can be reliably established. The ranking should then be recalculated based on the standardized affiliation names. This procedure will ensure that the reported distribution of productive affiliations accurately reflects the institutional contribution to the research field.

5.3. Analysis of productive countries

India ranks first in scientific production, with 120 publications, followed by China with 114 publications. The United States occupies the third position with 74 publications. These three countries therefore constitute the leading contributors to the literature on Artificial Intelligence Algorithms for Supply Chain Resilience and Performance within the analyzed Scopus dataset. The United Kingdom ranks fourth with 44 publications, followed by France with 31 publications. Iran occupies the sixth position with 24 publications, while Malaysia and Morocco each account for 21 publications. Germany and Turkey complete the top ten, with 18 and 17 publications, respectively.

Overall, the distribution shows a concentration of scientific production among a limited number of countries, particularly India, China, and the United States. At the same time, the presence of countries from Europe, Asia, the Middle East, and Africa indicates a geographically diverse research landscape. Morocco's presence among the ten most productive countries is also noteworthy, with 21 publications in the analyzed dataset.

In this study, "scientific production" refers to the number of Scopus-indexed documents attributed to each country based on the country information associated with the authors' affiliations, according to the bibliometric output used for the analysis. The ranking should therefore be interpreted as a descriptive measure of publication output rather than as an indicator of research quality, impact, or national research capacity.

Table 5: Analysis of productive countries

Countries	Scientific Production
INDIA	120
CHINA	114
USA	74
UK	44
FRANCE	31
IRAN	24
MALAYSIA	21
MOROCCO	21
GERMANY	18
TURKEY	17

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

5.4. Co-authorship network analysis

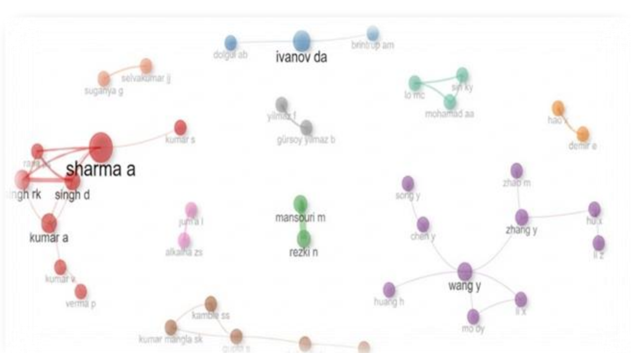

Figure 3: Co-authorship network among authors

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

The co-authorship network illustrates a fragmented collaboration structure composed of several distinct research communities. Each node represents an author, while the links represent co-authorship relationships. The node size reflects the corresponding visualization attribute used in the network, while the different colors distinguish separate collaboration clusters. The network displays several disconnected groups, indicating that co-authorship relationships are concentrated within specific research communities rather than being evenly distributed across the entire field.

The largest visually prominent node is Sharma A, which is located within a relatively dense collaboration cluster. This cluster includes authors such as Singh D, Singh RK, Kumar A, Kumar S, and other connected researchers. The multiple links surrounding Sharma A indicate a relatively strong pattern of co-authorship within this community. However, the visual prominence of the node should be interpreted as a characteristic of the displayed network rather than as evidence of greater scientific influence.

A second identifiable collaboration community is organized around Wang Y, which is connected to authors including Zhang Y, Zhao M, Huang H, Chen Y, Li X, and Mo D. This group forms another relatively connected cluster in the network, illustrating a distinct pattern of collaboration. Similarly, Ivanov DA appears in a separate collaboration group involving Dolgui AB and Bintrup AM. The separation of these groups from the other clusters highlights the heterogeneous and distributed nature of co-authorship in the field.

Overall, the network reveals several distinct and relatively disconnected collaboration communities, with Sharma A, Wang Y, and Ivanov DA appearing as visually prominent nodes within their respective groups. Rather than indicating author influence, these patterns describe the structure of collaboration observed in the analyzed dataset. The fragmented configuration suggests that research collaboration is concentrated within specific groups, while connections between different communities appear comparatively limited. Further assessment of authors' structural positions would require additional network indicators, such as degree centrality, betweenness centrality, or total link strength.

