

GREENING THE SUPPLY CHAIN. BEST PRACTICES FOR AZERBAIJAN

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ABSTRACT

Greening supply chains involves adopting environmentally friendly practices to reduce ecological footprints while maintaining market competitiveness. This approach involves selecting the most appropriate supply chain management strategies and integrating technologies such as blockchain for greater transparency and efficiency. The prioritization of agricultural development in Azerbaijan makes green supply chain management (GSCM) crucial for achieving economic growth and protecting the environment. This study conducts a systematic review to analyze the current environmental challenges and the impact of traditional supply chain practices in Azerbaijan. It also highlights the benefits of GSCM, including environmental, economic and social advantages, while addressing complexities and cost implications. The findings highlight the importance of overcoming challenges such as high operating costs and insufficient demand for green products to achieve sustainable development in Azerbaijan.

Keywords: Green supply chain, environmental sustainability, agricultural development, green logistics, Azerbaijan.

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INTRODUCTION

There are some definition of Green supply chain. One of them Green supply chain involves incorporating eco-friendly practices into a company's supply chain operations to lessen its environmental impact while staying competitive in the market. This encompasses strategies like choosing optimal supply chain management approaches to enhance overall performance and tackle sustainability concerns (Li, Niu and Liu, 2023). Moreover, the integration of blockchain technology and smart contracts has the potential to increase the efficiency and transparency of green supply chain management through decentralized, tamper-proof and collaborative evaluation systems (Himabindu, Ramalinga and Lakshmi, 2022).

Greening the supply chain in Azerbaijan is absolutely essential given the nation's strong focus on advancing its agricultural sector, the worldwide prioritization of sustainability, and the multitude of advantages for both economic progress and environmental preservation. The adoption of green supply chain management (GSCM) strategies is a strategic move that can not only boost agricultural output by investing in efficient logistics infrastructure (Mehdiyeva et al., 2020) but also mitigate adverse environmental effects in manufacturing processes (Liu and You, 2021). Furthermore, embracing GSCM practices can offer businesses a competitive edge, cost savings, and contribute to enhanced sustainability, efficiency, and overall long-term business performance (Achillas et al., 2018; Batrazovna et al., 2020).

METHODOLOGY

This study uses a systematic review methodology. While this methodology originated to review and synthesize research in healthcare, it is even more prevalent in the field of business and management. The following sections detail the data collection process, study selection criteria and data extraction methods.

Data collection

The studies to be included in the corpus were identified by searching the following databases: Google Scholar. All databases were explored by inputting three keywords (or a mix of keywords): green supply chain, environmental logistics, and eco-supply chain

Study selection

Several steps were taken to select relevant studies. First, we eliminated duplicate articles within and across the database. After that, we examined the titles and summaries of the articles we found to conduct a preliminary assessment of how they relate to the research questions and removed the ones that did not relate. This process resulted in 51 potentially relevant articles included in the full text search. For 7 of these, the full text was not available and for the other 44, the full text was extensively analyzed and 7 irrelevant articles were discarded as a result. At the conclusion of the procedure, a total of 44 articles were incorporated into the systematic review.

Data extraction

We extracted data from the full text for each study included in the systematic review. The data contained information such as the author(s), year of publication, title, the research

question(s) explored in this study, and the primary findings associated with the research question(s) of this study.

