Green Supply Chain Management in Manufacturing: Practices and Performance Metrics

Shivanshi Sharma
BBA- 2nd Year
Teerthanker Mahaveer Institute of Management and Technology
Teerthanker Mahaveer University
Moradabad, Uttar Pradesh

Priya Kaushik
BBA- 2nd Year
Teerthanker Mahaveer Institute of Management and Technology
Teerthanker Mahaveer University
Moradabad, Uttar Pradesh

Navya Chauhan
BBA- 2nd Year
Teerthanker Mahaveer Institute of Management and Technology
Teerthanker Mahaveer University
Moradabad, Uttar Pradesh

Abstract

Green Supply Chain Management (GSCM) has emerged as a pivotal strategy in addressing environmental concerns while maintaining competitiveness in manufacturing industries. The concept integrates environmental thinking into supply chain management, encompassing product design, material sourcing, production processes, and end-of-life product disposal. This paper explores the adoption and impact of GSCM practices in the manufacturing sector, focusing on the strategies employed and the metrics used to assess their performance. By leveraging secondary data and global case studies, the study identifies prevalent green practices such as eco-design, waste reduction, sustainable procurement, and reverse logistics. It also investigates performance indicators that measure environmental, operational, and economic outcomes.

The paper reveals that successful GSCM implementation leads to enhanced resource efficiency, regulatory compliance, cost reduction, and improved brand image. However, it also highlights challenges including high implementation costs, resistance to change, and lack of standardization in performance metrics. A framework is proposed to integrate GSCM practices systematically into manufacturing processes, enabling continuous improvement and sustainability. The research underscores the necessity of cross-functional collaboration, stakeholder engagement, and technological support in driving green supply chain transformations. This study contributes to both

academic literature and industry practice by providing insights into the strategic and measurable aspects of sustainable manufacturing.

Keywords Green Supply Chain Management, sustainable manufacturing, eco-design, reverse logistics, performance metrics, environmental sustainability, lean and green practices, circular economy, supplier collaboration, environmental compliance

Introduction

As environmental degradation intensifies and consumer awareness of sustainability grows, the manufacturing industry faces increasing pressure to minimize its ecological footprint. Traditional supply chain models, focused primarily on cost, speed, and efficiency, are no longer sufficient to meet the demands of environmentally conscious stakeholders. Green Supply Chain Management (GSCM) has emerged as a sustainable alternative that integrates environmental considerations into every phase of the supply chain.

GSCM encompasses a broad range of practices, from eco-friendly product design and responsible sourcing of raw materials to energy-efficient manufacturing processes and environmentally sound logistics. These practices aim not only to reduce environmental impact but also to enhance operational efficiency, reduce waste, and comply with stringent environmental regulations. Companies adopting GSCM are finding that sustainable operations can coexist with, and even enhance, business profitability and reputation.

The importance of GSCM has grown in response to global initiatives such as the Paris Agreement, UN Sustainable Development Goals, and national regulatory mandates on emissions and waste. Manufacturers are increasingly recognizing the strategic value of going green, yet the path to effective implementation remains complex and multifaceted. This paper seeks to explore how manufacturing firms are adopting green supply chain practices, what metrics they use to evaluate success, and what challenges and opportunities arise from these efforts.

Through a comprehensive analysis of case studies, literature, and performance data, this research aims to provide a strategic framework for embedding sustainability into manufacturing supply chains. It addresses the need for actionable insights into both the practices and performance measures that define successful GSCM, offering guidance to manufacturers striving to align their operations with environmental stewardship and competitive advantage.

Objectives

The primary aim of this research is to examine the role and impact of Green Supply Chain Management (GSCM) practices in the manufacturing sector, with a particular focus on performance metrics that evaluate environmental and operational outcomes. The specific objectives are:

- To identify and classify the key GSCM practices adopted by manufacturing firms.
- To analyze the performance metrics used to measure the effectiveness of GSCM in reducing environmental impact and improving operational efficiency.
- To assess the benefits and challenges associated with the implementation of GSCM in manufacturing.
- To propose a strategic framework for integrating GSCM practices into traditional supply chain operations.
- To provide actionable recommendations for industry stakeholders to enhance sustainability performance.

