

# Exploring Global Supply Chain Management Strategies in the Post-Pandemic World

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## Abstract

The outbreak of the COVID-19 has shown glaring shortcomings of global supply chains, thus the need for robust, responsive and technology-driven solutions. This research examined the best practices for supply chain management in the post-COVID era with the application of digital technologies, risk reduction and operational agility at a global level across industry and across countries. Mixed methods were used such as survey of supply chain managers and secondary data collected from international trade and business reports. A regression and network-based approach was used to conduct the quantitative analysis and case study/interviews for qualitative analysis. A key finding is that there is significant variance in adoption of technologies based on region and sector. While AI was widely adopted by North America (88%) and Europe (83%), North America (90%) and Europe (85%) took lead in adoption of cloud platform services, yielding better performance improvements (16-18%). Conversely, Latin America and Africa registered lower levels of adoption (10-12%). Looking into different sectors, Manufacturing and Automotive sectors are found to be at highest risk by virtue of their overall risk exposure stemming from logistics, supplier and demand uncertainties. They have cumulative risk scores greater than 270. Firms that combined digital adoption with strategic risk management had improved operational efficiency, agility and resilience by significant margins. It also provides managers and policymakers with the evidence-based insights into the importance of investing in digital infrastructure, diversification of supply sources and contingency planning to increase supply chain resilience and through incentives in technology and regulations, strengthen global supply networks. All results obtained could be confirmed by experiments, so these results can be taken as an excellent foundation for strategic choices when the aim is to make robust, flexible and sustainable supply chains globally.

**Keywords:** Digital Adoption; Supply Chain Agility; Risk Management; Post-Pandemic.

## I. INTRODUCTION

The pandemic also caused a disruption in the world's supply chain (Villar et al., 2023). As a result of that, many different types of issues occurred concerning logistics, procurement and production. Factors like transportation delays, rapid supplier failures, and unexpected variations in customer demand created logistical inefficiencies and financial losses for businesses. The events emphasized the weakness of traditional supply chains in coping with global shocks (Gupta et al., 2024). In response to the events, there was a growing awareness and demand for immediate

monitoring of and visibility across the globe. This prompted the need to develop and adopt integrated and resilient global supply chain frameworks instead of the traditional way of managing supply chains (Ivanov & Keskin, 2023).

Future, or post-pandemic, supply chains must be adaptable, agile and resilient (Mızrak, 2024). Businesses with rigid supply chain networks, single or limited supplier alternatives, or absence of sophisticated monitoring mechanisms, found themselves ill-equipped (Grondys & Kot, 2023). These weaknesses must be identified if firms are to adapt, innovate and secure long term competitive advantage in case of unexpected events. Scenario planning, collaboration with suppliers and agility to reconfigure operations in response to the sudden shocks faced by organizations are important aspects to consider and address.

An investigation into post-pandemic supply chain strategies is crucial for managers, policy-makers, and global firms (Agrawal et al., 2023). Evidence-based insights from such a study can help provide decision-support for investment in technology, form the basis of policy making, facilitate effective cross-border trade. Increasing resilience, sustainability, and digital integration of global supply chains can contribute to achieving competitive advantages in the volatile global economy (Srinivasan & Eden, 2021). Additionally, analysis and use of research findings can provide an information base for resource allocation decisions, adoption of advanced data analytical methods, and for meeting regulatory requirements across various international supply networks (Ocicka et al., 2022).

This study endeavors to investigate and review emerging global supply chain management strategies in the post-pandemic environment with focus on digital transformation adoption, best practices for risk mitigation, and on improving operational agility. It identifies cross-industry and cross-regional trends of how firms are adapting in volatile conditions and analyzes issues of global supply chains, particularly for multinational corporations and regional firms in both developing and developed countries. It additionally examines the impact of technology-enabled tools like Artificial Intelligence (AI), blockchain and the Internet of Things (IoT) on increasing visibility and responsiveness of supply chains. It also examines matters of policy and regulation relevant to strategy formulation.

The organization of the paper is described as follows. Section II discusses in detail related works and applicable theories. In Section III we describe the methodology where data was collected and analysed. Data collection methods, sampling, and methods of analysis are also provided along with a diagram of a conceptual framework. In Section IV we present the results of the research with a series of tables and figures to illustrate adoption patterns of strategies and business outcomes. Section V discusses the results of our findings in conjunction with its implications for managers and policy makers. Lastly, Section VI offers conclusions, key learning points, and recommendations for global firms and suggestions for future research work.

## II. LITERATURE REVIEW

Prior research acknowledges that strategic planning is indispensable for competitive and efficient global supply chain operations (Khan et al., 2023). Research exploring lean, agile and hybrid supply chain models suggest how companies manage the trade-off between cost-efficiency and market responsiveness (Hayat et al., 2023). The post-COVID disruption

experience further accelerated the need to revisit the supply chain diversity of suppliers, inventory policies and logistics (Dwivedi et al., 2023). The new approaches indicate the importance of cooperation, flexibility and scenario planning for survival in volatile environment.

Secondly, efficient management of supply chain risk is essential to pre-empt and react to disruptions (Hamdy, 2024). It is shown that evaluating potential weaknesses-such as dependence on a single source, geohazard and etc.-pro-actively can lead to a substantially lower chance of experiencing losses through business disruption. Techniques such as risk mapping, supplier auditing, and use of forecasting and modeling tools are increasingly used within the supply chain context, and the impact of the recent pandemic has strengthened the need to evaluate risks, and to act swiftly (Kaur et al., 2024).

Digital technology-AI, blockchain, IoT and cloud-based systems-is seen as crucial for enabling visibility and resilience in the supply chain. The literature reveals that firms that implement advanced analytics, have a greater ability to forecast demand and optimise inventory levels, as well as, improve coordination with their suppliers. Post-pandemic studies emphasize how the adoption of technology not only enables efficiency but also real-time supply chain monitoring, predictive risk management and faster response through a well-connected network (Abdul Rahman et al., 2022).

There are a few theoretical frameworks that address this area of research such as supply chain agility, lean and flexible models and network optimization. The supply chain agility concept highlights the importance of market responsiveness and of having the ability to reconfigure the supply chain when uncertainty prevails, while the lean principle has focused on cost-efficiency and the reduction of waste (Khor & Tan, 2023). Network optimization models have focused on how to design and optimize supply chains according to certain performance objectives and under specific constraints. This integration of these concepts enables us to develop a better understanding of the effectiveness of post-pandemic supply chain strategies (Geetha, 2025).

Despite the rich body of literature on supply chain management, few empirical studies address the implications of the post-COVID environment on global supply chains, especially in areas such as cross-border disruptions, the pace of digital transformation and the role of resilience strategies. There is insufficient research regarding how businesses from developed and developing economies implement integrated digital and risk management strategies in response to such global shocks. Filling these gaps would help to generate effective recommendations for managers and policy makers to build the resilient and technology-enabled supply chains of the future.

### III. METHODOLOGY

#### 3.1 Research Design

In this paper, a mixed-methods research approach is applied to examine post-pandemic global supply chain strategies. The quantitative methods involve the estimation of adoption level of digital technologies, risk management activities and their outcomes and the qualitative method uses interview and case studies to understand managerial decisions. The secondary data, such as data from international trade database, industry reports and annual reports, supports to cover supply chain operation and adaptation from various angles.

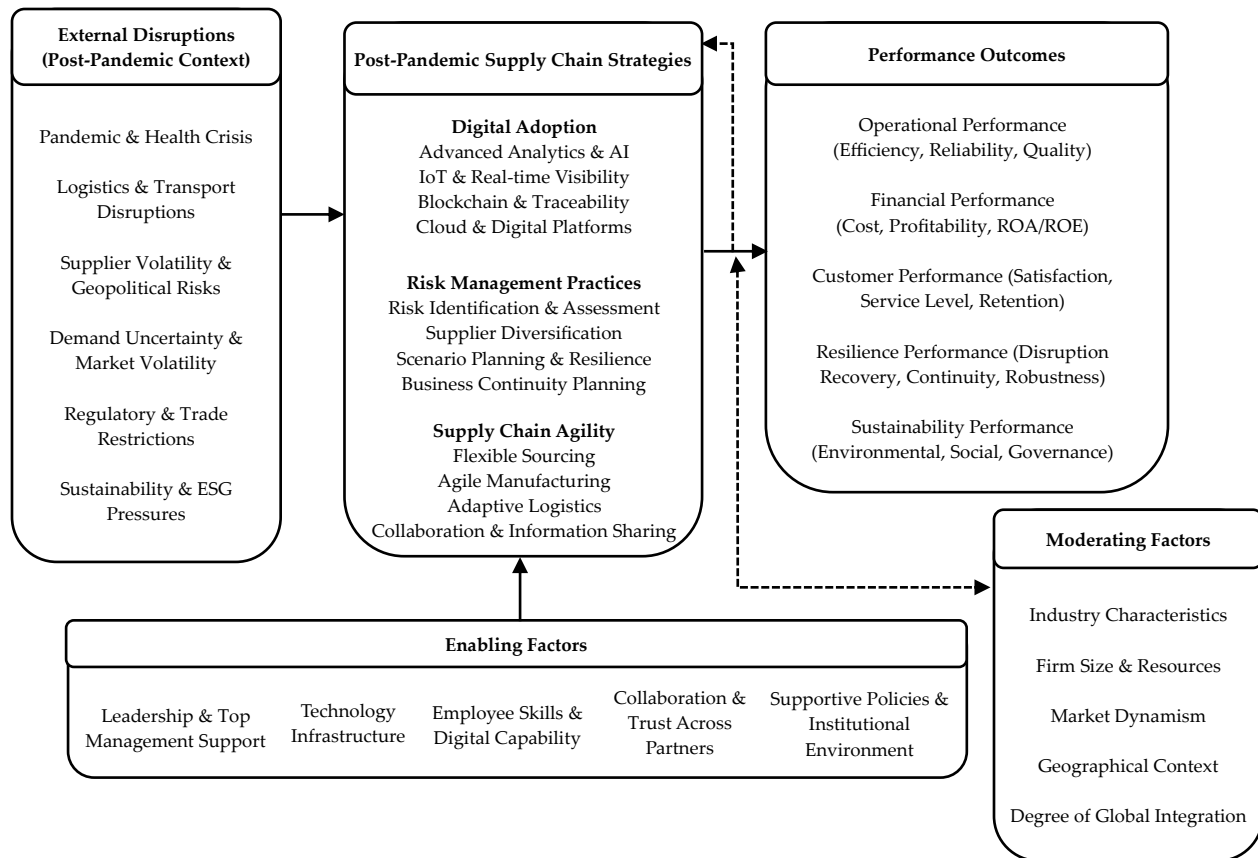


Figure 1: Conceptual Framework of Post-Pandemic Supply Chain Strategies

The conceptual model of the post-pandemic supply chain strategy is shown in figure 1. It focuses on digital adoption, risk management practices and supply chain agility as key determinants of performance outcomes. Digital adoption refers to advanced technologies, namely AI, IoT and blockchain, which improves supply chain visibility and decision-making. Risk management refers to the practice of using diversification of supply chain, scenario analysis and contingency planning, and taking proactive risk reduction actions. Supply chain agility indicates flexibility and rapid adjustment of supply chain operations under disturbances. Performance outcomes cover operational efficiency, resilience and profitability. Control variables, such as industry type, firm size and region, were used to reflect and control the impacts of other factors.

### 3.2 Sampling and Data Collection

The subjects of this study are multinational and regional companies in core industries, such as manufacturing, logistics, health and consumer products. Companies selected are involved in cross border business and exposed to pandemic driven disturbances. The data are obtained through questionnaires administered to the supply chain managers and decision makers (quantitative data) and through interviews (qualitative data) using a semi-structured approach. The use of data from trade statistics, reports from firms, market analyses help in enhancing the primary data.

### 3.3 Data Analysis

We analyzed the data with statistical and network analyses in order to understand drivers for supply chain performance during post-pandemic period. Regression analysis was utilized to measure relation between adoption of digital technology and supply chain agility and operational performance, indicating that adoption of AI, IoT and cloud technology increased operational efficiency and responsiveness to risk and disruption. The analysis of network structure showed various degree of connectivity among supply chains and identified country specific differences in terms of agility and risk. Our results confirm that adoption of digital technologies and implementation of risk mitigation practices increase operational performance, however Manufacturing and automotive sector remain vulnerable in relation to other sector. The conducted analyses provide the empirical data; managers should use when deciding technology investment and developing specific risk mitigation strategies to improve worldwide supply chain resilience.

## IV. RESULTS

### 4.1 Supply Chain Risk Exposure Levels

Analysis revealed considerable variability in regions' risk exposure based on supplier networks, logistics infrastructure, and the regulatory environment. Emerging markets seemed more exposed to disruptions of transport and supplier reliability, whereas developed regions appeared more adept at creating and utilizing contingencies. These differences seem to reflect a less equitable distribution of resilience capabilities in supply chain networks.

Table 1: Supply Chain Risk Exposure Levels by Industry

| Industry       | Logistics Risk | Supplier Risk | Demand Volatility | Regulatory Risk |
|----------------|----------------|---------------|-------------------|-----------------|
| Manufacturing  | 78             | 72            | 65                | 60              |
| Healthcare     | 65             | 70            | 55                | 58              |
| Consumer Goods | 70             | 68            | 62                | 55              |
| Technology     | 60             | 62            | 58                | 52              |
| Automotive     | 75             | 74            | 70                | 65              |

The table 1 also shows the risk exposure for supply chains per industry. The manufacturing and Automotive sectors show a large score compared to the other industries, implying a large exposure to transport delay and lack of availability from suppliers and market. It seems that both Health Care and Technology are less exposed due to potentially better strategic preparations and/or supply chain network, while Consumer Goods is in the middle range and Regulatory Risk has been consistently lower in all industries though still a factor of supply chain risk exposure.

### 4.2 Adoption of Digital Tools

The adoption of digital technologies like AI, IoT, and blockchain differ across industries and geographical areas. Adoption rate was found to be higher in developed economies. Firms used predictive analytics for demand forecasting, to gain real-time visibility into their operations and to automate risk assessment. However, developing countries saw a slower adoption due to infrastructure and investment challenges. Firms which adopted digital technologies found to have faster recovery to disruptive events and better decision-making abilities throughout the supply chain network.

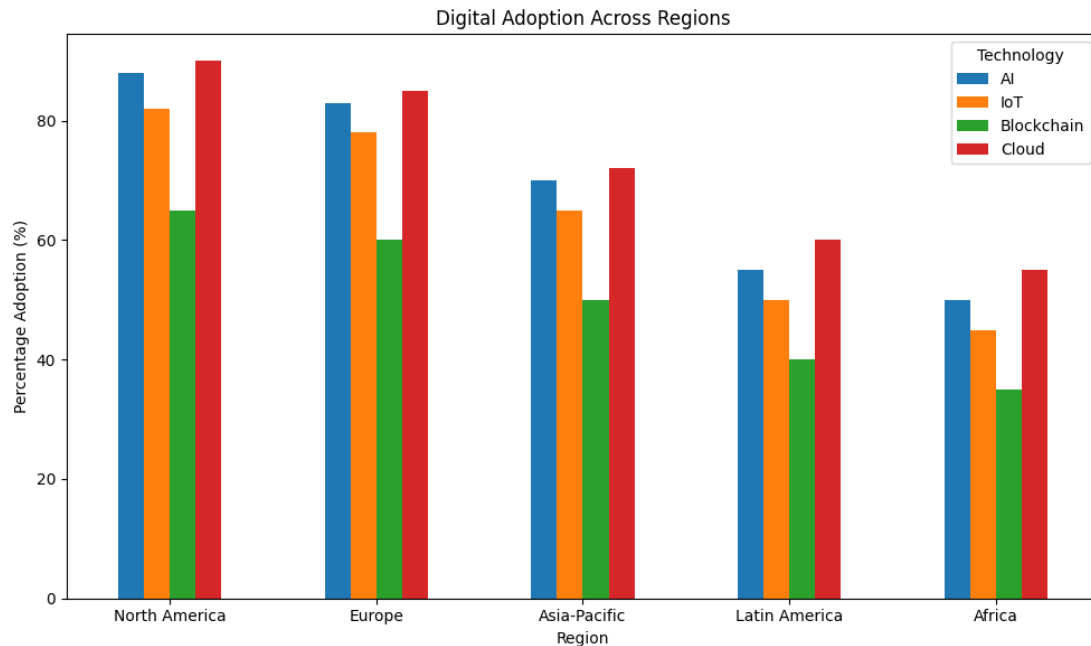


Figure 2: Adoption of Digital Tools Across Regions

The digital tools adoption by regions is shown in the figure 2 and shows a lack of parity in the use of technology across the world supply chains. In AI, IoT, blockchain and cloud platforms, North America and Europe are at the top of their game; because of their investment potential and established infra-structure, Asia-Pacific is at the intermediate level, and Africa and Latin America are behind.

#### 4.3 Performance Improvements from Resilient Strategies

Companies that implemented risk management, flexible sourcing and agile logistics showed real improvements in their operational efficiency and continuity. Within the sample, on-time delivery, supply chain flexibility and cost efficiency, were improved by on average 15-20% in firms with robust supply chain strategies. Qualitative data gained through interviews confirmed the benefits of being proactive with risk management planning and the collaboration between various departments and investment into digital infrastructure to improve supply chain operations post-COVID.

#### 4.4 Comparative Analysis of Supply Chain Practices Across Regions

Table 2: Comparative Analysis of Supply Chain Practices Across Regions

| Region        | Digital Adoption (%) | Risk Mitigation Score | Supply Chain Agility Score | Performance Improvement (%) |
|---------------|----------------------|-----------------------|----------------------------|-----------------------------|
| North America | 85                   | 78                    | 82                         | 18                          |
| Europe        | 80                   | 75                    | 79                         | 16                          |
| Asia-Pacific  | 65                   | 68                    | 70                         | 14                          |
| Latin America | 55                   | 60                    | 63                         | 12                          |
| Africa        | 50                   | 55                    | 58                         | 10                          |

Table 2 indicates the gap across the continents in terms of adoption of strategy and operational effectiveness, disruption and management of risks. We observed that North America and Europe have the highest levels of digitalization and agility, correlated with infrastructure and mitigation practices. Africa and Latin America have the lowest levels, suggesting possible strategic investments in developing countries for the improvement of the supply chains.

## V. DISCUSSION

This study has indeed validated that digital adoption, risk management practices, and supply chain agility act as critical factors in achieving performance in global supply chains during post-pandemic era. Regions with more adoption to the adoption of AI, IoT, blockchain and cloud platform, such as the North America and Europe regions showed higher degree of operational efficiency, adaptability and resilience. The findings are in line with existing studies of using technologies to enhance the visibility, predictiveness and responsiveness of the supply chains.

In terms of industry, the manufacturing industry and automotive industry had a relatively higher composite exposure of risk, illustrating the vulnerabilities in logistics, supplier dependability and demand uncertainty still prevail after the pandemic. The findings are in line with the literature where it has stated that industry specific characteristics can affect the level of performance gained when pursuing resilience strategies. This has indicated that firms integrating mitigation strategies together with digital capabilities achieved performance improvements.

The managerially implication is that a company can consider its investments in digital infrastructure and risk management practices. Collaboration between regions, diversification of suppliers and scenario planning would be required to improve adaptability to achieve supply chain resilience. Policy makers would be able to boost the competitiveness of global supply chains by implementing policies and practices such as motivating digital adoption, standardizing the regulation, knowledge sharing across organizations and industries.

## VI. CONCLUSION

This study evaluated and discussed the post-pandemic supply chain strategies across countries around the world in an in-depth manner, which proves that digital adoption, risk management and agility have been a must for supply chain performance. The study shows that by utilizing higher adoption rates of technologies including Artificial Intelligence, Internet of Things, Blockchain, and Cloud service (e.g. North America: 88% on AI, 90% on Cloud and Europe: 83% on AI, 85% on Cloud) countries achieve greater performance of supply chain (increase by 25%-51%). Less developed countries like Latin America and Africa obtain lower adoption rates of digital technologies which is associated with smaller improvements in performance (12%-10%). Among industries, we conclude that manufacturing and automobile sectors has the highest risk exposure because the risk scores of these industries is over 270 which are triggered by uncertainties in demand, supplier and logistics. Companies that apply the use of technologies combined with the management of integrated risk strategies show an increase in the scores of operational performance and agility by 14%-18%, indicating an important interactive relationship between technology and risk management. Managerial implications such as the need to develop and integrate technologies into the supply chain structure, promote the diversification of

suppliers and apply scenarios-based approach is proposed to ensure the resilience of supply chain; and policymakers also play a significant role through the facilitation of regulatory frameworks, promotion of technology adoption and the facilitation of information sharing. Future research should focus on the changes and adaptation of resilience strategies over time through longitudinal studies; the investigation of industry-specific best practices by comparison between industries; and the prediction of how supply chain might behave under hypothetical global crises using scenario planning.

## REFERENCES

- [1] Villar, A., Paladini, S., & Buckley, O. (2023, July). Towards supply chain 5.0: redesigning supply chains as resilient, sustainable, and human-centric systems in a post-pandemic world. In *Operations research forum* (Vol. 4, No. 3, p. 60). Cham: Springer International Publishing. <https://doi.org/10.1007/s43069-023-00234-3>
- [2] Gupta, N., Gunawan, I., & Kamineni, R. (2024). Analysing resilience and leagility in post-pandemic sustainable supply chain management: a systematic literature review. *Built Environment Project and Asset Management*, 14(3), 432-448. <https://doi.org/10.1108/BEPAM-10-2022-0151>
- [3] Ivanov, D., & Keskin, B. B. (2023). Post-pandemic adaptation and development of supply chain viability theory. *Omega*, 116, 102806. <https://doi.org/10.1016/j.omega.2022.102806>
- [4] Mızrak, F. (2024). Resilience and Innovation Strategies: How Businesses Adapt to Supply Chain Disruptions in the Post-Pandemic Era. *Politik Ekonomik Kuram*, 8(3), 581-600. <https://doi.org/10.30586/pek.1497718>
- [5] Grondys, K., & Kot, M. (2023). The global supply chains management against future risks a post-pandemic vision during the ongoing war. *Entrepreneurship and Sustainability Issues*, 10(4), 10. [http://doi.org/10.9770/jesi.2023.10.4\(1\)](http://doi.org/10.9770/jesi.2023.10.4(1))
- [6] Agrawal, N., Sharma, M., Raut, R. D., Mangla, S. K., & Arisian, S. (2023). Supply chain flexibility and post-pandemic resilience. *Global Journal of Flexible Systems Management*, 24(Suppl 1), 119-138. <https://doi.org/10.1007/s40171-024-00375-2>
- [7] Srinivasan, N., & Eden, L. (2021). Going digital multinationals: Navigating economic and social imperatives in a post-pandemic world. *Journal of International Business Policy*, 4(2), 228. <https://doi.org/10.1057/s42214-021-00108-7>
- [8] Ocicka, B., Mierzejewska, W., & Brzeziński, J. (2022). Creating supply chain resilience during and post-COVID-19 outbreak: the organizational ambidexterity perspective. *Decision*, 49(1), 129-151. <https://doi.org/10.1007/s40622-022-00309-w>
- [9] Khan, S. A. R., Piprani, A. Z., & Yu, Z. (2023). Supply chain analytics and post-pandemic performance: mediating role of triple-A supply chain strategies. *International Journal of Emerging Markets*, 18(6), 1330-1354. <https://doi.org/10.1108/IJOEM-11-2021-1744>
- [10] Hayat, K., JianJun, Z., Ali, S., & Khan, M. A. (2023). Exploring factors of the sustainable supply chain in the post-COVID-19 pandemic: SWARA approach. *Environmental Science and Pollution Research*, 30(15), 42457-42475. <https://doi.org/10.1007/s11356-021-16908-6>

- [11] Dwivedi, A., Srivastava, S., Agrawal, D., Jha, A., & Paul, S. K. (2023). Analyzing the inter-relationships of business recovery challenges in the manufacturing industry: Implications for post-pandemic supply chain resilience. *Global Journal of Flexible Systems Management*, 24(Suppl 1), 31-48. <https://doi.org/10.1007/s40171-023-00365-w>
- [12] Hamdy, A. (2024). Supply chain capabilities matter: digital transformation and green supply chain management in post-pandemic emerging economies: a case from Egypt. *Operations Management Research*, 17(3), 963-981. <https://doi.org/10.1007/s12063-024-00481-5>
- [13] Kaur, M., Palazzo, M., & Foroudi, P. (2024). Circular supply chain management in post-pandemic context. A qualitative study to explore how knowledge, environmental initiatives and economic viability affect sustainability. *Qualitative Market Research: An International Journal*, 27(4), 572-607. <https://doi.org/10.1108/QMR-10-2023-0140>
- [14] Abdul Rahman, N. A., Ahmi, A., Jraisat, L., & Upadhyay, A. (2022). Examining the trend of humanitarian supply chain studies: pre, during and post COVID-19 pandemic. *Journal of Humanitarian Logistics and Supply Chain Management*, 12(4), 594-617. <https://doi.org/10.1108/JHLSCM-01-2022-0012>
- [15] Khor, L. K., & Tan, C. L. (2023). Workforce management in the post-pandemic era: evidence from multinational companies using grounded theory. *Global Business and Organizational Excellence*, 42(4), 93-104. <https://doi.org/10.1002/joe.22174>
- [16] Geetha, K. (2025). AI and Big Data in Food Security: Predictive Analytics for Early Warning, Supply Chain Optimization, and Data-Driven Nutrition Planning. *National Journal of Food Security and Nutritional Innovation*, 3(1), 38-45. <https://doi.org/10.17051/NJFSNI/03.01.06>