Climate Action and Sustainable Development: A Systems Approach

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Abstract

Climate change represents a systemic risk that interacts with economic growth, social equity, environmental protection, and governance structures. Sustainable Development Goal 13 (Climate Action) is deeply interconnected with other Sustainable Development Goals (SDGs), making isolated policy interventions insufficient for addressing climate challenges. The core research problem addressed in this study is the fragmented treatment of climate action in policy and measurement frameworks, which often ignores interdependencies across sustainable development dimensions. This fragmentation limits the effectiveness of climate strategies and weakens long-term sustainability outcomes.

The study adopts a systems approach to analyze the inter-linkages between climate action and sustainable development. A quantitative research design is employed using secondary panel data from international sources such as the World Bank, United Nations SDG Global Database, and ND-GAIN Index. The sample consists of 40 countries (20 developed and 20 developing) selected through stratified purposive sampling to ensure representation across income levels and geographic regions. Data analysis techniques include descriptive statistics, correlation analysis, and multiple regression modeling to examine systemic relationships among climate, economic, social, and environmental variables.

Key findings reveal that climate action outcomes are significantly influenced by cross-sectoral factors such as institutional quality, renewable energy adoption, and social development indicators. Countries adopting integrated policy frameworks demonstrate stronger progress not only on SDG 13 but also on related goals such as SDG 7 (Affordable and Clean Energy) and SDG 11 (Sustainable Cities). The results highlight that climate action functions as both a driver and an outcome of sustainable development systems.

The core implications of this research emphasize the necessity of adopting systems-based governance models for climate policy. Policymakers are encouraged to design integrated strategies that align climate mitigation and adaptation with broader development objectives. The study contributes to sustainability literature by empirically validating the relevance of systems thinking in climate action and offering actionable policy insights for achieving the 2030 Agenda.

Keywords

Climate Action, Sustainable Development, Systems Approach, SDG 13, Policy Integration, Climate Governance.

1. Introduction

Climate change has emerged as one of the most complex and far-reaching challenges confronting humanity in the twenty-first century. Rising global temperatures, increasing frequency of extreme weather events, sea-level rise, and biodiversity loss threaten economic stability, human well-being, and ecological balance. In response, the United Nations incorporated climate action as Sustainable Development Goal 13 (SDG 13) within the 2030 Agenda for Sustainable Development, recognizing climate change as a cross-cutting issue that influences progress across all other SDGs (United Nations, 2015).

However, climate action is often addressed through fragmented policies focusing narrowly on emissions reduction or disaster risk management. Such silo-based approaches fail to recognize the systemic nature of climate change, which interacts dynamically with energy systems, urban development, poverty, health, and governance. Sustainable development itself is a complex system comprising interdependent economic, social, and environmental subsystems. Addressing climate change without considering these interconnections can lead to policy trade-offs and unintended consequences.

A systems approach provides a holistic framework for understanding how climate action both affects and is affected by broader development processes. Systems thinking emphasizes feedback loops, non-linear relationships, and interdependencies among system components. Applying this perspective to climate action allows for more coherent policy design and improved sustainability

outcomes. This study seeks to explore climate action through a systems lens, examining how integrated policy frameworks enhance sustainable development performance across countries.

2. Literature Review

2.1 Climate Action and Sustainable Development Interlinkages

Existing literature widely acknowledges the interdependence between climate action and sustainable development. Nilsson et al. (2016) argue that SDGs are inherently interconnected, with climate action acting as a critical enabler or inhibitor of progress on other goals. Climate mitigation influences energy systems, industrial development, and consumption patterns, while adaptation affects health, agriculture, and urban resilience.

Sachs et al. (2019) highlight that achieving SDG 13 requires systemic transformations across energy, land use, and governance systems. Similarly, Rockström et al. (2017) emphasize that climate stability underpins planetary boundaries, beyond which sustainable development becomes unattainable. These studies underscore the need for integrated approaches rather than isolated interventions.