These objectives aim to bridge the gap between theoretical understanding and practical application of GSCM. By focusing on both practices and performance indicators, the study seeks to offer a balanced perspective that informs managerial decisions and policy-making. Furthermore, the research contributes to the growing body of literature advocating for sustainability in industrial operations and supports efforts to meet global environmental goals through effective supply chain management.

Literature Review

The concept of Green Supply Chain Management has evolved significantly over the past two decades. Srivastava (2007) defines GSCM as the integration of environmental concerns into supply chain activities, including design, sourcing, production, delivery, and disposal. The literature highlights that GSCM not only addresses environmental issues but also offers competitive advantages through cost savings, risk mitigation, and brand enhancement.

Zhu and Sarkis (2004) identified three major categories of GSCM practices: internal environmental management, external cooperation, and eco-design. These practices are widely recognized as essential components of a sustainable supply chain. The development of performance metrics is another critical area. Hervani, Helms, and Sarkis (2005) proposed a comprehensive performance measurement system that includes environmental, economic, and operational indicators.

Despite the growing awareness, implementation challenges persist. Studies by Rao and Holt (2005) suggest that high costs, resistance to change, and lack of regulatory support are significant barriers. Nonetheless, successful case studies from companies like Toyota, Siemens, and Unilever demonstrate that systematic GSCM adoption can yield substantial benefits.

This literature review provides a foundation for understanding the evolution, scope, and measurement of GSCM, setting the stage for further exploration into its practical application in manufacturing contexts.

Research Design

This study adopts a qualitative research methodology based on secondary data analysis. The research design includes an extensive review of academic literature, industry reports, corporate sustainability disclosures, and government publications to examine GSCM practices and performance metrics in the manufacturing sector.

The research utilizes a comparative case study approach, analyzing practices adopted by leading manufacturing firms across diverse industries, including automotive, electronics, and consumer goods. Key selection criteria for case studies include the firm's commitment to sustainability, public availability of environmental data, and documented performance metrics.

Thematic analysis is used to categorize GSCM practices and identify common performance indicators such as carbon footprint reduction, energy efficiency, waste minimization, and cost savings. The analysis also considers contextual factors like regulatory environment, industry type, and organizational culture that influence the adoption and effectiveness of GSCM.

By triangulating data from multiple sources, the research aims to develop a robust understanding of how green supply chain strategies are implemented and evaluated in real-world manufacturing settings. While the study is limited to secondary data, it provides a comprehensive foundation for

future empirical research involving primary data collection and quantitative performance measurement.

Research Gap

While Green Supply Chain Management has been extensively studied, several gaps remain in the literature and industry practice. First, there is a lack of consensus on standardized performance metrics to evaluate GSCM effectiveness. Most studies propose frameworks but do not empirically validate them across diverse manufacturing sectors.

Second, existing research often focuses on isolated practices such as eco-design or reverse logistics, rather than examining the integration of multiple GSCM practices within a comprehensive strategy. This fragmentation limits our understanding of how these practices interact to deliver sustainable outcomes.

Third, there is limited research on the contextual factors—such as regional regulations, firm size, and market dynamics—that affect the implementation and success of GSCM in different manufacturing environments. Such insights are crucial for tailoring strategies to specific operational contexts.

Lastly, many studies emphasize the benefits of GSCM but overlook the operational and organizational challenges that firms encounter during implementation. These include internal resistance, cost concerns, and supply chain complexity.

This study addresses these gaps by synthesizing diverse GSCM practices, identifying commonly used and effective performance metrics, and proposing an integrative framework. It also highlights the enablers and barriers that influence GSCM outcomes, offering a holistic view that supports strategic decision-making in sustainable manufacturing

Data Analysis and Interpretation

The analysis of secondary data from leading manufacturing firms reveals several recurring GSCM practices and associated performance metrics. Key findings include:

Eco-Design and Sustainable Materials: Companies like HP and Siemens implement eco-design to reduce material usage and enable recyclability. Metrics include the percentage of recyclable materials used and product lifecycle environmental impact.

