






Artificial Intelligence Applications in the Supply Chain: A Narrative-Umbrella Review



Aplicaciones de la Inteligencia Artificial en la Cadena de Suministro: Una Revisión Narrativa- Paraguas

Silva-Leyva, Laura * ^a, Martínez-Contreras, Ulises ^b, Woocay-Prieto, Arturo ^c and Ronquillo-Salas, Carlos ^d

^a  National Technological Institute of Mexico, Technological Institute of Ciudad Juarez •  0000-0002-8403-7286

^b  National Technological Institute of Mexico, Technological Institute of Ciudad Juarez •  0000-0002-1631-4448

^c  National Technological Institute of Mexico, Technological Institute of Ciudad Juarez •  0000-0001-9235-0494

^d  National Technological Institute of Mexico, Technological Institute of Ciudad Juarez •  0009-0000-4671-5966

Classification:

Area: Engineering
Field: Engineering
Discipline: Industrial Engineers
Subdiscipline: Systems

 <https://doi.org/10.35429/JSI.2025.9.23.1.1.10>

History of the article:

Received: October 30, 2025

Accepted: December 30, 2025

*  carlos.rs@cdjuarez.tecnm.mx



Abstract

Traditional statistical methods present limitations in the face of exponential data growth and the complexity of modern supply chains [SCs]. Artificial Intelligence [AI], with its ability to handle massive data, is gaining relevance. Therefore, it is interesting to understand, based on recent scientific publications, which AI algorithms are gaining importance, as well as their impact on the field. A search was conducted for systematic literature review articles on AI applications in SCs, identifying key areas and algorithms employed, their contributions, and potential future research. The selected articles were in English, had to contain the words "systematic review" in the title, and were due to be published between 2021 and 2025. They highlighted advances in various areas of the supply chain and identified opportunities in topics such as reverse logistics, environmental sustainability, returns automation, and the integration of AI with other technologies.

Resumen

Los métodos estadísticos tradicionales presentan limitaciones ante el crecimiento exponencial de los datos y la complejidad de las cadenas de suministro [SC] modernas, la Inteligencia Artificial [IA] al tener la capacidad de manejar datos masivos toma relevancia, por lo cual resulta interesante conocer según publicaciones científicas recientes cuáles son los algoritmos de IA que están tomando importancia, así como su impacto en el campo. Se realizó una búsqueda de artículos de revisiones sistemáticas de literatura de las aplicaciones de IA en la SC identificando las áreas clave y algoritmos empleados, sus aportaciones y posibles investigaciones futuras. Los artículos seleccionados son en el idioma inglés, debieron contener en el título las palabras "revisión sistemática", con fecha de publicación del 2021 al 2025. Destacaron avances en áreas diversas de la cadena e identificaron oportunidades en temas como logística inversa, sostenibilidad ambiental, automatización de devoluciones e integración de la IA con otras tecnologías.

Applications of the Artificial Intelligence in Supply Chain: A Narrative-Umbrella Review		
Objectives	Methodology	Contribution
Learn what algorithms and how artificial intelligence contribute to supply chain optimization.	Review of systematic literature reviews, selecting 10 relevant articles with publication periods from 2021 to 2025.	Identify the applications of Artificial Intelligence in the Supply Chain over the past three decades and identify potential gaps for future research.

Aplicaciones de la Inteligencia Artificial en la cadena de Suministro: Una Revisión Narrativa-Paraguas		
Objectives	Methodology	Contribution
Conocer que algoritmos y cómo la inteligencia artificial contribuye a la optimización de la cadena de suministro.	Revisión de revisiones sistemáticas de literatura, selección de 10 artículos relevantes con periodos de publicación del 2021 al 2025.	Identificar las aplicaciones de la Inteligencia Artificial en la Cadena de Suministro en las últimas tres décadas e identificar posibles lagunas para próximas investigaciones.

Artificial Intelligence, Sismatic Review, Supply Chain

Inteligencia artificial, revisión sistemática, cadena de suministro

Area: Promotion of frontier research and basic science in all fields of knowledge

Citation: Silva-Leyva, Laura, Martínez-Contreras, Ulises, Woocay-Prieto, Arturo and Ronquillo-Salas, Carlos. [2025]. Artificial Intelligence Applications in the Supply Chain: A Narrative-Umbrella Review. Journal of Systematic Innovation. 9[23]1-10: e1923110.