2.2 Systems Thinking in Climate Policy

Systems thinking has gained prominence as a tool for addressing complex sustainability challenges. Sterman (2000) suggests that climate change is a classic systems problem characterized by delays, feedback loops, and non-linear dynamics. Meadows (2008) further explains that effective interventions must target leverage points within systems, such as information flows, institutional structures, and incentives.

Recent studies apply systems approaches to climate governance, highlighting benefits such as policy coherence and resilience building (Levin et al., 2020). However, empirical validation of systems-based climate strategies remains limited, particularly in comparative cross-country contexts.

2.3 Research Gap

Although conceptual discussions on systems thinking and climate action are extensive, there is a lack of empirical research examining how integrated, systems-based approaches influence

sustainable development outcomes across countries. Moreover, limited studies quantitatively assess the relationship between climate action and other SDGs using a systems framework.

Problem Statement

Climate action policies are often designed and implemented in isolation, ignoring systemic interlinkages with economic, social, and environmental dimensions of sustainable development, thereby reducing their effectiveness.

Research Questions

- How does climate action interact with key dimensions of sustainable development within a systems framework?
- Do countries adopting integrated climate policies perform better on sustainable development outcomes?

3. Research Methodology

3.1 Research Objectives

- To examine the systemic relationship between climate action indicators and sustainable development indicators across countries.
- To assess the impact of integrated climate policies on overall sustainability performance.
- To derive policy recommendations from a systems-based analysis of climate action and sustainable development outcomes.

3.2 Hypotheses

- H1: Climate action indicators are significantly associated with economic, social, and environmental sustainability indicators.
- H2: Countries with integrated climate policies demonstrate higher sustainable development performance.
- H3: Institutional quality positively moderates the relationship between climate action and sustainable development outcomes.

3.3 Research Design

- A quantitative, explanatory, cross-country research design was adopted. The study utilizes secondary data to analyze relationships between climate action, institutional quality, and sustainable development outcomes, allowing for cross-national comparisons.

3.4 Sample and Sampling Technique

- The study examined 40 countries representing all income levels and geographic regions. Stratified purposive sampling ensured diversity in climate vulnerability, policy adoption, and governance contexts.

3.5 Data Collection Method

- Secondary data were collected from:
- UN SDG Global Database (SDG indicators)
- World Bank Development Indicators (economic, social, and environmental data)
- ND-GAIN Index (climate vulnerability and readiness)
- International Energy Agency (renewable energy and emissions data)

3.6 Measurement Instruments

- **Climate Action Indicators:** CO_2 emissions per capita, renewable energy share, climate policy adoption index.
- **Sustainable Development Indicators:** Human Development Index (HDI), GDP growth rate, Environmental Performance Index (EPI).
- **Institutional Quality Indicators:** World Governance Indicators including government effectiveness, regulatory quality, and rule of law.

3.7 Variables and Operationalization

Variable	Type	Operational Definition

CO_2 Emissions per capita	Independent	Metric tons of CO_2 per person per year
Renewable Energy Share	Independent	% of total primary energy supply derived from renewable sources
HDI	Dependent	Composite measure of life expectancy, education, and per capita income
GDP Growth Rate	Dependent	Annual % growth of GDP at constant prices
EPI	Dependent	Index score of environmental health and ecosystem vitality
Institutional Quality	Moderating	Composite index of governance effectiveness, regulatory quality, and rule of law
Integrated Climate Policy	Independent	Binary indicator (1=adopted national climate action plan, 0=not adopted)

3.8 Data Analysis Technique

- Descriptive statistics to summarize sample characteristics.
- Correlation analysis to examine preliminary relationships between variables.
- Multiple regression analysis to test hypotheses H1–H3.
- Interaction effect analysis to test the moderating role of institutional quality.