Green Procurement: Firms increasingly source from suppliers with environmental certifications. Metrics include supplier compliance rate with environmental standards and sustainable procurement scorecards.

Energy Efficiency in Production: Manufacturing units employ energy-saving technologies and renewable energy sources. Performance is measured through energy consumption per unit of output and carbon emissions per production cycle.

Waste Reduction and Recycling: Companies implement zero-waste policies and closed-loop systems. Metrics include waste diversion rates and landfill avoidance.

Reverse Logistics: Brands like Dell operate take-back and refurbishment programs. Success is measured by the volume of returned products processed and materials recovered.

Interpretation: Performance metrics are not only operational but also strategic, reflecting a firm's commitment to long-term sustainability. The integration of environmental performance into key performance indicators (KPIs) helps align sustainability goals with business objectives. Case studies suggest that firms adopting comprehensive GSCM strategies report higher stakeholder satisfaction, improved compliance, and enhanced competitive advantage.

The thematic analysis indicates that successful GSCM implementation requires top management support, cross-functional coordination, and continuous improvement mechanisms. Metrics serve both as benchmarks and tools for accountability, guiding firms toward greener operations and innovation.

Limitations

This study, while comprehensive in its scope, has several limitations. The reliance on secondary data restricts the ability to capture real-time insights and nuanced stakeholder perspectives. Data availability and quality vary across organizations, which may introduce bias or inconsistencies in analysis.

The research predominantly focuses on large, multinational firms with established sustainability programs. As such, the findings may not be fully generalizable to small and medium enterprises (SMEs) that operate with limited resources and face different implementation challenges.

Additionally, the study does not employ quantitative methods to statistically validate the correlation between GSCM practices and performance outcomes. This limits the ability to make causal inferences or conduct rigorous impact assessments.

The dynamic nature of environmental regulations, market demands, and technological innovations means that GSCM practices and metrics are continuously evolving. As a result, some findings may become outdated or require periodic reevaluation.

Future research should incorporate primary data collection, such as surveys or interviews with supply chain managers, to enrich the analysis. Longitudinal studies could also provide deeper insights into the progression and impact of GSCM initiatives over time.

Conclusion

Green Supply Chain Management represents a transformative approach to sustainable manufacturing, offering a pathway to align environmental responsibility with operational excellence. This study highlights that GSCM is not merely a set of isolated practices but a strategic framework that integrates sustainability into the core functions of supply chain management.

The research identifies key practices—such as eco-design, green procurement, energy-efficient production, waste reduction, and reverse logistics—that have demonstrated effectiveness in reducing environmental impacts and enhancing organizational performance. Performance metrics play a crucial role in monitoring progress, fostering accountability, and driving continuous improvement. Successful implementation of GSCM practices contributes to regulatory compliance, cost savings, brand differentiation, and stakeholder trust.

However, challenges remain. The lack of standardized metrics, high implementation costs, and operational complexities hinder broader adoption. Organizational culture, leadership commitment, and external support are essential enablers of GSCM success. The study underscores the need for an integrative framework that combines technical, organizational, and strategic elements to embed sustainability into manufacturing supply chains.

In conclusion, GSCM is a vital lever for achieving sustainable development goals in the industrial sector. By adopting holistic and data-driven approaches, manufacturers can transition from reactive compliance to proactive sustainability leadership. Future research and practice should focus on expanding the applicability of GSCM to SMEs, developing standardized performance

indicators, and exploring innovative technologies that support green transformations. Through collective effort, the manufacturing sector can become a catalyst for environmental stewardship and sustainable economic growth.