ISSN: 2523-6784 / © 2009 The Author[s]. Published by ECORFAN-Mexico, S.C. for its Holding Taiwan on behalf of Journal of Systematic Innovation. This is an open access article under the CC BY-NC-ND license [<http://creativecommons.org/licenses/by-nc-nd/4.0/>]

Peer review under the responsibility of the Scientific Committee MARVID®- in the contribution to the scientific, technological and innovation Peer Review Process through the training of Human Resources for continuity in the Critical Analysis of International Research.



Introduction

The exponential growth in data volume, coupled with the complexity of modern supply chains, has revealed the limitations of classical statistical methods, which are not always adequate for making effective decisions or accurate forecasts. In this context, artificial intelligence [AI] algorithms have been implemented to improve and complement traditional statistical methods, providing more robust tools for the analysis and management of complex data. [Angos, M. et al., 2022; Nweje, U. and Taiwo, M., 2025]

This research focuses on a review of scientific publications that explores how artificial intelligence contributes to supply chain optimization. This document is relevant because, as a review of systematic literature reviews, it addresses important information from three decades by considering articles whose analysis material was from those time ranges. Relevant articles published from 2021 to date were selected, synthesized individually, and analyzed collectively to assess the contributions of AI algorithms at different stages of supply chain. It was observed that research focused on key areas: demand forecasting, inventory optimization, supplier selection, planning, and logistics, primarily. This study identifies gaps particularly in areas such as the application of AI for reverse logistics, environmental sustainability, automation in return processes, and integration of AI with other technologies. The review highlights the need for further research to address these areas to maximize the impact of artificial intelligence on the supply chain.

Methodology

This document is an umbrella review of review of reviews [Chamberg-Michilot, D., et al. 2021], an exploration of scientific publications of systematic literature reviews that explore how artificial intelligence contributes to supply chain optimization. The articles analyzed were published in English. The relevance of this document is that, by selecting systematic reviews, it addresses information from three decades by considering articles whose analysis material was from those time ranges. Ten important articles were selected, with publications period from 2021 to 2025, introducing artificial intelligence, systematic review, and supply chain [SC] as keywords.

These works were analyzed in terms of their methodological approaches and the impact achieved in different areas of supply chain. Each of them is summarized, and then a general conclusion is presented on the applications, as well as the gaps found in the literature for further research.

The first article, Artificial intelligence in supply chain and operations management: a multiple case study research, addresses how artificial intelligence [AI] has played a crucial role in supply chain management in recent years. Its applications cover various areas, such as demand forecasting, planning, inventory management, supplier selection, quality control in order receipt, manufacturing, maintenance, shipping, logistics optimization, picking, and warehouse management.

These applications have generated significant benefits, including reduced inventory days, lower costs, improve fault identification accuracy, resource optimization, increased customer satisfaction and product quality, reduce transportation time and cost, and advances in environmental sustainability. The integration of artificial intelligence methods with SCOR model [Plan, Source, Make, Deliver, and Return] is analyzed, highlighting the following aspects: In the area of *planning*, AI is applied to demand forecasting, demand planning, and inventory management. The techniques used include adaptive fuzzy neural inference system, seasonal models based on hybrid fuzzy intelligence, short-term memory [LSTM], and support vector regression [SVR]. However, machine learning [ML] methods have limitations, such as the need for large amounts of historical data and suboptimal performance in ambiguous situations.

To address these limitations, the use of hybrid models is recommended. In the area of *procurement*, which covers the issuance of purchase orders, delivery schedules, order receipt and validation, and the acceptance of supplier invoices, models based on fuzzy theory, multi-criteria decision models, genetic algorithms, and artificial neural networks [CNN], are used. For supplier selection, supervised learning, reinforcement learning, decision trees, and support vector machines [SVM] techniques applied.

The *manufacturing* process includes material conversion, maintenance, repair, recycling, remodeling, and manufacturing. The most relevant techniques include: simulation from predicting machinery failures, genetic algorithms for optimizing workflows, fuzzy logic [FL] and neural networks [NN] for planning customer needs, real-time data collection using the Internet of Things [IoT] and sensors, and the use of digital twins for process design, simulation, and validation. Specifically in *delivery*, which involves receiving, validating, preparing orders, packaging, and shipping, ANN and genetic algorithms are used to optimize logistics, warehouse management, and transport routes. Finally, reverse logistics, linked to the circular economy, benefits from the use of AI to automate and streamline the sorting of returns. Recent studies focus on models that optimize environmental factors related to returns.