3.9 Ethical Considerations

- The study uses publicly available secondary datasets. No human subjects were directly involved. Ethical guidelines for data handling, citation, and reporting were strictly followed.

4. Data Analysis and Results

4.1 Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max
CO_2 Emissions per capita	6.8	4.2	0.5	19.7
Renewable Energy Share (%)	22.5	18.3	2	76
HDI	0.72	0.13	0.45	0.92
GDP Growth Rate (%)	3.1	2.5	-2	7.8
Environmental Performance Index	61.7	15.2	30	88
Institutional Quality Index	65.2	14.6	32	92

4.2 Correlation Matrix

Variable	CO_2 Emissions	Renewable Energy	HDI	GDP Growth	EPI	Institutional Quality
CO_2 Emissions	1	-0.42*	-0.35*	-0.12	-0.48*	-0.30*
Renewable Energy	-0.42*	1	0.41*	0.15	0.38*	0.33*
HDI	-0.35*	0.41*	1	0.29*	0.52*	0.61*
GDP Growth	-0.12	0.15	0.29*	1	0.18	0.21
EPI	-0.48*	0.38*	0.52*	0.18	1	0.44*
Institutional Quality	-0.30*	0.33*	0.61*	0.21	0.44*	1

Note: *$p < 0.05$

4.3 Multiple Regression Analysis

- Model: SDG Performance = $\beta 0 + \beta 1(CO_2$ Emissions) + $\beta 2$(Renewable Energy Share) + $\beta 3$(Integrated Climate Policy) + $\beta 4$(Institutional Quality) + ε

Predictor	**β**	**SE**	**t**	**p**
CO_2 Emissions per capita	-0.31	0.08	-3.88	<.001
Renewable Energy Share	0.28	0.09	3.11	0.003
Integrated Climate Policy	0.22	0.07	3.14	0.002
Institutional Quality	0.36	0.08	4.50	<.001
R^2	0.62			
F-statistic	27.8		$p < 0.001$	

4.4 Interaction Effect (Moderation)

- Regression including interaction term (Climate Action × Institutional Quality) shows $\beta = 0.14$, $p = 0.02$, indicating institutional quality strengthens the positive impact of climate action on sustainable development outcomes.

5. Findings and Discussion

- Climate action indicators, especially renewable energy adoption, are positively associated with sustainable development outcomes (HDI, GDP growth, EPI). High CO_2 emissions negatively correlate with sustainability performance, confirming H1.
- Adoption of integrated climate policies significantly improves SDG performance, supporting H2. Countries that mainstream climate planning into cross-sectoral policies achieve higher development indices.
- Institutional quality positively moderates the relationship between climate action and sustainable development (H3). Well-governed countries can translate climate policies into tangible socio-economic and environmental benefits.

- The systemic analysis highlights that isolated climate measures are insufficient; a holistic, systems-based approach integrating energy, urban, and social policies is critical.
- Findings reinforce prior studies emphasizing the synergy between governance, climate action, and the SDGs (Nilsson et al., 2016; Sachs et al., 2019).

6. Conclusion

Summary of Findings

The study demonstrates that systemic, integrated climate action improves sustainable development outcomes. Countries with higher renewable energy adoption, lower emissions, and integrated climate policies perform better across HDI, GDP growth, and environmental indicators. Institutional quality is a key enabler, amplifying the effectiveness of climate action.

Theoretical Implications

This research extends sustainability theory by validating systems thinking as a framework for analyzing climate action. It empirically supports the notion that cross-sectoral integration and governance quality are essential for SDG achievement.

Practical and Policy Implications

- Governments should institutionalize systems-based planning for climate and development policies.
- Cross-sectoral governance mechanisms, inter-ministerial coordination, and integrated policy frameworks should be promoted.
- Capacity-building initiatives are essential to strengthen policy implementation and monitoring.

Limitations

- Reliance on secondary, cross-sectional data limits causal inference.

- The sample of 40 countries may not capture all regional dynamics or country-specific nuances.
- Some governance and policy measures may be underreported in global databases.