5.5. Keyword co-occurrence analysis

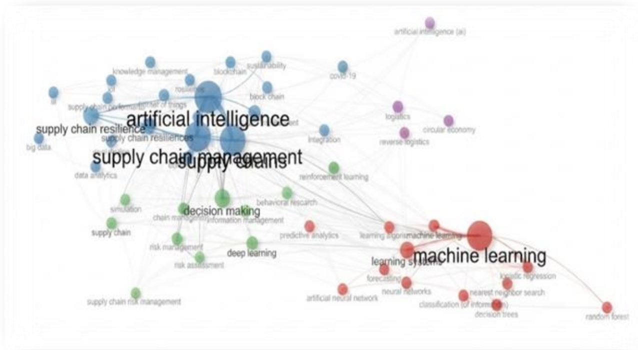

Figure 4: Visualization of the keyword co-occurrence network

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

The keyword co-occurrence analysis identifies four main thematic clusters that characterize the research landscape at the intersection of artificial intelligence, supply chain resilience, and supply chain performance. Before constructing the network, the keywords were standardized through a thesaurus to consolidate abbreviations, synonymous expressions, singular and plural forms, and orthographic variants. In particular, terms such as AI/artificial intelligence, IoT/internet of things, machine learning/machine-learning, and supply chain resilience/supply chain resiliences were harmonized. The resulting network was then recalculated using the normalized dataset.

The first cluster is primarily associated with machine learning and predictive methods. It includes terms such as machine learning, learning systems, logistic regression, forecasting, neural networks, learning algorithms, predictive analytics, random forest, artificial neural networks, decision trees, nearest-neighbor search, and classification. The co-occurrence of these terms indicates a research stream focusing on the application of machine-learning techniques to prediction, classification, forecasting, and analytical decision support. This cluster therefore reflects the methodological dimension of artificial intelligence research, with particular emphasis on data-driven learning algorithms and predictive modelling.

The second cluster represents the broader intersection between artificial intelligence, supply chain management, resilience, sustainability, and digital technologies. Key terms include artificial intelligence, supply chain management, supply chain resilience, resilience, sustainability, sustainable development, supply chain performance, blockchain, data analytics, internet of things, optimization, COVID-19, generative AI, integration, knowledge management, and big data. The structure of this cluster suggests that recent research increasingly connects AI-enabled technologies with supply chain resilience and performance, while also considering sustainability and digital transformation. The presence of terms such as COVID-19 and generative AI further indicates the emergence of new research directions associated with major disruptions and recent technological developments.

The third cluster is centered on risk, uncertainty, and decision-making in supply chains. It comprises terms such as uncertainty, decision making, supply chain, deep learning, risk assessment, risk management, behavioral research, information management, reinforcement learning, simulation, and supply chain risk management. The co-occurrence structure indicates a research stream concerned with managing uncertainty and supply chain risks through advanced analytical and computational approaches. In particular, the presence of deep learning, reinforcement learning, and simulation highlights the increasing use of AI-based methods to support risk assessment, scenario analysis, and decision-making under uncertain conditions.

The fourth cluster focuses on the relationship between artificial intelligence, logistics, reverse logistics, and the circular economy. The occurrence of these concepts within the same thematic group points to a research stream examining the role of AI in logistics and reverse-logistics activities and their relationship with circular and sustainable supply chain practices. This cluster complements the sustainability-oriented dimension identified in the second cluster by highlighting logistics processes associated with resource recovery, reverse flows, and circularity.

Overall, the four clusters reveal a research field structured around four complementary dimensions: (1) machine-learning and predictive techniques, (2) AI-enabled digital transformation and supply chain resilience and sustainability, (3) risk, uncertainty, and AI-supported decision-making, and (4) AI applications in logistics and circular economy practices. Rather than representing isolated research areas, these clusters illustrate the multidimensional development of AI-related research in supply chain contexts, ranging from methodological advances in machine learning to their application in resilience, risk management, sustainability, and logistics.