In addition, the article also addresses the financial, organizational, strategic, technological, and legal barriers to the implementation of AI in the supply chain. Finally, the study suggests as future lines of research the application of AI in return processes, with an emphasis on the circular economy [Cannas, V. G., 2023]

The second article analyzed, *Applications of Artificial Intelligence in Reverse Logistics: A Bibliometric and Network Analysis*, reflects a comprehensive analysis of research conducted over the last three decades, identifying the most influential works, the main contributors, and the key connections between different studies in this field.

The findings highlight significant growth in the application of artificial intelligence [AI] within the field of machine learning [ML] in recent years. It mentions that several countries, including China, India, the United Kingdom, and the United States, have integrated cutting-edge AI-based technologies to optimize the flow in their reverse supply chains. These technologies have improved sustainability and efficiency by reducing waste within management systems.

Network analysis shows that researchers' attention has been focused primarily on issues related to recycling and waste management. To address these challenges, a variety of AI algorithms have been implemented. However, while remanufacturing has seen a significant increase in the use of AI, other critical areas still require greater attention in future research.

SA notable transition from the use of traditional machine learning algorithms to Deep learning [DL] was observed. This shift is due to the ability of DL algorithms to process data more quickly and operate efficiently in complex environments. In addition, hybrid models combining DL and ML algorithms have emerged, achieving promising results in addressing multifaceted problems. Some of these supervised learning algorithms used in reverse logistics are: linear regression [LR], support vector regression [SVR], random forest [RF], decision trees [DT], logistic regression [LR], regression trees [RT], backpropagation neural networks [BPNN], ensemble machine learning [EML], and inductive learning algorithms [ILA]. Unsupervised learning algorithms include: self-organizing map [SOM], K-means, and principal component analysis [PCA].

Deep learning [DL] requires input data for the algorithm to classify into three categories: prediction, classification, and estimation.

The document mentions multiple Deep learning algorithms with applications in reverse logistics: convolutional neural networks [CNN], You Only Look Once [YOLO], artificial neural networks [ANN], recurrent neural networks [RNN], multilayer perceptrons [MLP], long short-term memory [LSTM], and Deep belief networks [DBN].

AI continues to evolve, and in the area of reverse logistics, it has been applied in multiple ways: predicting manufactured products, classifying and identifying waste, return rates, predicting recycling, forecasting waste, sustainable transportation, storage and packaging, waste collection in a smart environment, demand forecasting, product return, rate predictions, cost forecasting, grouping discarded material for reuse, examining multiple factor trends, and sorting recyclable materials, to name a few.

Predictive analytics will play an essential role in improving processes such as remanufacturing by optimizing product returns within the supply chain. For example, using historical data to accurately predict return volumes will maximize the value of returning products, promoting a more sustainable and efficient economy.

In summary, AI has improved reverse logistics management and has been applied to remanufacturing, but it also shows that the processes of product reuse, refurbishment, and return lag behind in the application of AI. As technological advances continue to redefine the limits of what is possible, the opportunities to improve supply chain management through AI are extensive.

This study provides valuable information for harnessing the potential of artificial intelligence in the future to solve critical challenges in global sustainability and efficiency [Bhowmik, O. et al., 2024].

The third article, Systematic literature review on artificial intelligence applications in supply chain demand forecasting, provides a concise summary of systematic literature review conducted on the applications of artificial intelligence [AI] particularly machine learning [ML] and deep learning [DL] in supply chain demand forecasting, comparing them with traditional forecasting techniques. The authors followed by PRISMA [Preferred Reporting Items for Systematic Reviews and Meta-Analyses] guidelines to conduct a comprehensive search of the relevant literature. The 65 selected articles were subjected to an in-depth analysis to evaluate the performance of AI-driven models compared to traditional forecasting techniques.

This analysis included examining the advantages of AI models, the scalability and responsiveness of forecasting to real-time data, such as greater accuracy, scalability, and responsiveness of real-time forecasts, as well as identifying the challenges faced in implementation. The review highlights that AI-driven models, particularly those using machine learning [ML] and deep learning [DL], significantly outperform traditional forecasting techniques by improving forecast accuracy. It also found that AI applications are beneficial in retail, manufacturing, and trade. The review also points to several challenges that hinder the widespread adoption of AI in demand forecasting, including issues related to data quality, the complexity of AI models, and high implementation costs, which may limit organizations willingness to adopt these advanced technologies.

It suggests areas for future research, focusing particularly on improving data management practices, developing more interpretable AI models, as this would facilitate wider implementation of AI, leading to better forecasting and decision-making, and exploring ways to reduce high implementation costs [Saha, R., et al., 2024].