LITERATURE REVIEW

Current Environmental Situation in Azerbaijan

The environmental situation in Azerbaijan showcases a intricate interaction between ecological challenges and human influences. Various studies point out an increasing recognition of ecological footprints among consumers (Gurbuz, Nesirov and Ozkan, 2021), highlighting the necessity for adopting sustainable practices. Air, water basin and soil pollution as well as degradation of pastures and forests are among the problems facing the country (Mammadov, 2017). Disruptions to ecosystems due to techno-anthropogenic impacts have made it essential to conduct thorough monitoring and assessment for sustainable development (Keyserukhsakaya, Nadjafova and Ismaylov, 2023). The contamination of water with industrial wastes and drilling slurry brings about health hazards, leading to the exploration of water treatment techniques and the establishment of legislation for effective resource management. Furthermore, research establishes a connection between social inequality and susceptibility to environmental risks, stressing the need to tackle the unfair distribution of toxic waste sites for interventions promoting environmental and human well-being (Blois, Tasch and Abbasov, 2022). These discoveries highlight the importance of adopting comprehensive approaches to environmental management in Azerbaijan. As highlighted in several research papers, traditional supply chain practices have a significant impact on environmental issues. The adoption of sustainable supply chain management (SSCM) practices is crucial for improving environmental performance in industries like fastener manufacturing (Zaabi, Dhaheri and Diabat, 2013). Green supply chain management (GSCM) emphasizes environmental concerns within traditional supply chain management, aiming to enhance economic and environmental performance (Shafique, Asghar and Rahman, 2017). Integration with suppliers and managing supply disruption risks play key roles in promoting environmental practices and overall performance in green supply chains (Kim and Chai, 2017). Additionally, behavioral concerns can influence sustainability practices in supply chains, underscoring the importance of considering such factors for environmental sustainability (Dong et al., 2019). The complexity of traditional food systems also impacts environmental sustainability, with transportation and processing affecting microbial safety and nutrient availability in food products (Smetana et al., 2020).

Benefits of greening the supply chain

Greening the supply chain brings about multiple advantages, as demonstrated by several research studies. The implementation of green supply chain management practices results in enhanced firm performance (Afzal and Hanif, 2022; Sharma, Dhir et al., 2023), boosts organizational efficiency through waste and energy consumption reduction, and contributes to environmental preservation (Huang, 2022). By integrating sustainability into supply chain operations, companies can realize cost savings, eliminate unnecessary components, and raise prices, ultimately securing a competitive edge (Zaheb et al., 2022). Moreover, the use of green tactics not just boosts the economy but also contributes significantly to improving the environment, encouraging the advancement of green and sustainable practices. The benefits of incorporating green practices in the supply chain can be classified into environmental, financial, and societal dimensions.

Environmental benefits

Implementing Green Supply Chain Management (GSCM) practices in the supply chain brings about various environmental advantages, such as waste reduction, promotion of resource reusability, fostering innovation, and enhancing overall environmental sustainability (Kamarudin, Nizam and Win, 2023; Sharma et al., 2023). By integrating sustainability measures into supply chain activities, businesses can lessen negative environmental effects, enhance asset productivity, cut down on manufacturing expenses, and boost customer perception of added value (Huang, 2022). The adoption of GSCM practices not only enhances business performance but also contributes to economic-environmental performance, fostering economic development while continuously enhancing the environment (Rizki, Murwaningsari and Sudibyo, 2022). Moreover, aligning GSCM with Enterprise Resource Planning (ERP) systems further boosts sustainability performance, with environmental awareness reinforcing GSCM's influence on overall sustainability outcomes (Veljković, Milovanovic and Talić, 2022).

Economic benefits

Green Supply Chain Management (GSCM) practices can bring significant economic advantages to companies by improving profitability and operational efficiency, while simultaneously lowering environmental risks and costs (Allam et al., 2021). The utilization of Back Propagation neural network (BPNN) algorithms within green supply chains, with the support of intelligent logistics robots, optimizes supply chain operations using different metrics, resulting in enhanced economic and environmental outcomes for businesses (Wang, 2022). Furthermore, integrating sustainability, especially environmental issues, into supply chain management has the potential to boost business performance by leveraging the roles of supply chain visibility, resilience, and robustness, as illustrated in a study within the manufacturing sector in the United Kingdom (Sharma et al., 2023). Embracing green supply chain practices not only fosters economic growth but also plays a part in environmental preservation and resource utilization, thereby ensuring the sustainable progress of enterprises (Endy, 2023).