5.6. Thematic map

Figure 5: Thematic map

Source: Authors' elaboration using R bibliometrix package (Biblioshiny).

The figure 6 represents a strategic thematic map derived from a bibliometric analysis, organizing research topics into four quadrants according to two dimensions: the developmental degree indicating a theme's internal cohesion, and the relevance degree, reflecting how strongly a theme is connected to other research domains in the field.

The Niche Themes quadrant (high density, low centrality) contains topics that are internally well developed but weakly connected to the field's main trends. Here we find decision making combined with behavioral research and COVID-19.

Close to the intersection of the two axes, the cluster machine learning, learning systems, and logistic regression sits just above the density threshold, indicating a moderately developed theme still in the process of becoming more central to the field.

The Motor Themes quadrant (high density, high centrality) contains the topics that are both well developed and highly connected, effectively driving the field forward. Here we find artificial intelligence combined with supply chain management and supply chains — confirming that AI applications in supply chain contexts constitute the core, driving theme of this research field.

The Basic Themes quadrant includes topics that are central to the field but not yet deeply developed internally. Here we find deep learning combined with risk assessment and risk management, suggesting that these are foundational, widely referenced topics that have not yet reached the same level of specialization as the motor themes.

Finally, the Declining Themes quadrant contains decision support systems, k-means clustering, and integer programming — topics that are either newly emerging or losing relevance within the field, and which remain weakly connected and underdeveloped relative to the rest of the literature.

Conclusion

This systematic literature review (2015–2026) highlights the growing role of artificial intelligence (AI) algorithms — machine learning, deep learning, reinforcement learning, and natural language processing — in the joint management of supply chain resilience and performance. The bibliometric analysis of 288 Scopus documents confirms the dynamism of this field of research, with very strong annual growth (34.47%), sustained international collaboration (36.46%), and remarkable scientific impact (an average of 20.55 citations per document).

From a theoretical perspective, this study highlights the importance of invoking three essential theoretical frameworks to understand the interaction of artificial intelligence (AI) with supply chain resilience and performance. First, agency theory requires a radical reconceptualization: AI is no longer merely a decision-support tool; it has become an autonomous agent capable of making strategic decisions, raising unprecedented challenges related to information asymmetry. Second, stakeholder theory calls for an expanded perspective on supply chain governance, in which algorithms must reconcile the diverse and sometimes conflicting interests of network stakeholders, going beyond mere economic efficiency.

In summary, the Resource-Based View (RBV) regards AI as a unique and irreplaceable strategic resource. Mastering this resource enables organizations to absorb disruptions and maintain a sustainable competitive advantage. Although empirical evidence highlights the potential of AI as a driver of performance, particularly through machine learning and multi-agent systems, this study reveals a theoretical gap: the existing literature tends to prioritize practical applications rather than developing a rigorous theoretical conceptualization of algorithmic agency and the dynamic interconnections among stakeholders. This consequently opens up critical avenues for future research.

From an institutional perspective, an analysis of affiliations reveals a fairly scattered scientific output, with no single institution dominating: the two most prolific institutions (Hochschule für Wirtschaft und Recht Berlin and O.P. Jindal Global University) have only 6 publications each, and the majority of the top ten institutions have between 4 and 6 publications. This balanced distribution reflects a research field that is still in its infancy and undergoing institutional development, where no single academic institution has emerged as the undisputed leader, while a marked geographical diversity is evident (Germany, India, Thailand, Hong Kong, Malaysia, Iran, Morocco).

From a geographic perspective, an analysis of the countries producing these publications confirms and expands on this observation: India (120 publications) and China (114) clearly dominate the global scientific landscape. The United States, although ranked third (74 publications), follows these two countries in terms of publication output, while the United Kingdom and France continue to play an active role in Europe. The presence of countries such as Iran, Malaysia, and Morocco further confirms the global nature of scientific interest in AI, supply chains, resilience, and performance.

Analysis of the co-author network reveals a fragmented scientific landscape, built around various specific yet significant research communities, whose structure illustrates both the field's thematic specialization and its potential for future collaborative progress. The most significant cluster is centered around Sharma A, the network's most influential contributor, who collaborates constructively with Singh D, Singh RK, Kumar A, and Kumar S, thereby establishing a coherently interconnected research group. The prominent location and size of the corresponding node attest to this author's central position in the field's knowledge production.

A second major cluster is currently forming around Wang Y, in close collaboration with Zhang Y, Zhao M, Huang H, Chen Y, and Li X. This highly interconnected research community represents a significant driver of scientific output in the field. The network also highlights the significant influence of Ivanov D, who forms a distinct cluster with Dolgui A and Bintrup AM. Overall, this analysis confirms that the research field is characterized by a small number of pivotal authors — Sharma A, Wang Y, and Ivanov D — who serve as structural hubs within their respective collaboration networks.

An analysis of keyword co-occurrence reveals that the field of study is organized into four complementary thematic clusters that, taken together, reflect the depth and gradual evolution of the field of artificial intelligence as applied to the supply chain. The first cluster, focused on machine learning, neural networks, random forests, decision trees, and predictive analytics, underscores the importance of machine learning as a methodological foundation for training systems to anticipate information and automate decision-making.

The second cluster, which is the richest from a conceptual standpoint, brings together artificial intelligence, supply chain management, resilience, sustainability, blockchain, the Internet of Things, and big data. This demonstrates that AI, IoT, and blockchain are increasingly studied as technological enablers of supply chain resilience and efficiency, supported by the growing availability of actionable data.

The third cluster, focused on decision-making, deep learning, reinforcement learning, risk assessment and management, and simulation, highlights the importance of using advanced learning methods for risk assessment and for supporting managerial decisions under conditions of uncertainty.

The fourth cluster, although more limited in scope, combines artificial intelligence with reverse logistics and the circular economy, illustrating the growing integration of AI with environmental concerns and sustainable supply chain practices.

The analyses reveal that artificial intelligence, as it relates to supply chain management, stands out as the dominant theme in the field, exhibiting strong internal cohesion and high centrality. This position underscores that AI applications in the supply chain sector represent the central and most developed focus of recent scientific research.

Conversely, the deep learning cluster related to risk assessment and management falls within the "fundamental topics" quadrant: although it is closely linked to other fields, this topic remains underdeveloped internally at present. This finding indicates that the topic is important and widely addressed in the literature, but has not yet reached the level of specialization observed in more mature research themes, leaving room for further development.

The "machine learning, learning systems, and logistic regression" cluster, located above the intensity point and near the intersection of the two axes, illustrates a topic in a transitional phase: moderately developed, it is gradually gaining prominence without yet being fully integrated into the core of the field.

The niche topics quadrant—which encompasses decision-making, behavioral research, and COVID-19—contains well-developed themes, but these are relatively disconnected from the field's predominant trends. These themes illustrate specific or context-dependent research directions, particularly those associated with the COVID-19 crisis, that remain peripheral to the mainstream research agenda.

Finally, the quadrant of declining topics—which includes decision support systems, k-means clustering, and integer programming — comprises quantitative techniques that appear less central or insufficiently connected to the current thematic structure of the field.

Overall, the study identifies a lack of theoretical integration between supply chain resilience and performance, despite promising empirical evidence regarding the potential contribution of AI-based approaches, including reductions in forecasting errors and operational costs. It therefore calls for a stronger theoretical articulation of AI-enabled resilience mechanisms through the complementary lenses of agency theory, stakeholder theory, and the Resource-Based View.

Overall, the study maps the rapid expansion and conceptual structure of research linking AI, supply chain resilience, and performance. The findings identify the principal collaboration patterns and thematic clusters but should not be interpreted as causal evidence that AI improves resilience or performance. The results are bounded by the use of a single database, the selected disciplinary and language filters, the partial coverage of 2026, and the sensitivity of science-mapping outputs to metadata cleaning and parameter choices. Future research should validate the structure across databases and complement bibliometric evidence with longitudinal and empirical studies of AI-enabled resilience mechanisms.

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