The fourth article is “The role of Artificial Intelligence in Supply Chain Management: A Systematic Literature Review”. IT highlights that companies, to remain competitive and efficient, must integrate advanced technology, particularly artificial intelligence. The article conducted a systematic literature review, analyzing papers published in peer-reviewed journals from major databases such as Scopus and Web of Science.

The analysis included an assessment of the frequency of the literature, focusing on years of publication, contributions from leading journals and publishers, and the methodologies used in the studies.

It was found that AI applications in the supply chain include demand forecasting, inventory level optimization, logistics operations efficiency, and the identification and management of risks within the supply chain. The use of AI in these areas allows better-informed decisions, minimized forecasting errors, and improves the overall efficiency of the chain.

For future research in the field of AI and supply chain management, it recommends investigating advances in machine learning, deep learning, and other AI methodologies that have not yet been fully integrated to further improve processes in the supply chain, as well as integrating AI with other advanced technologies such as the Internet of Things [IoT], blockchain, and Big Data. It also recommends conducting longitudinal and sectoral studies, as well as examining the ethical and social implications of Ai in SCs. The paper highlights the need to develop standardized performance metrics to evaluate the effectiveness of Ai applications in SC management. The paper concludes that the integration of AI technologies is fundamentally transforming supply chain management, leading to greater efficiency, agility, and resilience in operations, and improving decision-making processes [Logožar, K., 2024].

The objective of the fifth article, *Advancing supply chain management through artificial intelligence: a systematic literature review*, is to evaluate how artificial intelligence [AI] influences supply chain management [SCM] by seeking to understand how AI can improve SCM practices and what challenges exist in its implementation. The study employs a systematic literature review, which is structured in a five-step process. It analyzes academic publications from 2000 to 2024, using various databases to ensure a comprehensive review, identifying a total of 426 articles relevant to its analysis.

The study highlights that AI techniques have considerable potential to improve efficiency, accuracy, and decision-making processes within SCM. It also identifies several barriers that hinder the wider implementation of AI in SCM. These barriers include financial constraints, organizational issues, strategic misalignments, technological limitations, and legal barriers.

The paper suggests investing in infrastructure, developing employee skills, and implementing effective management practices, as well as exploring new AI applications, conducting longitudinal studies, adopting interdisciplinary approaches, documenting practical implementations, and addressing ethical and legal considerations [Younesse, O. et al., 2025].

The sixth article, *Examining the integration of artificial intelligence in supply chain management from Industry 4.0 to 6.0: a systematic literature review*, provides summary of research conducted on the integration of Artificial Intelligence [AI] into supply chain management [SCM] as industries transition from Industry 4.0 [“smart” and connected production systems that are designed to detect, predict, and interact with the physical world in order to make decisions that support real-time production, [WEF, 2022]] to Industry 6.0 [merging human-centered automation, hyperconnectivity, and cognitive manufacturing, driven by advances in artificial intelligence, quantum computing, and edge computing [Roshid, M., et al., 2025]].

The research uses the PRISMA framework for systematic review of literature, analyzing literature published between 2010 and 2023.

A comprehensive search was conducted in multiple databases, including Web of Science, Scopus, IEEE Xplore, Google Scholar, and Science Direct. The review process involved rigorous eligibility screening and thematic analysis using Atlas-ti software to identify key themes related to Ai integration in SCM. Ai integration significantly enhances SCM by improving demand forecasting, inventory management, and overall decision-making capabilities.

The transition to Industry 5.0 emphasizes huma-Ai collaboration, leading to better personalization and problem solving. Additionally, Ai technologies contribute to sustainability by optimizing resource use and minimizing environmental impacts. However, challenges such as cybersecurity risks and workforce skill gaps must be addressed to fully leverage the potential of AI. The integration of Ai into SCM not only increases operational efficiency and sustainability but also improves resilience to disruptions. The study highlights the importance of balancing technological advances with sustainable, human-centered practices.

The findings of the document highlight several significant results, such as improved demand forecasting helping to optimize inventory levels and improving decision making processes. The transition to Industry 5.0 emphasizes the importance of human-AI collaboration, leading to more personalized solutions, problem solving, contributions to sustainability, optimization of resource utilization, and reduction of environmental impacts.

The study also identifies several challenges that must be addressed for effective Ai integration, including cybersecurity risks and workforce skill gaps. The study concludes that a balanced approach is necessary for successful Ai integration in SCM. This approach must combine technological advances with sustainable, human-centered practices, ensuring that the benefits of AI are realized while mitigating the associated risks [Samuels, A., 2025]. Artificial Intelligence [AI] is transforming supply chain management [SCM] by improving efficiency, reducing costs, and optimizing resources, as mentioned in the seventh article, *Artificial Intelligence in Supply Chain Management: A Systematic Literature Review and Guidelines for future research*.