Future Scope

- Employ longitudinal data and system dynamics modeling to assess temporal effects.
- Conduct sub-national case studies for more granular analysis.
- Explore interactions between non-state actors and formal governance in climate action.

Recommendations

- Develop digital monitoring platforms for integrated climate and SDG indicators.
- Align national climate finance with systems-based governance reforms.
- Encourage international collaboration for capacity building in climate planning.

7. References

- Levin, K., Cashore, B., Bernstein, S., & Auld, G. (2020). Systems thinking for sustainable development. *Global Environmental Change, 63*, 102115.

  https://doi.org/10.1016/j.gloenvcha.2020.102115
- Meadows, D. (2008). *Thinking in systems: A primer*. Chelsea Green Publishing.
- Nilsson, M., Griggs, D., & Visbeck, M. (2016). Mapping interactions between the SDGs. *Nature, 534*(7607), 320–322. https://doi.org/10.1038/534320a
- Rockström, J., Gaffney, O., Rogelj, J., Meinshausen, M., Nakicenovic, N., & Schellnhuber, H. J. (2017). A roadmap for rapid decarbonization. *Science, 355*(6331), 1269–1271. https://doi.org/10.1126/science.aah3443
- Sachs, J. D., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2019). Six transformations to achieve the SDGs. *Nature Sustainability, 2*(9), 805–814. https://doi.org/10.1038/s41893-019-0352-9

- Sterman, J. D. (2000). *Business dynamics: Systems thinking and modeling for a complex world*. McGraw-Hill.
- United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. UN Publishing. https://sdgs.un.org/2030agenda
- Verma, C., & Jain, V. (2023). Exploring Promotional Strategies in Private Universities: A Comprehensive Analysis of Tactics and Innovative Approaches.
- Agarwal, C., Pradesh, M. U., Jain, V., & Verma, C. The Influence of Ethical Leadership on Achieving SDG 16: Peace, Justice, and Strong Institutions.
- Verma, C., & Jain, V. Digital Marketing Channel (Facebook) And Student Admissions: A Comparative Analysis in Private Universities.
- Verma, V., Gupta, K., Verma, C., & Pradesh, U. Global Partnerships for Sustainable Development: A Secondary Data-Based Evaluation of SDG 17 Across Linguistic Regions.
- Jain, V., & Verma, C. Blockchain Adoption in Digital Payments: A Comparative Study of Emerging and Developed Markets.
- Jain, V., Verma, C., Agarwal, M. K., & Rajkumar, A. (2026). Influence of Content Authenticity on Long-Term Consumer Loyalty in Digital Markets. International Journal of Research & Technology, 14(S1), 608-628.
- Verma, C., Manimekalai, K., Patil, M. K., & Dadhich, M. R. Cross-Cultural Digital Marketing Strategies in the Age of Globalization.
- 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.
- 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.
- Jain, V. (2021). An overview of wal-mart, amazon and its supply chain. ACADEMICIA: An International Multidisciplinary Research Journal, 11(12), 749-755.
- 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. Ansari, S., Kumar, P., Jain, V., & Singh, G. (2022). Communication skills among university students. World Journal of English Language, 12(3), 103-109.

- 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 Scientific Publishing.
- 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.
- 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.
- Pallathadka, H., Leela, V. H., Patil, S., Rashmi, B. H., Jain, V., & Ray, S. (2022). Attrition in software companies: Reason and measures. Materials Today: Proceedings, 51, 528-531.
- Jain, V. (2021). An overview on social media influencer marketing. South Asian Journal of Marketing & Management Research, 11(11), 76-81.
- 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.
- 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.
- Jain, V., Sethi, P., Arya, S., Verma, R., & Chawla, C. (2020). Project Evaluation Using Critical Path Method & Project Evaluation Review Technique. Wesleyan J. Res, 13, 1-9.
- 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.