Social benefits

Social advantages can be integrated into supply chains by various methods, such as promoting social sustainability, encouraging cooperation and collaboration, and aligning supply chain management with social enterprise objectives. Research underscores the significance of social responsibility in business activities (Gao, 2022), while underscoring the positive influence of collective efforts like cooperation and collaboration on social advancements within artisanal supply chains (Jeevitha and Mishra, 2023). Social enterprises can utilize the social capital ingrained in their supply chain partnerships to address operational limitations and improve efficiency in delivering social benefits (Taylor, 2022). Moreover, integrating corporate social responsibility (CSR) initiatives throughout the supply chain to align with stakeholders' expectations and maintain sustainable practices is crucial and ultimately delivers social benefits and competitive advantages (Santos and Guarnieri, 2021). By taking into account factors such as job creation, community impact, and stakeholder involvement, supply chains can be optimized to maximize both economic and social advantages (Tsoulfas, 2023).

Challenges of green supply chain

Implementing green supply chain management (GSCM) encounters numerous significant challenges, such as a lack of workforce and equipment, as well as inadequate commitment from senior management towards sourcing eco-friendly materials (Vichoray and Deogaonkar, 2023). Furthermore, additional hurdles include high operational expenses, limited demand for sustainable products due to their higher costs, and insufficient legal measures for environmental safeguarding (Banihashemi et al., 2022). Also, there exists a necessity for expertise in reverse logistics, appropriate waste disposal procedures, and efficient management of customer behavior post-purchase, in addition to inconsistent transportation and substandard vehicle upkeep (Fahmy et al., 2022). These barriers impede the successful integration of GSCM across various sectors, underscoring the critical importance of tackling these obstacles to attain sustainable economic and environmental results (Khamis, Munishi and Issa, 2022).

Cost Implications

Implementing a green supply chain can affect costs in different ways. Research indicates that expenses such as inventory, production, and transportation are likely to rise with the adoption of green supply chain management (Tengah, 2022). Despite the potential cost increase, companies can gain competitive advantages by engaging in practices like green purchasing, eco-design, and collaborating with customers, which can enhance their competitive edge without compromising quality or performance (Alsuraihi et al., 2022). Moreover, the green supply chain performance of manufacturing firms has been shown to positively influence supply chain financing, with social performance specifically reducing the financing costs (Fatima, 2022). In general, although there may be initial cost implications, the long-term advantages of implementing a green supply chain can surpass these costs and result in enhanced performance and sustainability for organizations (Li, Shi and Lin, 2022).

Complexity of green supply chain

Green supply chains are marked by increased complexity due to various factors identified in the research papers provided. This complexity stems from the fragmented and intricate nature of global supply networks, which interact with diverse governance mechanisms to impact environmental performance (Tachizawa and Wong, 2015). Moreover, the static complexity of the supply chain leads to the implementation of various sustainability practices across different levels, including sourcing and organizational practices for the primary company, sourcing practices for first-tier suppliers, and organizational practices for second-tier suppliers (Bai and Sarkis, 2018). Additionally, government interventions through subsidies influence price decisions within the green supply chain, affecting wholesale and retail prices of green products and impacting market dynamics (Macchion et al., 2020). It is essential for organizations looking to attain and sustain a competitive edge in the changing landscape of green supply chain management to comprehend and oversee this complexity (Ma, Hou and Tian, 2019).

Trains in green supply chain

Implementing green training practices within firms involved in the railway industry can enhance the overall sustainability of operations and supply chain management (Zhu, 2022). Furthermore, the integration of sustainable energy sources such as solar panels on railroad

ties, along with the implementation of intelligent systems like the Internet of Things (IoT) for instantaneous supervision and energy conservation, can lead to a greater diminishment of carbon emissions and the advancement of ecological responsibility within railway activities. By focusing on energy-saving measures like regenerative braking, energy storage systems, LED lighting, and natural ventilation, trains can optimize efficiency and minimize environmental impact, making them a crucial component of a sustainable green supply chain (Padmakala et al., 2023). By leveraging these strategies and technologies, Azerbaijan can enhance its rail transport system to reduce carbon footprints, promote renewable energy usage, and improve overall sustainability in the supply chain.

CONCLUSION

Azerbaijan's environmental condition is characterized by noteworthy obstacles, encompassing air, water, and soil contamination, as well as ecosystem deterioration predominantly influenced by human actions. Industrial water pollution and social inequalities that exacerbate environmental risks underscore the need for efficient resource management and equitable distribution of environmental burdens efficiency, waste minimization and economic benefit. Sustainable supply chain management (SSCM) is critical to improving environmental performance, especially in sectors such as manufacturing and food processing. Despite encountering obstacles such as elevated operational expenditures and insufficient regulatory frameworks, the enduring merits of GSCM, which encompass enhanced sustainability and competitive edge, surpass these challenges. Addressing the complexity of green supply chains, understanding global network dynamics, and integrating sustainable practices are essential for achieving sustainable development. Moreover, the implementation of environmentally friendly practices within the railway sector has the potential to greatly diminish carbon emissions. Overall, Azerbaijan adopt comprehensive environmental management strategies, emphasizing sustainable practices and social equity to mitigate ecological challenges and ensure a sustainable future.

Despite the growing literature on green supply chain management (GSCM), some critical gaps remain, particularly in the Azerbaijani context. Addressing these gaps could lead to a more comprehensive understanding of GSCM and its unique challenges and opportunities in Azerbaijan's unique environmental, economic and social environment

REFERENCES

1. Li, J., Niu, J., & Liu, Y. (2023). A Green Supply Chain Evaluation System Based on Blockchain. In *2023 8th International Conference on Computer and Communication Systems (ICCCS)* (pp. 808-815). IEEE..
2. Himabindu N, Ramalinga S, & Lakshmi P. (2022). Green Supply Chain Management: A Review and Research Direction. *International Journal of Engineering and Management Research*, 12(4), 17–21.
3. Mehdiyeva, I., Kerimli, V., Gafarov, N., Sultanova, N., Heydarova, K., & Taghiyev, A. (2020). Barriers and drivers of the implementation and management of green agri-food supply chains in Azerbaijan. *International Journal of Supply Chain Management*, 9(4), 527-535.
4. Liu, HC., You, XY. (2021). Green Supply Chain Management. In: *Green Supplier Evaluation and Selection: Models, Methods and Applications*. Springer
5. Achillas, C., Bochtis, D.D., Aidonis, D., & Folinias, D. (2018). *Green Supply Chain Management (1st ed.)*. Routledge.
6. Batrazovna, D. V., Dikareva, I. A., Tochieva, L. K., Musayeva, B. M., & Misakov, V. S. (2020). Features of green supply chain management for investment projects in the recreational territories of the North Caucasus Republics. *Int. J. Supply Chain. Manag*, 9, 719-723.

7. Gurbuz, I. B., Nesirov, E., & Ozkan, G. (2021). Investigating environmental awareness of citizens of Azerbaijan: a survey on ecological footprint. *Environment, Development and Sustainability*, 23, 10378-10396.
8. Mammadov, G. S. (2017). About eco-ethical problems of Azerbaijan Republic. *Annals of Agrarian Science*, 15(1), 88-95.
9. Keyserukhsakaya, F., Nadjafova, S., & Ismaylov, N. (2023). The Relevance of Systematic Studies of the Ecology of Azerbaijan for the Sustainable Development of Organic Agriculture. *Bulletin of Science and Practice*, 9(4).
10. de Blois, C. L. C., Tasch, J., & Abbasov, R. (2022). Azerbaijan's Social Inequality and Vulnerability to Environmental Hazards. *Caucasus Survey*, 10(1), 43-75.
11. Al Zaabi, S., Al Dhaheri, N., & Diabat, A. (2013). Analysis of interaction between the barriers for the implementation of sustainable supply chain management. *The International Journal of Advanced Manufacturing Technology*, 68, 895-905.
12. Shafique, M., Asghar, M., & Rahman, H. (2017). The impact of green supply chain management practices on performance: Moderating role of institutional pressure with mediating effect of green innovation. *Business, Management and Economics Engineering*, 15(1), 91-108.
13. Kim, M., & Chai, S. (2017). Implementing environmental practices for accomplishing sustainable green supply chain management. *Sustainability*, 9(7), 1192.
14. Dong, C., Li, Q., Shen, B., & Tong, X. (2019). Sustainability in supply chains with behavioral concerns. *Sustainability*, 11(15), 4051.
15. Smetana, S., Oehen, B., Goyal, S., & Heinz, V. (2020). Environmental sustainability issues for western food production. In *Nutritional and health aspects of food in Western Europe* (pp. 173-200). Academic Press.
16. Afzal, N., & Hanif, A. (2022). The Impact of Green Supply Chain Management Practices on Firm Performance: Evidence from Manufacturing Industry. *Global Business Review*, 09721509221125576.
17. Sharma, M., Dhir, A., AlKatheeri, H., Khan, M., & Ajmal, M. M. (2023). Greening of supply chain to drive performance through logical integration of supply chain resources. *Business Strategy and the Environment*, 32(6), 3833-3847.
18. Huang, H. (2022). [Retracted] Green Supply Chain Management and Its Impact on Economic-Environmental Performance: Evidence from Asian Countries. *Journal of Environmental and Public Health*, 2022(1), 7035260.
19. Zaheb, H., Karimy, H., Sabory, N. R., & Danish, M. S. S. (2022). A concise review of green supply chain management within organization reform. *Journal of Business and Management Revolution*, 1-5.
20. Kamarudin, N., Nizam, N. Z., & Win, C. K. (2023). Green Supply Chain Management Integrate for Environmental Sustainability in University Smart Campus. In *Handbook of Research on Designing Sustainable Supply Chains to Achieve a Circular Economy* (pp. 377-394). IGI Global.
21. Rizki, A. F., Murwaningsari, E., & Sudibyo, Y. A. (2022). Does green supply chain management improve sustainable performance?. *International Journal of Energy Economics and Policy*, 12(6), 323-331.
22. Veljković, J., Milovanović, G., & Talić, M. (2022). Green supply chains and global competitiveness of companies. *Ekonomika*, 68(3), 29-43.
23. Allam, D., Elseify, E., Youssef, A., & Khourshed, N. (2021). The relationship between green supply chain management and profitability. *Open Access Library Journal*, 8(2), 1-15.
24. Wang, H. (2022). Green supply chain optimization based on bp neural network. *Frontiers in Neurorobotics*, 16, 865693.
25. Endy, C. (2023) ; Penerapan Strategi Green Supply Chain Pada Bidang Ekonomi
26. Gao, C. (2022). Incorporating social benefits in optimal design of bioethanol supply chains: a case study in China. *Production & Manufacturing Research*, 10(1), 176-197.
27. Mallieswari, R., Jeevitha, R., Niharika, Mishra. (2023). Analysis of supply chain social sustainability in hotel industry. *International journal of advanced research*, 1367-1371
28. Taylor, K. (2022). A Strategic Contingency Perspective on Social Capital in Social Impact Supply Chains. In *Academy of Management Proceedings* (Vol. 2022, No. 1, p. 12109). Briarcliff Manor, NY 10510: Academy of Management.

29. dos Santos, R. R., & Guarnieri, P. (2021). Social gains for artisanal agroindustrial producers induced by cooperation and collaboration in agri-food supply chain. *Social Responsibility Journal*, 17(8), 1131-1149.
30. Tsoulfas, G. T. (2023). Supply chains and corporate social responsibility orientation: an interpretive structural modeling approach. *KnE Social Sciences*, 213-233.
31. Mankar, V., Vichoray, C., Somani, N., & Deogaonkar, A. (2023). Identifying the barriers to green supply chain practices for small and medium enterprises with reference to central India. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 8(6), 27.
32. Banihashemi, S. A., Khalilzadeh, M., Antucheviciene, J., & Edalatpanah, S. A. (2022). Identifying and prioritizing the challenges and obstacles of the green supply chain management in the construction industry using the fuzzy BWM method. *Buildings*, 13(1), 38.
33. Fahmy, H., Mazouzi, M., Masmoudi, A. A., & El Mehdi, T. (2022). Barriers of the Green Supply Chain Management Implementation: A Benchmark of Studies of Analytic Hierarchy Process and Interpretive Structural Modeling. *Journal of Engineering Research and Sciences*. 1. 223-230.
34. Khamis, A. A., Munishi, E. J., & Issa, I. M. (2022). The Challenges Faced by Manufacturing Companies in Implementation of Green Supply Chain: Evidence from the Bakhresa Food Products Limited in Dar es Salaam–Tanzania. *International Journal of Social Science Research and Review*, 5(7), 69-81.
35. Chalarhena, N., & Hendayani, R. (2022). Pengaruh green supply chain management terhadap performa ekonomi dan organisasi pada UMKM industri makanan di Wonosobo Jawa Tengah. *Fair Value: Jurnal Ilmiah Akuntansi dan Keuangan*, 5(3), 1696-1713.
36. Alsuraihi, A., Ab Wahab, N., Noorizam, K. A. M., Masruk, R., & Ab Rahman, Z. (2022). The Impact Of Green Supply Chain Management Practices On Firm's Competitive Advantages. *International Journal of Health Sciences*.
37. Fatima, E. (2022). IMPACT OF GREEN SUPPLY CHAIN MANAGEMENT ON FIRM PERFORMANCE. *Global Journal for Management and Administrative Sciences*. 3. 1-19.
38. Lin, W., Li, S., Shi, Y., & Lin, F. (2022, August). Impact of Green Efforts on Channel Structure of Green Supply Chain. In *2022 10th International Conference on Traffic and Logistic Engineering (ICTLE)* (pp. 145-149). IEEE.
39. Tachizawa, E. M., & Wong, C. Y. (2015). The performance of green supply chain management governance mechanisms: A supply network and complexity perspective. *Journal of Supply Chain Management*, 51(3), 18-32.
40. Bai, C., & Sarkis, J. (2018). Evaluating complex decision and predictive environments: the case of green supply chain flexibility. *Technological and Economic Development of Economy*, 24(4), 1630-1658.
41. Macchion, L., Moretto, A., Caniato, F., Danese, P., & Vinelli, A. (2020). Static supply chain complexity and sustainability practices: A multitier examination. *Corporate Social Responsibility and Environmental Management*, 27(6), 2679-2691.
42. Ma, J., Hou, A., & Tian, Y. (2019). Research on the complexity of green innovative enterprise in dynamic game model and governmental policy making. *Chaos, Solitons & Fractals: X*, 2, 100008.
43. Zhu, L. (2022). Green supply chain management. *Journal of Digitainability, Realism & Mastery (DREAM)*, 1(01), 12-17.
44. Padmakala, S., Alkawak, O. A., Reddy, G. V. S., Narendranathan, S. K., Muthuraman, M. S., & Sendilvelan, S. (2023, January). A Train with Automatic Functioning based on IoT with Solar Energy Source. In *2023 International Conference on Intelligent Data Communication Technologies and Internet of Things (IDCIoT)* (pp. 908-913). IEEE.