They show how the most prevalent techniques, artificial neural networks [ANN], fuzzy logic [FL], and genetic algorithms [GA], offer promising results, but their combination could maximize benefits and minimize risks. This study addresses the lack of systematic reviews by identifying gaps in literature and exploring practical applications. Emerging topics such as sustainability, big data, and automation are also highlighted. It concludes that AI is key in SCM, but future research should consider its impact on organizations of various sizes.

Articles were selected from Elsevier Scopus database, searching by title, abstract, and article keywords to identify peer-reviewed systematic reviews in English published from 2018 to mid-2022. Thirty-four documents were analyzed.

Three Ai techniques applied to SCM were identified: ANNs, genetic algorithms, and FL. ANNs are mainly applied to marketing, sales forecasting, and customer segmentation. Genetic algorithms [GA] allow for parameter optimization and can also be extended to multi-objective optimization [MOO]. Fuzzy logic allows for addressing uncertainty, unpredictability, difficult to-formulate systems, and ambiguity of information, making it an excellent technique for working with qualitative information.

Due to the growing volume of data, big data analytics have proven crucial in addressing changes such as the IT revolution, customers awareness, and globalization. The use of big data analytics [BDA] in conjunction with artificial intelligence was defined as the best solution, as it allows companies to extract useful information from large amounts of data and use it to address SCM issues. BDA is considered the best way to combat market competitiveness. Finally, automation, which can be divided into three different capabilities: “process automation”, “operational automation” and “tactical automation”.

In terms of future research, it is suggested to examine how the application of Ai techniques might differ between organizations of different sizes: research is also proposed to explore the risk of using AI technologies in SC [Ferreira, B. & Reis, J., 2023].

Article number eight, Artificial intelligence in supply chain management: A systematic literature review, identifies the contributions of artificial intelligence [AI] to supply chain management [SCM], addressing four aspects: outstanding AI techniques, as well as those that have potential for applications in SCM: subfields enhanced through AI in SCM: and subfields susceptible to development through AI.

Using a specific set of inclusion and exclusion criteria to identify and examine the literature, the key words from Stock and Boyers's [2009] definition of SCM were used: supply chain, marketing, production, and logistics, combined with “artificial intelligence”.

Only peer-reviewed conference and journal articles were evaluated. From 2008 to 2018. The databases used were Wiley Online Library, ScienceDirect, Emerald Insight, Taylor & Francis, and JSTOR.

Of the 64 articles analyzed, 14 contribute to the area of marketing, 6 to logistics, 23 to production, and 21 to the general field of supply chain, five focus on demand forecasting, proposing the use of artificial neural networks [ANN], fuzzy inference systems, and support vector machine to manage fuzzy demand, develop a model for customer segmentation to improve inventory, and accurately forecast demand. Two articles focus on supplier selection, with the application of fuzzy Bayesian supplier selection and neuro-fuzzy supplier selection. Simulation, the use of Radio Frequency Identification [RFID] integrated with Information Technologies [IT], as well as the Internet of Things [IO] applied to the monitoring of risks and inventory replenishment problems. For marketing, the use of ANN, agent-based systems [ABS], genetic algorithms [GA], k-mean clustering, support vector data, multi-agent systems [MASs], and neural decision trees [NTD] stand out, with the results of these applications including sales forecasting, pricing models, market segmentation, and predicting consumer decisions, among others.

In the field of logistics, the use of heuristic methods, intelligent systems, and autonomous agents is mentioned. AI and RFID techniques are used in the operation and management of cargo containers and batch problems.

In the field of production, GA, ANN, NTD, data mining, FL, Gaussian models, and case-based reasoning [CBR] are used for production forecasting, production fault detection, production planning and scheduling, quality improvement and control, product line optimization, rapid prototyping, and manufacturing.

In conclusion, in any of the fields, the most widely used Ai technique was ANN, and specifically for SC, the second most widely used technique was FL and modeling. It is concluded that many studies focus on the design and creation of models, but only a few evaluate their application or use. This conclusion suggests the use of real data to test the proposal. It also mentions that improving the use of AI in SCM requires well-structured problems and the use of appropriate software. Another recommendation is the application of agent-based systems [ABS] for risk or disaster management in the chain [Toorajipour, R. et al., 2021].

The ninth paper, Artificial intelligence applied to supply chain operations management: a systematic literature review, emphasizes that AI is crucial for minimizing operational uncertainty and improving performance in supply chain management [*SCM]. Big data analytics [BDA] is an important area within AI; both are transforming supply chains.

The systematic review for the paper covers the literature on Ai applications in SCM from 2000 to 2020 using a meta-synthesis methodology.

The paper addresses the main methodologies used in the Ai SCM literature and includes qualitative, quantitative, and mixed-method approaches. It identifies the areas in which it is mainly applied, namely demand forecasting, inventory management, logistics optimization, and supplier selection. It also addresses the most frequently used AI models, covering machine algorithms, neural networks, and optimization techniques, including BDA.

It identifies the need for more empirical studies and exploration of new AI technologies and their applications in supply chains. These include investigating the long-term impacts of AI on supply chain resilience, exploring the ethical implications of AI in SCM, and addressing issues related to data privacy, algorithmic bias, and the impact on employment in the industry.

It also involves developing frameworks for integrating AI technologies into existing supply chain processes. Encouraging interdisciplinary research that combines knowledge from various fields, such as operation management, information systems, and data science. This interdisciplinary approach can lead to more comprehensive solutions and innovations in SCM.

This forward-looking perspective aims to guide research in improving the overall understanding of the role of AI in SCM and addressing the challenges and opportunities it presents [Dayrell, M. & Fontes, O., 2023].

The tenth article, Applications of artificial intelligence and machine learning within supply chains: systematic review and future research directions, the purpose of this research is to examine how artificial intelligence [AI] and machine learning [ML] techniques are currently being applied in supply chain management, with the aim of identifying their main advancements, benefits, and potential directions for future research.

Through a systematic literature review conducted across major databases such as Web of Science, Scopus, and Google Scholar, a total of 388 publications were analyzed, of which 50 were selected for their relevance in directly linking AI and ML to supply chain management. The findings reveal that these technologies have significant potential to enhance operational efficiency, improve responsiveness, and provide competitive advantages to organizations. Among the most notable outcomes are the reduction of the bullwhip effect and the optimization of logistics networks. However, the authors agree that the full potential of AI and ML has not yet been fully realized.

The study further suggests that their application could be strengthened through integration with emerging technologies such as big data and robotics. It also emphasizes the importance of continuing to explore and deepen the use of these tools within supply chain management, as there remain numerous promising approaches that have yet to be investigated [Younis, H., et al., 2021]

Table 1 presents a resume for articles.

Box 1

Table 1

Summary by article

YEAR OF PUBLICATION	ARTICLE	REVIEW METHODOLOGY	APPLICATIONS	FUTURE RESEARCH
2023	Artificial intelligence in supply chain and operations management : a multiple case study research	Artificial intelligence methods with Score model	Demand forecasting and planning Inventory management Supplier selection Supplier selection Issuing receiving and validating orders failure prediction Warehouse and transport route management	IA in Return Processes with an emphasis on the circular economy
2024	Application of artificial intelligence in reverse logistics: A bibliometric and network analysis	Bibliometric and network analysis. Sources: journals, conferences, reviews, and book chapters. Scopus database, Google Scholar 1990-2023 Information from journals, HistCite, Tableau, and R Studio	Waste classification and identification demand forecast	AI in refurbishment, reuse, and product return management
2024	Systematic literature review on artificial intelligence applications in supply chain demand forecasting.	PRISMA guidelines	Inventory management, production scheduling, and overall operational efficiency	Develop more interpretable AI models. Explore ways to reduce the high costs of implementation with AI technologies
2024	The role of Artificial Intelligence in Supply Chain Management: A systematic Literature Review	Systematic literature review, analyzing Works published in Scopus and Web of Science. Frequency analysis, contribution analysis, methodological evaluation, and content analysis	Demand forecasting, inventory management, logistics operation, risk management	Investigate advances in ML, DL, and other AI methodologies not yet integrated into supply chain practices Examine the integration of AI with other advanced technologies, such as the Internet of Things [IoT], blockchain, and big data analytics. Research data privacy, job displacement, and the overall impact of AI on workforce dynamics within the SC.
2025	Advancing supply chain management through artificial intelligence: a systematic literature	Five-step process structure, publications from 2000-2024	Improves efficiency, accuracy, and decision-making processes	Explore new AI applications, conduct longitudinal studies, adopt interdisciplinary approaches, document practical implementations, and address ethical and legal considerations
	Examining the integration	PRISMA Framework Publications from 2010 to	Mejora la previsión de la demanda, la	Combine technological advances with