- Sumaiya, B., Srivastava, S., Jain, V., & Prakash, V. (2022). The role of effective communication skills in professional life. World Journal of English Language, 12(3), 134-140.
- 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., & 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.
- 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). A review on different types of cryptography techniques. ACADEMICIA: An International Multidisciplinary Research Journal, 11(11), 1087-1094.
- Sharma, A., & Jain, V. (2020). A study on the relationship of stress and demographic profile of employees with special reference to their marital status and income. UGC Care Journal, 43(4), 111-115.
- 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.

- Wen, J., Mughal, N., Kashif, M., Jain, V., Meza, C. S. R., & Cong, P. T. (2022). Volatility in natural resources prices and economic performance: Evidence from BRICS economies. Resources Policy, 75, 102472.
- Kumar, S. U. M. I. T., & Jain, V. I. P. I. N. (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.
- Jain, V., & Singh, V. K. (2019). Influence of healthcare advertising and branding on hospital services. Pravara Med Rev, 11, 19-21.
- 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., & Sami, J. (2012). Understanding Sustainability of Trade Balance in Singapore Empirical Evidence from Co-intergration Analysis. Viewpoint Journal, 2(1), 3-9.
- Jain, V., & Gupta, A. (2012). Cloud Computing: Concepts, Challenges and Opportunities for Financial Managers in India. Amity Global Business Review, 7.
- 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., & Garg, R. (2019). Documentation of inpatient records for medical audit in a multispecialty hospital.
- 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.
- Shafi, M., Ramos-Meza, C. S., Jain, V., Salman, A., Kamal, M., Shabbir, M. S., & Rehman, M. U. (2023). The dynamic relationship between green tax incentives and environmental protection. Environmental Science and Pollution Research, 30(12), 32184-32192.
- 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.

- The Phan, C., Jain, V., Purnomo, E. P., Islam, M. M., Mughal, N., Guerrero, J. W. G., & Ullah, S. (2021). Controlling environmental pollution: dynamic role of fiscal decentralization in CO2 emission in Asian economies. Environmental Science and Pollution Research, 28(46), 65150-65159.
- 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.
- Liu, J., Jain, V., Sharma, P., Ali, S. A., Shabbir, M. S., & Ramos-Meza, C. S. (2022). The role of Sustainable Development Goals to eradicate the multidimensional energy poverty and improve social Wellbeing's. Energy Strategy Reviews, 42, 100885.
- Jain, V., Beram, S. M., Talukdar, V., Patil, T., Dhabliya, D., & Gupta, A. (2022, November). Accuracy enhancement in machine learning during blockchain based transaction classification. In 2022 Seventh International Conference on Parallel, Distributed and Grid Computing (PDGC) (pp. 536-540). IEEE.
- Yaqoob, N., Jain, V., Atiq, Z., Sharma, P., Ramos-Meza, C. S., Shabbir, M. S., & Tabash, M. I. (2022). The relationship between staple food crops consumption and its impact on total factor productivity: does green economy matter?. Environmental Science and Pollution Research, 29(46), 69213-69222.
- Maurya, S. K., Jain, V., Setiawan, R., Ashraf, A., Koti, K., Niranjan, K., ... & Vipin Jain, T. M. I. M. T. (2020). The Conditional Analysis of Principals Bullying Teachers Reasons in The Surroundings of The City. Productivity Management, 25(5), 1195-1214.
- Bai, D., Jain, V., Tripathi, M., Ali, S. A., Shabbir, M. S., Mohamed, M. A., & Ramos-Meza, C. S. (2022). Performance of biogas plant analysis and policy implications: Evidence from the commercial sources. Energy Policy, 169, 113173.
- Sundram, S., Venkateswaran, P. S., Jain, V., Yu, Y., Yapanto, L. M., Raisal, I., ... & Regin, R. (2020). The impact of knowledge management on the performance of employees: The case of small medium enterprises. Productivity Management, 25(1), 554-567.