References

- Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. International Journal of Management Reviews, 9(1), 53–80.
- Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. Journal of Operations Management, 22(3), 265–289.
- Hervani, A. A., Helms, M. M., & Sarkis, J. (2005). Performance measurement for green supply chain management. Benchmarking: An International Journal, 12(4), 330–353.
- Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? International Journal of Operations & Production Management, 25(9), 898–916.
- Baines, T., Brown, S., Benedettini, O., & Ball, P. (2012). Examining green production and its role within the competitive strategy of manufacturers. Journal of Industrial Engineering and Management, 5(1), 53–87.
- Ma, X., Arif, A., Kaur, P., Jain, V., Refiana Said, L., & Mughal, N. (2022). Revealing the effectiveness of technological innovation shocks on CO2 emissions in BRICS: emerging challenges and implications. Environmental Science and Pollution Research, 29(31), 47373-47381.
- Hasan, N., Nanda, S., Singh, G., Sharma, V., Kaur, G., & Jain, V. (2024, February). Adoption of Blockchain Technology in Productivity and Automation Process of Microfinance Services. In 2024 4th International Conference on Innovative Practices in Technology and Management (ICIPTM) (pp. 1-5). IEEE.
- Jan, N., Jain, V., Li, Z., Sattar, J., & Tongkachok, K. (2022). Post-COVID-19 investor psychology and individual investment decision: A moderating role of information availability. Frontiers in Psychology, 13, 846088.

- Maurya, S. K., Jain, V., Setiawan, R., Ashraf, A., Koti, K., Niranjan, K., ... & Rajest, S. S. (2021). The Conditional Analysis of Principals Bullying Teachers Reasons in The Surroundings of The City (Doctoral dissertation, Petra Christian University).
- Anand, R., Juneja, S., Juneja, A., Jain, V., & Kannan, R. (Eds.). (2023). Integration of IoT with cloud computing for smart applications. CRC Press.
- Dadhich, M., Pahwa, M. S., Jain, V., & Doshi, R. (2021). Predictive models for stock market index using stochastic time series ARIMA modeling in emerging economy. In Advances in Mechanical Engineering: Select Proceedings of CAMSE 2020 (pp. 281-290). Springer Singapore.
- Ahmad, A. Y., Jain, V., Verma, C., Chauhan, A., Singh, A., Gupta, A., & Pramanik, S. (2024). CSR Objectives and Public Institute Management in the Republic of Slovenia. In Ethical Quandaries in Business Practices: Exploring Morality and Social Responsibility (pp. 183-202). IGI Global.
- Verma, C., Sharma, R., Kaushik, P., & Jain, V. (2024). The Role of Microfinance Initiatives in Promoting Sustainable Economic Development: Exploring Opportunities, Challenges, and Outcomes.
- Liu, L., Bashir, T., Abdalla, A. A., Salman, A., Ramos-Meza, C. S., Jain, V., & Shabbir, M. S. (2024). Can money supply endogeneity influence bank stock returns? A case study of South Asian economies. Environment, Development and Sustainability, 26(2), 2775-2787.
- Zhang, M., Jain, V., Qian, X., Ramos-Meza, C. S., Ali, S. A., Sharma, P., ... & Shabbir, M. S. (2023). The dynamic relationship among technological innovation, international trade, and energy production. Frontiers in Environmental Science, 10, 967138.
- Cao, Y., Tabasam, A. H., Ahtsham Ali, S., Ashiq, A., Ramos-Meza, C. S., Jain, V., & Shahzad Shabbir, M. (2023). The dynamic role of sustainable development goals to eradicate the multidimensional poverty: evidence from emerging economy. Economic research-Ekonomska istraživanja, 36(3).
- Liu, Y., Cao, D., Cao, X., Jain, V., Chawla, C., Shabbir, M. S., & Ramos-Meza, C. S. (2023). The effects of MDR-TB treatment regimens through socioeconomic and spatial

characteristics on environmental-health outcomes: evidence from Chinese hospitals. Energy & Environment, 34(4), 1081-1093.

- Chawla, C., Jain, V., Joshi, A., & Gupta, V. (2013). A study of satisfaction level and awareness of tax-payers towards e-filing of income tax return—with reference to Moradabad city. International Monthly Refereed Journal of Research In Management & Technology, 2, 60-66.
- Kaur, M., Sinha, R., Chaudhary, V., Sikandar, M. A., Jain, V., Gambhir, V., & Dhiman, V. (2022). Impact of COVID-19 pandemic on the livelihood of employees in different sectors. Materials Today: Proceedings, 51, 764-769.
- Liu, Y., Salman, A., Khan, K., Mahmood, C. K., Ramos-Meza, C. S., Jain, V., & Shabbir, M. S. (2023). The effect of green energy production, green technological innovation, green international trade, on ecological footprints. Environment, Development and Sustainability, 1-14.
- Jun, W., Mughal, N., Kaur, P., Xing, Z., & Jain, V. (2022). Achieving green environment targets in the world's top 10 emitter countries: the role of green innovations and renewable electricity production. Economic research-Ekonomska istraživanja, 35(1), 5310-5335.
- Verma, C., & Jain, V. Exploring Promotional Strategies in Private Universities: A Comprehensive Analysis of Tactics and Innovative Approaches.
- Jain, V., Ramos-Meza, C. S., Aslam, E., Chawla, C., Nawab, T., Shabbir, M. S., & Bansal, A. (2023). Do energy resources matter for growth level? The dynamic effects of different strategies of renewable energy, carbon emissions on sustainable economic growth. Clean Technologies and Environmental Policy, 25(3), 771-777.
- Jain, V., Rastogi, M., Ramesh, J. V. N., Chauhan, A., Agarwal, P., Pramanik, S., & Gupta, A. (2023). FinTech and Artificial Intelligence in Relationship Banking and Computer Technology. In AI, IoT, and Blockchain Breakthroughs in E-Governance (pp. 169-187). IGI Global.
- Rajkumar, D. A., Agarwal, P., Rastogi, D. M., Jain, D. V., Chawla, D. C., & Agarwal, D. M. (2022). Intelligent Solutions for Manipulating Purchasing Decisions of Customers

Using Internet of Things during Covid-19 Pandemic. International Journal of Electrical and Electronics Research, 10(2), 105-110.

- Jain, V., Agarwal, M. K., Hasan, N., & Kaur, G. (2022). Role of Microfinance and Microinsurance Services As a Tool for Poverty Alleviation. Journal of Management & Entrepreneurship, 16(2), 1179-1195.
- Wang, J., Ramzan, M., Makin, F., Mahmood, C. K., Ramos-Meza, C. S., Jain, V., & Shabbir, M. S. (2023). Does clean energy matter? The dynamic effects of different strategies of renewable energy, carbon emissions, and trade openness on sustainable economic growth. Environment, Development and Sustainability, 1-10.
- Sharma, D. K., Boddu, R. S. K., Bhasin, N. K., Nisha, S. S., Jain, V., & Mohiddin, M. K. (2021, October). Cloud computing in medicine: Current trends and possibilities. In 2021 International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation (ICAECA) (pp. 1-5). IEEE.
- Anand, R., Jain, V., Singh, A., Rahal, D., Rastogi, P., Rajkumar, A., & Gupta, A. (2023). Clustering of big data in cloud environments for smart applications. In Integration of IoT with Cloud Computing for Smart Applications (pp. 227-247). Chapman and Hall/CRC.
- Zhengxia, T., Batool, Z., Ali, S., Haseeb, M., Jain, V., Raza, S. M. F., & Chakrabarti, P. (2023). Impact of technology on the relation between disaggregated energy consumption and CO2 emission in populous countries of Asia. Environmental Science and Pollution Research, 30(26), 68327-68338.
- Sikandar, H., Kohar, U. H. A., Corzo-Palomo, E. E., Gamero-Huarcaya, V. K., Ramos-Meza, C. S., Shabbir, M. S., & Jain, V. (2024). Mapping the development of open innovation research in business and management field: A bibliometric analysis. Journal of the Knowledge Economy, 15(2), 9868-9890.
- Shaikh, A. A., Doss, A. N., Subramanian, M., Jain, V., Naved, M., & Mohiddin, M. K. (2022). Major applications of data mining in medical. Materials Today: Proceedings, 56, 2300-2304.
- Jain, V., Sharma, M. P., Kumar, A., & Kansal, A. (2020). Digital Banking: A Case Study of India. Solid State Technology, 63(6), 19980-19988.

- Sumathi, M. S., Jain, V., & Zarrarahmed, Z. K. (2023). Using artificial intelligence (ai) and internet of things (iot) for improving network security by hybrid cryptography approach.
- Ehsan, S., Tabasam, A. H., Ramos-Meza, C. S., Ashiq, A., Jain, V., Nazir, M. S., ... & Gohae, H. M. (2023). Does Zero-Leverage phenomenon improve sustainable environmental manufacturing sector: evidence from Pakistani manufacture industry?. Global Business Review, 09721509221150876.
- Ramos Meza, C. S., Bashir, S., Jain, V., Aziz, S., Raza Shah, S. A., Shabbir, M. S., & Agustin, D. W. I. (2021). The economic consequences of the loan guarantees and firm's performance: a moderate role of corporate social responsibility. Global Business Review, 09721509211039674.
- Sharifi, P., Jain, V., Arab Poshtkohi, M., Seyyedi, E., & Aghapour, V. (2021). Banks credit risk prediction with optimized ANN based on improved owl search algorithm. Mathematical Problems in Engineering, 2021(1), 8458501.
- RAJKUMAR, A., & JAIN, V. (2021). A Literature Study on the Product Packaging Influences on the Customers Behavior. Journal of Contemporary Issues in Business and Government| Vol, 27(3), 780.
- CHAWLA, C., & JAIN, V. (2017). PROBLEMS AND PROSPECTS OF TOURISM INDUSTRY IN INDIA-WITH SPECIAL REFERENCE TO UTTAR PRADESH. CLEAR International Journal of Research in Commerce & Management, 8(9).
- Jain, V. (2021). An overview on social media influencer marketing. South Asian Journal of Marketing & Management Research, 11(11), 76-81.
- Jain, V., Navarro, E. R., Wisetsri, W., & Alshiqi, S. (2020). An empirical study of linkage between leadership styles and job satisfaction in selected organizations. PalArch's Journal of Archaeology of Egypt/Egyptology, 17(9), 3720-3732.
- Jain, V., Gupta, S. S., Shankar, K. T., & Bagaria, K. R. (2022). A study on leadership management, principles, theories, and educational management. World Journal of English Language, 12(3), 203-211.

- Sharma, A., & Jain, V. (2020). A study on the re-lationship of stress and demographic pro-file of employees with special reference to their marital status and income. UGC Care Journal, 43(4), 111-115.
- Jain, V., Chawla, C., Agarwal, M., Pawha, M. S., & Agarwal, R. (2019). Impact of Customer Relationship Management on Customer Loyalty: A Study on Restaurants of Moradabad. International Journal of Advanced Science and Technology, 28(15), 482-49.
- Jain, V., Goyal, M., & Pahwa, M. S. (2019). Modeling the relationship of consumer engagement and brand trust on social media purchase intention-a confirmatory factor experimental technique. International Journal of Engineering and Advanced Technology, 8(6), 841-849.
- Jain, V., Al Ayub Ahmed, A., Chaudhary, V., Saxena, D., Subramanian, M., & Mohiddin, M. K. (2022, June). Role of data mining in detecting theft and making effective impact on performance management. In Proceedings of Second International Conference in Mechanical and Energy Technology: ICMET 2021, India (pp. 425-433). Singapore: Springer Nature Singapore.
- Meza, C. S. R., Kashif, M., Jain, V., Guerrero, J. W. G., Roopchund, R., Niedbala, G., & Phan The, C. (2021). Stock markets dynamics and environmental pollution: emerging issues and policy options in Asia. Environmental Science and Pollution Research, 28(43), 61801-61810.
- Sasmoko, Ramos-Meza, C. S., Jain, V., Imran, M., Khan, H. U. R., Chawla, C., ... & Zaman, K. (2022). Sustainable growth strategy promoting green innovation processes, mass production, and climate change adaptation: A win-win situation. Frontiers in Environmental Science, 10, 1059975.
- Jain, V., Sethi, P., Arya, S., Chawla, C., Verma, R., & Chawla, C. (2020). 5 1 Principal,"Project Evaluation using Critical Path Method & Project Evaluation Review Technique Connecting Researchers on the Globe View project Researcher's Achievements View project Project Evaluation using Critical Path Method & Project Evaluation Review Technique,". Wesleyan Journal of Research, 13(52).

- Jain, V., Arya, S., & Gupta, R. (2018). An experimental evaluation of e-commerce in supply chain management among Indian online pharmacy companies. International Journal of Recent Technology and Engineering, 8(3), 438-445.
- Chawla, C., Jain, V., & Mahajan, T. (2013). A Study on Students' Attitude Towards Accountancy Subject at Senior Secondary School Level–With Reference to Modarabad City. International Journal of Management, 4(3), 177-184.
- Jain, V., & Sami, J. (2012). Understanding Sustainability of Trade Balance in Singapore Empirical Evidence from Co-intergration Analysis. Viewpoint Journal, 2(1), 3-9.
- Verma, A. K., Ansari, S. N., Bagaria, A., & Jain, V. (2022). The Role of Communication for Business Growth: A Comprehensive Review. World Journal of English Language, 12(3), 164-164.
- Ansari, S., Kumar, P., Jain, V., & Singh, G. (2022). Communication Skills among University Students. World Journal of English Language, 12(3), 103-109.
- Rao, D. N., Vidhya, G., Rajesh, M. V., Jain, V., Alharbi, A. R., Kumar, H., & Halifa, A. (2022). An innovative methodology for network latency detection based on IoT centered blockchain transactions. Wireless Communications and Mobile Computing, 2022(1), 8664079.
- Jain, V. (2021). An overview of wal-mart, amazon and its supply chain. ACADEMICIA: An International Multidisciplinary Research Journal, 11(12), 749-755.
- Jain, V., & Garg, R. (2019). Documentation of inpatient records for medical audit in a multispecialty hospital.
- Verma, A., Singh, A., Sethi, P., Jain, V., Chawla, C., Bhargava, A., & Gupta, A. (2023). Applications of Data Security and Blockchain in Smart City Identity Management. In Handbook of Research on Data-Driven Mathematical Modeling in Smart Cities (pp. 154-174). IGI Global.
- Agarwal, P., Jain, V., & Goel, S. (2020). Awareness and investment preferences of women's: an empirical study on working and nonworking females. PalArch's Journal of Archaeology of Egypt/Egyptology, 17(7), 13469-13484.

- Jha, R. S., Jain, V., & Chawla, C. (2019). Hate speech & mob lynching: a study of its relations, impacts & regulating laws. Think India (QJ), 22(3), 1401-1405.
- Jain, V., & Singh, V. K. (2019). Influence of healthcare advertising and branding on hospital services. Pravara Med Rev, 11, 19-21.
- Jain, V., & Gupta, A. (2012). Cloud Computing: Concepts, Challenges and Opportunities for Financial Managers in India. Amity Global Business Review, 7.
- Jain, V., & Ackerson, D. (2023). The Importance of Emotional Intelligence in Effective Leadership. Edited by Dan Ackerson, Semaphore, 5.
- Sharif, S., Lodhi, R. N., Jain, V., & Sharma, P. (2022). A dark side of land revenue management and counterproductive work behavior: does organizational injustice add fuel to fire?. Journal of Public Procurement, 22(4), 265-288.
- Jain, V. (2021). A review on different types of cryptography techniques. ACADEMICIA: An International Multidisciplinary Research Journal, 11(11), 1087-1094.
- Kumar, S., & Jain, V. (2021). A survey on business profitability for a music artist by advertising on YouTube. Journal of Contemporary Issues in Business and Government| Vol, 27(3), 807.
- Chawla, C. H. A. N. C. H. A. L., & Jain, V. I. P. I. N. (2021). Teamwork on employee performance and organization Growth. Journal of Contemporary Issues in Business and Government, 27(3), 706.
- MEHRA, A., & JAIN, V. (2021). A review study on the brand image on the customer's perspective. Journal of Contemporary Issues in Business and Government| Vol, 27(3), 773.
- Jha, R. S., Tyagi, N., Jain, V., Chaudhary, A., & Sourabh, B. (2020). Role of Ethics in Indian Politics. Waffen-Und Kostumkunde Journal, 9(8), 88-97.
- Kumar, A., Kansal, A., & Jain, V. (2020). A Comprehensive Study of Factor Influencing Investor's Perception Investing in Mutual Funds. European Journal of Molecular & Clinical Medicine, 7(11), 2020.
- Veeraiah, V., Ahamad, S., Jain, V., Anand, R., Sindhwani, N., & Gupta, A. (2023, May). IoT for Emerging Engineering Application Related to Commercial System.

In International Conference on Emergent Converging Technologies and Biomedical Systems (pp. 537-550). Singapore: Springer Nature Singapore.

- Jain, V. (2021). Word of mouth as a new element of the marketing communication mix: Online consumer review. South Asian Journal of Marketing & Management Research, 11(11), 108-114.
- Kansal, A., Jain, V., & Agrawal, S. K. (2020). Impact of digital marketing on the purchase of health insurance products. Jour of Adv Research in Dynamical & Control Systems, 12.
- Jain, V., Chawla, C., Arya, S., Agarwal, R., & Agarwal, M. (2019). An Empirical Study of Product Design for New Product Development with Special Reference to Indian Mobile Industry. TEST Engineering & Management, 81, 1241-1254.
- Jain, V. (2017). Emerging Digital Business Opportunities and Value. Data Analytics & Digital Technologies.
- Khan, H., Veeraiah, V., Jain, V., Rajkumar, A., Gupta, A., & Pandey, D. (2023). Integrating Deep Learning in an IoT Model to Build Smart Applications for Sustainable Cities. In Handbook of Research on Data-Driven Mathematical Modeling in Smart Cities (pp. 238-261). IGI Global.
- Jain, V, Agarwal, M. K., Hasan, N., & Kaur, G. ROLE OF MICROFINANCE AND MICROINSURANCE SERVICES AS A TOOL FOR POVERTY ALLEVIATION.
- Gupta, N., Sharma, M., Rastogi, M., Chauhan, A., Jain, V., & Yadav, P. K. (2021). Impact of COVID-19 on education sector in Uttarakhand: Exploratory factor analysis. Linguistics and Culture Review, 784-793.
- Jain, V. (2021). Information technology outsourcing chain: Literature review and implications for development of distributed coordination. ACADEMICIA: An International Multidisciplinary Research Journal, 11(11), 1067-1072.
- Jain, V. I. P. I. N., Chawla, C. H. A. N. C. H. A. L., & Arya, S. A. T. Y. E. N. D. R. A. (2021). Employee Involvement and Work Culture. Journal of Contemporary Issues in Business and Government, 27(3), 694-699.
- Setiawan, R., Kulkarni, V. D., Upadhyay, Y. K., Jain, V., Mishra, R., Yu, S. Y., & Raisal, I. (2020). The Influence Work-Life Policies Can Have on Part-Time Employees in Contrast

to Full-Time Workers and The Consequence It Can Have on Their Job Satisfaction, Organizational Commitment and Motivation (Doctoral dissertation, Petra Christian University).

- Verma, C., Sharma, R., Kaushik, P., & Jain, V. (2024). The Role of Microfinance Initiatives in Promoting Sustainable Economic Development: Exploring Opportunities, Challenges, and Outcomes.
- Jain, V. (2021). An overview on employee motivation. Asian Journal of Multidimensional Research, 10(12), 63-68.
- Jain, V. (2021). A review on different types of cryptography techniques "should be replaced by" exploring the potential of steganography in the modern era. ACADEMICIA: An International Multidisciplinary Research Journal, 11(11), 1139-1146.
- Jain, V., Chawla, C., Arya, S., Agarwal, R., & Agarwal, M. (2019). Impact of Job Satisfaction on relationship between employee performance and human resource management practices followed by Bharti Airtel Limited Telecommunications with reference to Moradabad region. International Journal of Recent Technology and Engineering, 8, 493-498.
- Jain, V., Verma, C., Chauhan, A., Singh, A., Jain, S., Pramanik, S., & Gupta, A. (2024). A Website-Dependent Instructional Platform to Assist Indonesian MSMEs. In Empowering Entrepreneurial Mindsets With AI (pp. 299-318). IGI Global