2025	of artificial intelligence in supply chain management from Industry 4.0 to 6.0: a systematic literature review	2023 databases, Web of Science, Scopus, IEEE Xplore, Google Scholar, and ScienceDirect Atlas-ti software to identify key topics related to the integration of AI in SCM	administración de inventario y la toma de decisiones	sustainable, human-centered practices
2023	Artificial intelligence in supply chain management : a systematic literature review and guidelines for future research	PRISMA and content analysis Elsevier Scopus database, 34 articles	Marketing, sales forecasting, and customer segmentation Parameter optimization	Exploring the risks of using AI technologies in SC Investigate how AI techniques may differ between organization of different sizes.
2021	Artificial intelligence in supply chain management : A systematic literature review,	Wiley Online Library, ScienceDirect, Emerald Insight, Taylor & Francis and JSTOR Papers from 2008 to 2018 only peer-reviewed journal and conference papers were considered for the review 64 articles	Risks, Inventory, value chain, planning, maintenance, demand forecasting, supplier selection, supply chain design, management, chain integration planning, sustainability	Use of real data to test proposed models. Design of well-structured problems and use appropriate software.
2023	Artificial intelligence applied to supply chain operations management : a systematic literature review.	Meta-synthesis of articles from 2000 to 2020.	Demand forecasting, inventory management, logistics optimization, and supplier selection.	Long-term impact of AI on SC resilience Ethical implications Data privacy Impact on employment in the industry Interdisciplinary research Exploration of new technologies and their applications in SC
2021	Applications of artificial intelligence and machine learning within supply chains: systematic review and future research directions	Databases used: Web of Science, Scopus and Google Scholar 50 articles reviewed	Reduction of the bullwhip effect	Research on Big Data and Robotics in SC

Source: Own elaboration

Results

Table 1 provides a concise overview of the methodology, applications, and future lines of research in supply chain.

Conclusions

AI is transforming the supply chain, enabling problems to be solved more accurately, faster, and with more information, which is why it has multiple applications.

The articles analyzed provide an understanding of the variety of algorithms used in the field of AI and highlight the diversity of applications of this technology throughout the supply chain, including demand forecasting, inventory optimization, predictive maintenance, risk management, and supplier selection, to name just a few.

These studies also identify gaps in current research and potential opportunities for future inquiries in this field. Among the many suggestions for future research are AI in return processes with an emphasis on the circular economy, AI for returns management, exploring ways to reduce the high costs of implementation, examining the integration of AI with other technologies, data privacy, risk exploration, combining technological advances with sustainable practices, resilience in the SC, and research on big data and robotics.

Although AI and ML are adding value to supply chains, some researchers believe that these technologies are not fully exploited, suggesting that there are still many tools and techniques that could improve the overall value of supply chains [Younis, H., et al., 2021]. The adoption of AI provides competitive advantages and contributes to a more sustainable future, hence the importance of embracing it. [FEM, 2022, Hinojosa, R. O., 2025].

Declarations

Conflict of interest

No conflict of interest is declared; there no financial or personal interests that could have influenced the content of this article.

Author contribution

Martínez, Ulises y Woocay, Arturo: contributed with suggestions for articles to review and research.

Ronquillo, Carlos: contributed with suggestions for articles, research, and as corresponding author.

Silva, Laura: contributed with the idea, research and narrative.

Availability of data and materials

The information for the article is available.

ISSN: 2523-6784

RENIECYT: 1702902

ECORFAN® All rights reserved.

Abbreviations

ABS	Agent-based systems
AI [IA]	Artificial Intelligence
ANN	Artificial Neural Network
BDA	Big Data Analysis
BPNN	Backpropagation neural network
DBN	Deep Believe Network
CBR	Case-Based Reasoning
CNN	Convolutional Neural Network
DL	Deep Learning
DT	Decision Trees
EML	Ensemble Machine Learning
FL	Fuzzy Logic
GA	Genetic Algorithm
ILA	Inductive Learning Algorithm
IoT	Internet of Things
K-NN	k-Nearest Neighbors
LR	Logistic Regression
LSTM	Long Short-Term Memory
ML	Machine Learning
MLP	Multy Layer Perceptron
MOO	Multi-objective optimization
NB	Naïve Bayes
NTD	Neural Decision Tree
PCA	Principal component analysis
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RF	Random Forest
RFID	Radio Frequency Identification
RL	Lineal Regression
RNN	Recurrent Neural Network
RT	Regression Tree
SC	Supply Chain
SCM	Supply Chain Management
SCOR	Supply Chain Operations Reference
SOM	Self-Organizing Map
SVM	Machine Support Vector
SVR	Support Vector Regression
TICS	Information Technologies
YOLO	You Only Look Once

References

Antecedents

Angos, M., Dietrich, F., and Palma, Daniel. [2022] Review and analysis of artificial intelligence methods for demand forecasting in supply chain management. *55th CIRP Conference on Manufacturing Systems*.

FEM Foro Económico Mundial [3 mayo de 2022] [¿Qué es la “Industria” y qué significará para los países en desarrollo?](#)

Silva-Leyva, Laura, Martínez-Contreras, Ulises, Woocay-Prieto, Arturo and Ronquillo-Salas, Carlos. [2025]. Artificial Intelligence Applications in the Supply Chain: A Narrative-Umbrella Review. *Journal of Systematic Innovation*. 9[23]1-10: e1923110. <https://doi.org/10.35429/JSI.2025.9.23.1.1.10>

Roshid, M., Waaje, A. and Karim, R., [2025] [Industry 6.0 as an Emerging Field of Research: A Systematic and Bibliometric Analysis](#) Conference: EMIDWORLD 2nd International Congress on Economics, Public Finance, Business & Social Sciences At: Istanbul/Türkiye.

Basics

Bhowmik, O., Chowdhury, S., Ashik, J., Mahmud, GM., Khan, Md., and Ibne Hossain, N.U. [2024] [Application of artificial intelligence in reverse logistics: A bibliometric and network analysis](#), *Supply Chain Analytics*, Volume 7, 100076, ISSN 2949-8635,

Cannas, V. G., Ciano, M. P., Saltalamacchia, M., & Secchi, R. [2023]. [Artificial intelligence in supply chain and operations management: a multiple case study research](#). *International Journal of Production Research*, 62[9], 3333–3360.

Chambergó-Michilot D, Díaz-Barrera ME, Benites-Zapata VA. [Revisiones de alcance, revisiones paraguas y síntesis enfocada en revisión de mapas: aspectos metodológicos y aplicaciones](#). *Rev Peru Med Exp Salud Publica* 2021;38[1]:136-42.

Dayrell, M. and Fontes, O. [2023] [Artificial intelligence applied to supply chain operations management: a systematic literature review](#). [2023]. *International Journal of Logistics Systems and Management*, 45[1], 1.

Ferreira, B., & Reis, J. [2023]. [Artificial intelligence in supply chain management: a systematic literature review and guidelines for future research](#). In *International Joint Conference on Industrial Engineering and Operations Management* [pp. 339-354]. Springer, Cham.

Logožar, K. [2024]. [The role of Artificial Intelligence in Supply Chain Management: A systematic Literature Review](#). *10*, 328–337.

Nweje, Uche, and Taiwo, Moyosore [2025] [Leveraging Artificial Intelligence for predictive supply chain management, focus on how AI-driven tools are revolutionizing demand forecasting and inventory optimization](#). *International Journal of Science and Research Archive*.

Saha, R., Shofiullah, S., Faysal, S.A., Happy, A.T., [2024]. [Systematic Literature Review on Artificial Intelligence Applications in Supply Chain Demand Forecasting](#). *Academic Journal on Business Administration, Innovation & Sustainability*, 4 [04], 109-127.

Samuels, A. [2025]. [Examining the integration of artificial intelligence in supply chain management from Industry 4.0 to 6.0: a systematic literature review](#). *Frontiers in Artificial Intelligence*, 7.

Stock, James, & Boyer, Stefanie. [2009]. [Developing a consensus definition of supply chain management: A qualitative study](#). *International Journal of Physical Distribution & Logistics Management*.

Toorajipour, R., Sohrabpour, V., Nazarpour, A., Oghazi, P., and Fischl, M. [2021]. [Artificial intelligence in supply chain management: A systematic literature review](#). *Journal of Business Research*, Volume 122, Pages 502-517,

Younesse, O., Ziti, S., & Lagmiri, S. N. [2025]. [Advancing supply chain management through artificial intelligence: a systematic literature review](#). *Indonesian Journal of Electrical Engineering and Computer Science*, 38[1], 321.

Younis, H., Sundarakani, B., & Alsharairi, M. [2021]. [Applications of artificial intelligence and machine learning within supply chains: systematic review and future research directions](#). *Journal of Modelling in Management*.

Supports

Hinojosa, R. O. [2025]. [Innovación abierta. Conceptos, casos y aplicaciones](#). ITESO.