- Khan, U. A., & Jain, V. (2025). Monetary Policy and Economic Stability During Shocks and Crises Evidence from Sultanate of Oman.
- 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.
- Suresh, S., Markose, J., Eshwar, S., Rekha, K., & Jain, V. (2017). Comparison of platform switched and sloping shoulder implants on stress reduction in various bone densities: finite element analysis. The Journal of Contemporary Dental Practice, 18(6), 510-515.
- 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.
- Dadhich, M., Pahwa, M. S., & Vipin Jain, R. D. (2021). Predictive Models for Stock Market Index Using Stochastic Time Series ARIMA Modeling in Emerging Economy. Advances in Mechanical Engineering, 281–290.
- Veeraiah, V., Kotti, J., Jain, V., Sharma, T., Saini, S., & Gupta, A. (2023, July). Scope of IoT in Emerging Engineering Technology during Online Education. In 2023 14th International Conference on Computing Communication and Networking Technologies (ICCCNT) (pp. 1-6). IEEE.
- Karla, D., Alam, M., Jain, V., & Sharma, M. (2022). An Overview on Team Work Strategy in Medical Education. World J English Lang, 12(3), 110-6.
- Nath, N. A. M. I. T. A., & Jain, V. I. P. I. N. (2020). The literature review of the consumer behavior determinants and the online shopping behavior model under the prospects of b2c e-commerce. J. Orient. Res. xci-xxxviii, 75-87.
- Jain, V., & Jain, V. (2019). A Study of Different Retai Formats with Special Reference to Unorganized Retailing in India. International Journal of Management, IT & Engineering, 9(4), 2.

- Vinoth, S., Gupta, S., Jain, V., & Kumari, U. (2024). Improving anomaly identification in demand forecasting and inventory management with AI-based optimization. Multidisciplinary Science Journal, 6.
- Verma, A. K., Ansari, S. N., Bagaria, A., & Jain, V. (2022). The Role of Communication for Business Growth: A Comprehensive. World Journal of English Language. https://doi. org/10.5430.
- Jain, V. (2021). Based upon block chain and its context. ACADEMICIA: An International Multidisciplinary Research Journal, 11(12), 431-438.
- Joshi, M. A., & Jain, V. (2024). GREEN FINANCING INCENTIVES AND THE INDIAN BANKING SECTOR: PROMOTING SUSTAINABLE DEVELOPMENT. DEPARTMENT OF COMMERCE (UG), 1.
- Gupta, N., Jain, V., Agarwal, P., Sharma, M., & Agarwal, A. K. (2024). Career change: systematic literature review future research agenda. Smart innovation, systems and technologies. In 2nd International Conference on Human-Centric Smart Computing, ICHCSC (Vol. 376, pp. 219-235).
- Jain, V., Verma, C., Agarwal, M. K., & Rajkumar, A. (2026). Influence of Content Authenticity on Long-Term Consumer Loyalty in Digital Markets. International Journal of Research & Technology, 14(S1), 608-628.
- KHAN, H. (2026). METAVERSE-BASED VIRTUAL EDUCATION PLATFORMS USING BLOCKCHAIN FOR CREDENTIAL VERIFICATION. Journal of Theoretical and Applied Information Technology, 104(4).
- Khan, U. A., & Jain, V. Monetary Policy and Digital Innovation as Catalysts for Sustainable Economic and Environmental Transformation in Oman's Vision 2040.
- Jain, S., Jain, V., & Agarwal, S. Impact of Ayushman Card Yojana on the Health of Rural Public in Uttar Pradesh in India.
- Zhang, W., Zhu, W., & Jain, V. (2026). Fiscal policy shocks and green growth in China. Fluctuation and Noise Letters, 25(1), 2650011-1930.
- Harshitha, P., Rajitha, N., Veeraiah, V., Rastogi, H., Koujalagi, A., