

A Study on Artificial Intelligence in Supply Chain and Operations Management: An Investigation of Perception and Readiness among Undergraduate Logistics Students

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ABSTRACT

AI, or artificial intelligence, has become a revolutionary force in contemporary supply chain and operations management. As digitalisation and Industry 4.0 principles advance, organisations are increasingly adopting AI-driven solutions, like machine learning, predictive analytics, intelligent automation, and data-informed decision-making systems. These technologies help companies enhance demand forecasting, optimise logistics networks, automate warehouse operations, and monitor supply chain activities in real time. As a result, conventional supply chains are transforming into flexible, responsive, and data-driven systems that can swiftly react to fluctuating market conditions. The readiness of future logistics workers is essential in this technological landscape. Graduates entering the logistics and supply chain sector must possess knowledge of traditional supply chain procedures and awareness of contemporary technologies, including AI and data analytics. Proficiencies in data analysis, engagement with AI-driven systems, and technology-facilitated decision-making are increasingly vital competencies. Consequently, higher education institutions must guarantee that logistics students receive sufficient training for AI-driven environments. This study investigates the perceptions and preparedness of undergraduate logistics students concerning the adoption of AI in supply chain and operations management. A quantitative study design was employed, gathering data using a standardised questionnaire. The results show that students predominantly possess favourable attitudes towards AI and acknowledge its capacity to increase efficiency and job prospects. Nonetheless, their preparedness primarily relies on technical exposure and the inclusion of AI-related topics in the curriculum. The report advocates AI-integrated courses and enhanced collaboration between business and academia to adequately equip students for future supply chain requirements.

Keywords: Artificial Intelligence, Supply Chain Management, Operations Management, Student Perception, Technology Readiness, Logistics Education.

Introduction

AI in supply chain and operations management has changed logistics systems. Machine learning, predictive analytics, robotics, and intelligent automation have increased strategic decision-making and operational efficiency. As companies adopt AI-driven supply chains, graduates' technological readiness determines their job.

Few studies have investigated undergraduate logistics students' opinions and preparation for AI integration, despite the industry's rapid usage of technology. Prospective supply chain professionals' awareness, perspective, and preparation are examined. Digital technology has changed supply chain and operations management. AI is a powerful driver of innovation and operational efficiency among these

new technologies. Historical supply chain systems relied on manual procedures, retrospective data analysis, and human judgment. AI-driven technologies like predictive analytics, machine learning, robotics, and intelligent automation are making supply chains more data-centric, responsive, and autonomous. These technologies let companies analyze massive databases, identify patterns, predict demand, and improve operations in real time. Modern commercial logistics, procurement, inventory management, and AI have transformed distribution systems.

AI boosts supply chain efficiency and effectiveness. Machine learning algorithms can predict demand from historical and real-time data, helping companies avoid stock outs and overstock inventory. Predictive analytics help companies anticipate market trends, identify disruptions, and plan for supply chain resilience. AI-driven analytics analyzes complex datasets and uncovers hidden demand and supply dynamics patterns, improving forecasting precision and operational efficiency, according to research.

AI enables automation in logistics and operations management. Intelligent systems can automate decision-making, monitor shipments, improve delivery routes, and optimise warehouse operations utilising robots and AGS. These innovations reduce human errors, boost productivity, and improve supply chain efficiency. AI-driven route optimisation systems may consider traffic, weather, and delivery schedules to find the best transport routes. This helps reduce operational costs and improve customer satisfaction through timely deliveries.

Strategic decision-making can be improved by integrating AI into the supply chain. AI technologies help management understand demand patterns, supplier performance, and risks by analyzing big volumes of supply chain data. This lets companies make data-driven decisions to boost competitiveness and flexibility. Global crises, supplier delays, and sudden changes in customer demand can be better handled by AI-driven supply chains.

As more industries adopt AI technology, demand for AI-integrated supply chain system experts has grown. Modern logistics and supply chain jobs involve digital, data analytics, and automation skills. Thus, supply chain and logistics graduates' employment increasingly depends on their technology skills and ability to work in AI-enhanced environments. To prepare students for the changing industry, universities and educational institutions should incorporate AI-related information and digital skills into logistics and supply chain curricula.

AI is increasingly integrated into industrial supply chains, but little is known about how potential professionals, especially undergraduate logistics students, view and prepare for this technological transformation. Most AI research in supply chain management focuses on predictive analytics, automation, and optimisation models. However, few studies examine students' awareness, attitudes, and preparedness to use AI-enabled technologies. Understanding students' viewpoints is important since they will manage technologically advanced supply chains.

This study addresses the research gap by examining undergraduate students' awareness, views, and preparedness for AI in logistics and supply chain management. The study examines students' understanding of AI applications and their readiness to use them in professional settings, providing valuable information for educators, policymakers, and industry stakeholders. These findings can inform academic curriculum, training programs, and skill-development efforts to equip logistics professionals for an AI-driven supply chain ecosystem.

Literature Review

Sharma, Rakeshet. al.(2022) emphasised that AI substantially enhance demand forecasting in supply chains through the application of machine learning algorithms to examine past data and discern demand patterns. Their research highlighted that AI-driven forecasting solutions reduce uncertainty and help organisations maintain optimal inventory levels, thereby enhancing supply chain efficiency.

Toorajipour, Rezaet. al.(2021) investigated the function of AI in supply chain management& Operation Management and determined that sophisticated algorithms enhance logistics efficiency by optimising transportation routes and delivery timelines. Their research indicated that AI-driven route optimisation tools can evaluate factors such as traffic conditions, transportation expenses, and delivery priority to enhance distribution efficiency.

Belhadi, Amineet. al. (2021) examined the role of AI in enhancing supply chain resilience and fostering innovation. Their research revealed that AI-driven analytics enables organisations to identify potential disruptions and respond swiftly to supply chain concerns, thereby enhancing risk mitigation measures.

Ivanov, Dmitry, and Dolgui, Alexandre (2021) presented the notion of digital supply chain twins augmented by artificial intelligence technologies. Their research revealed that AI-driven digital models may replicate supply chain processes, enabling organisations to foresee interruptions, enhance logistics operations, and bolster overall supply chain resilience.

Bag, Surajitet. al. (2021) examined the function of AI in sustainable supply chain management. Their findings demonstrated that AI technologies enhance warehouse automation, optimise resource utilisation, and refine logistics coordination, thus facilitating sustainable and efficient supply chain operations.

Heikki Min (2022) studied the utilisation of AI in operations management and highlighted its significance in predictive maintenance. The research emphasised that AI-driven predictive analytics can evaluate machine data and operational patterns to anticipate possible equipment breakdowns. This allows organisations to prearrange maintenance procedures, therefore minimising unforeseen downtime and enhancing operational efficiency.

Tsan-Ming Choiet. al.(2020) examined the inclusion of artificial intelligence and big data analytics in operations management. Their research demonstrated that AI-driven analytical tools augment decision-making in production planning by scrutinising extensive operational data, hence facilitating optimal resource allocation and optimising production scheduling.

Rameshwar Dubey, et. al.(2020) explored the adoption of Artificial Intelligence in supply chain and operations processes. Their study revealed that AI-driven systems improve quality control by using automated inspection technologies and computer vision to detect product defects more accurately than traditional manual methods.

Nir Kshetri (2021) examined the effect of Artificial Intelligence on enhancing operational efficiency across many sectors. The research indicated that AI-driven decision-support systems aid managers in overseeing operational performance and detecting inefficiencies in production processes, hence enabling organisations to attain enhanced productivity and cost efficiency.

Arun Kumaret. al.(2022) examined the adoption of AI technologies in operations management. Their findings revealed that AI-enabled solutions facilitate production planning, optimise resource allocation, and improve operational performance through sophisticated data analysis and automated decision-making.

Fred D. Davis (1989) The Technology Acceptance Model (TAM) was established to elucidate the mechanisms by which individuals adopt and utilise new technologies. The model highlights two primary determinants—perceived utility and perceived ease of use—that affect consumers' attitudes towards technology adoption and their intention to utilise technological systems.

Sachin Kambleet. al.(2022) investigated technology adoption in digital supply chains and found that employees' readiness, awareness, and technological competence strongly influence the successful implementation of AI-driven systems in logistics and operations management.

Objectives of the Study

- To examine awareness levels of AI applications in supply chain and operations.
- To analyse perception toward AI's impact on logistics careers.
- To assess readiness for AI-enabled supply chain environments.

Hypotheses of the Study

- H₀1:** Awareness of Artificial Intelligence does not significantly influence the perception of students toward AI in supply chain and operations management.
- H₀2:** Perception toward Artificial Intelligence does not significantly influence the readiness of students to adopt AI-enabled technologies.
- H₀3:** Awareness of Artificial Intelligence does not have a significant influence on students' readiness for AI-enabled supply chain roles.

Research Methodology

A descriptive and analytical research approach is used to analyse undergraduate logistics students' perspectives and preparedness for AI in supply chain and operations management. The descriptive analysis examines students' awareness, attitudes, and views about AI applications, whereas

the analytical part examines their relationships. A sample of 120 undergraduate students in logistics and supply chain management was studied. These kids represent future logistics workers who will use AI-driven technology. The researcher used convenience sampling to recruit respondents and collect data from willing participants. A systematic Likert-scale questionnaire given to the respondents to rate their agreement with several questions about AI awareness, perception, and readiness. The questionnaire collected demographic data and students' views on supply chain and operations management AI applications in numerous parts.

Descriptive statistics, correlation analysis, and regression analysis are used to examine patterns and correlations among variables. A criterion of 0.70 or higher was considered acceptable for Cronbach's Alpha, indicating that the questionnaire was reliable for the study.

Data Analysis

- **Reliability Analysis (Cronbach's Alpha):** Reliability analysis was conducted to measure the internal consistency of the questionnaire items for each construct.

Cronbach's Alpha Reliability Table

Construct	Number of Items	Cronbach's Alpha	Interpretation
Awareness of AI	7	0.872	Excellent reliability
Perception toward AI	7	0.889	Excellent reliability
Readiness for AI Environment	7	0.861	Good reliability
Overall Scale	21	0.903	Highly reliable

Source: Primary Data

- **Interpretation:** A Cronbach's Alpha value above 0.70 indicates acceptable reliability. All constructions exceed 0.85, demonstrating strong internal consistency.

Regression Analysis for Hypothesis 1

H₀1: Awareness of Artificial Intelligence does not significantly influence students' perception toward AI in supply chain and operations management.

Model Summary

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	0.583	0.340	0.331	0.487

Source: Primary Data

Interpretation: $R^2 = 0.340$ indicates that 34% of the variance in perception is explained by AI awareness.

ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.931	1	8.931	37.61	0.000
Residual	17.337	73	0.237		
Total	26.268	74			

Source: Primary Data

Interpretation: The F value is 37.61, and the p-value is 0.000 (<0.05), indicating that the regression model is statistically significant. So, the null hypothesis is rejected, and the alternative hypothesis is accepted. So, Awareness of Artificial Intelligence significantly influences students' perception toward AI in supply chain and operations management

Coefficients Table

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
Constant	1.214	0.421	—	2.88	0.005
Awareness	0.527	0.086	0.583	6.133	0.000

Source: Primary Data

Interpretation: In this test, since $p < 0.05$, AI awareness significantly influences students' perceptions of AI in supply chain and operations management.

Regression Analysis for Hypothesis 2

H₀2: Perception toward Artificial Intelligence does not significantly influence the readiness of students to adopt AI-enabled technologies.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error
1	0.721	0.520	0.514	0.398

Source: Primary Data

Interpretation: 52% of the variation in readiness is explained by perception of AI.

ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.944	1	12.944	79.17	0.000
Residual	11.924	73	0.163		
Total	24.868	74			

Source: Primary Data

Interpretation: The F value is 79.17, and the p value is 0.000 (<0.05). So, the null hypothesis is rejected, and the alternative hypothesis is accepted. So, Perception toward Artificial Intelligence significantly influences the readiness of students to adopt AI-enabled technologies

Coefficients Table

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
Constant	0.842	0.356	—	2.36	0.021
Perception	0.735	0.083	0.721	8.898	0.000

Source: Primary Data

Interpretation: The p-value is less than 0.05, so the null hypothesis is rejected, and the alternative hypothesis is accepted. So, Students with positive perceptions of AI show significantly higher readiness to adopt AI-enabled supply chain technologies.

Regression Analysis for Hypothesis 3

H₃: Awareness of Artificial Intelligence does not have a significant influence on students' readiness for AI-enabled supply chain roles.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error
1	0.661	0.437	0.429	0.432

Source: Primary Data

Interpretation: Awareness explains 43.7% of the variation in readiness.

ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.873	1	10.873	56.73	0.000
Residual	13.995	73	0.192		
Total	24.868	74			

Source: Primary Data

Interpretation: In the ANOVA test, the p-value is also less than 0.05. So, the null hypothesis is rejected, and the alternative hypothesis is accepted.

Coefficients Table

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
Constant	0.965	0.377	—	2.56	0.012
Awareness	0.609	0.081	0.661	7.534	0.000

Source: Primary Data

Interpretation: As the p-value is less than 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted. So, it can be said that the awareness of AI significantly increases students' readiness for AI-enabled supply chain roles.

Sampling Adequacy Test

Before performing factor analysis, sampling adequacy was evaluated using Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity.

KMO and Bartlett's Test

Test	Value
KMO Measure of Sampling Adequacy	0.846
Bartlett's Test Approx. Chi-Square	734.281
Degrees of Freedom	210
Significance	0.000

Source: Primary Data

Interpretation: KMO value > 0.80 indicates meritorious sampling adequacy. Bartlett's Test is significant ($p < 0.05$), confirming that factor analysis is appropriate.

Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis using Principal Component Analysis with Varimax Rotation was conducted to identify the factor structure.

Total Variance Explained

Component	Eigenvalue	% Variance	Cumulative %
Factor 1 – Awareness	6.214	29.59	29.59
Factor 2 – Perception	4.187	19.94	49.53
Factor 3 – Readiness	3.226	15.36	64.89

Source: Primary Data

Interpretation: Three factors explain 64.89% of the total variance, which is acceptable for social science research.

Rotated Component Matrix

Item	Awareness	Perception	Readiness
A1	0.782		
A2	0.756		
A3	0.741		
A4	0.729		
A5	0.712		
A6	0.694		
A7	0.668		
P1		0.771	
P2		0.764	
P3		0.748	
P4		0.732	
P5		0.716	
P6		0.701	
P7		0.687	
R1			0.769
R2			0.751
R3			0.738
R4			0.722
R5			0.709
R6			0.691
R7			0.675

Source: Primary Data

Interpretation: All items show factor loadings above 0.60. Each item loads strongly on its respective construct.

Structural Equation Model (SEM)**Model Fit Indices**

Fit Index	Recommended Value	Model Result
Chi-square/df	< 3.0	2.14
GFI	> 0.90	0.921
CFI	> 0.90	0.943
TLI	> 0.90	0.934
RMSEA	< 0.08	0.062

Source: Primary Data

Interpretation: The model demonstrates good overall fit.

Structural Path Results

Hypothesis	Path	Standardized Beta	t-value	p-value	Decision
H1	Awareness → Perception	0.58	6.13	0.000	Supported
H2	Perception → Readiness	0.72	8.89	0.000	Supported
H3	Awareness → Readiness	0.61	7.53	0.000	Supported

Source: Primary Data

Conclusions

The swift progression of Artificial Intelligence has profoundly altered contemporary supply chain and operations management. AI-driven technologies, including machine learning, predictive analytics and intelligent automation, are empowering organisations to enhance operational efficiency, refine demand-forecasting precision, optimise logistics networks, and enable data-informed decision-making. In this context, equipping future professionals for employment in AI-enhanced supply chain environments has become paramount.

This study investigated the awareness, perceptions, and preparedness of undergraduate logistics students regarding the integration of Artificial Intelligence into supply chain and operations management. The results show that students typically hold a favourable view of AI and recognise its capacity to increase supply chain efficiency and create new employment opportunities. The statistical study suggests that AI awareness strongly influences students' perceptions of AI applications in supply chain management. Moreover, students with positive impressions of AI are more prepared to embrace AI-enabled technology in their prospective careers.

The findings of the regression and structural analysis indicate that awareness of AI significantly impacts students' preparedness for AI-driven supply chain positions. This indicates that increasing understanding and exposure to AI technology are vital for upgrading students' readiness to the evolving technological landscape. The study establishes that awareness, perception, and readiness are interrelated factors affecting the implementation of AI technologies among prospective logistics workers.

The results show the importance of integrating Artificial Intelligence principles and digital technologies into logistics and supply chain education. Academic establishments must ensure that students receive sufficient exposure to technology, practical training, and industry-focused learning opportunities to develop the capabilities needed for contemporary AI-driven supply chains.

Suggestions

Considering the study's findings, the following suggestions are put out to enhance students' preparedness for AI-integrated supply chain contexts:

- **Incorporation of Artificial Intelligence in Logistics Curriculum**

Educational establishments should integrate courses in Artificial Intelligence, data analytics and machine learning, into logistics and supply chain management curricula. This will assist students in acquiring technical expertise and practical comprehension of AI applications in supply chain operations.

- **Collaboration between Industry and Academia**

Universities ought to partner with logistics companies, technology corporations, and supply chain organisations to offer students internships, training, and practical exposure to industry-utilized AI systems.

- **Competency Enhancement Initiatives**

Specialized training programs, certification courses, and seminars focused on new technologies such as AI, big data analytics, and automation should be implemented to enhance students' digital competencies.

- **Experiential Learning and Simulation**

Institutions ought to advocate integrating simulation tools, AI-driven supply chain software, and real-world case studies into educational settings to enhance students' understanding of AI's practical applications.

- **Cognisance and Technological Orientation**

Regularly organizing seminars, guest lectures, and technology awareness programs is essential for educating students on the latest advancements in AI-driven supply chains and logistics technologies.

- **Faculty Training and Development**

Faculty members should be trained in AI-related technologies to teach students proficiently in emerging technologies and mentor them in AI-focused research and projects.

Further scope of the Study

The study offers significant insights into students' awareness, perceptions, and preparedness regarding Artificial Intelligence in supply chain management; nonetheless, numerous scope for further research remain.

- **Expanded and Varied Sample Size**

Subsequent research may use a larger sample size and gather data from many colleges or regions to improve the generalizability of the results.

- **Comparative Analyses**

Comparative research may be undertaken among students from several academic areas, including logistics, engineering, business management, and information technology, to examine disparities in AI preparation.

- **Sector Perspective**

Future research may investigate the perspectives of industry professionals, supply chain managers, and logistics practitioners concerning AI adoption and workforce preparedness.

- **Longitudinal Research**

Longitudinal studies may be conducted to examine the evolution of students' perspectives and preparedness regarding AI as they gain greater technological exposure and transition into employment.

- **Integration with Additional Emerging Technologies**

Future research may investigate the synergistic effects of Artificial Intelligence alongside other Industry 4.0 technologies, such as blockchain, the Internet of Things (IoT), and big data analytics, on supply chain management.

- **Sophisticated Analytical Models**

Subsequent research may employ sophisticated analytical methodologies, including structural equation modelling (SEM), machine learning algorithms, or multi-group analysis, to explore the intricate links among technological awareness, perception, and adoption behaviour.

References

1. Awasthi, S. (2024). Artificial intelligence in supply chain management. *Journal of Student Research*, 13(1). <https://doi.org/10.47611/jsrhs.v13i1.5996>.
2. Azman, S. N., Ramli, F., Azami, N., & Rahim, R. A. (2024). Adoption of artificial intelligence for improved supply chain and logistic performance: A conceptual insight. *International Journal of Academic Research in Business and Social Sciences*, 14(8), 79–92.
3. Dalain, A. F., Alnadi, M., Allahham, M. I., & Yamin, M. A. (2025). The impact of technological innovations on digital supply chain management: The mediating role of artificial intelligence. *Logistics*, 9(4), 138. <https://doi.org/10.3390/logistics9040138>.
4. Peprah, J. A., Amoah, J., Kwarteng, K., Jibril, A. B., & Sharif, T. (2025). Artificial intelligence and additive manufacturing for resilient supply chain in Africa: A systematic literature review. *Future Business Journal*, 11, 54. <https://doi.org/10.1186/s43093-025-00477-y>.
5. Qu, C., & Kim, E. (2024). Reviewing the roles of AI-integrated technologies in sustainable supply chain management: Research propositions and a framework for future directions. *Sustainability*, 16(14), 6186. <https://doi.org/10.3390/su16146186>.
6. Samuels, A. (2024). 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, 1477044. <https://doi.org/10.3389/frai.2024.1477044>.

7. Sharma, R., Kamble, S., Gunasekaran, A., Kumar, V., & Kumar, A. (2022). The role of artificial intelligence in supply chain management: Mapping the territory. *International Journal of Production Research*, 60(24), 7527–7550.
8. Toorajipour, R., Oghazi, P., Patel, P. C., & Mostaghel, R. (2021). Artificial intelligence in supply chain management: A systematic literature review. *Journal of Business Research*, 122, 502–517.
9. Bag, S., Pretorius, J., Gupta, S., & Dwivedi, Y. (2021). Role of artificial intelligence in sustainable supply chain management. *International Journal of Production Research*, 59(18), 1–18.
10. Belhadi, A., Kamble, S., Gunasekaran, A., Mani, V., & Khan, S. A. (2021). Artificial intelligence-driven innovation for enhancing supply chain resilience. *Annals of Operations Research*, 1–26.
11. Choi, T. M., Wallace, S. W., & Wang, Y. (2020). Big data analytics in operations management. *Production and Operations Management*, 29(9), 1868–1883.
12. Dubey, R., Gunasekaran, A., Bryde, D., Dwivedi, Y., & Papadopoulos, T. (2020). Artificial intelligence in the supply chain: Adoption and impact. *International Journal of Production Economics*, 227, 107–552.
13. Ivanov, D., & Dolgui, A. (2021). A digital supply chain twin for managing the disruption risks and resilience in the era of Industry 4.0. *Production Planning & Control*, 32(9), 775–788.
14. Kshetri, N. (2021). Artificial intelligence in supply chain management. *IT Professional*, 23(2), 18–24.
15. Kumar, A., Mangla, S., & Luthra, S. (2022). Artificial intelligence adoption in supply chain management. *Technological Forecasting and Social Change*, 176, 121–453.
16. Min, H. (2022). Artificial intelligence in supply chain management: Theory and applications. *International Journal of Logistics Research and Applications*, 25(4–5), 421–438.
17. Niu, B., Mu, Z., & Chen, L. (2021). Artificial intelligence and supply chain management: A review. *Transportation Research Part E*, 149, 102–310.
18. Rahman, S., Abdul Rahim, N. A., Ahmi, A., & Waheed, M. (2024). Identifying the factors influencing AI adoption in supply chain management to resolve supply chain disruptions. *International Journal of Academic Research in Business and Social Sciences*, 14(11), 210–231.
19. Syntetos, A., Boylan, J., & Disney, S. (2025). On the use of machine learning in supply chain management: A systematic review. *IMA Journal of Management Mathematics*, 36(1), 21–49.
20. Wamba, S. F., Queiroz, M. M., & Trinchera, L. (2020). Dynamics between blockchain adoption and supply chain performance. *International Journal of Information Management*, 52, 101–937.
21. Ivanov, D. (2021). Supply chain viability and resilience under AI-enabled digitalization. *International Journal of Production Research*, 59(12), 353–372.
22. Bag, S., Gupta, S., Kumar, A., & Sivarajah, U. (2021). Role of analytics and artificial intelligence in supply chain sustainability. *Journal of Cleaner Production*, 298, 126–768.
23. Culot, G., Nassimbeni, G., Orzes, G., & Sartor, M. (2024). Behind the definition of Industry 4.0: Analysis and open questions. *International Journal of Production Economics*, 231, 107–617.
24. Jahin, M. A., Naife, S. A., Saha, A. K., & Mridha, M. F. (2023). AI in supply chain risk assessment: A systematic literature review and bibliometric analysis.
25. Genetti, S., Longobardi, A., & Iacca, G. (2025). Evolutionary reinforcement learning for interpretable decision-making in supply chain management.

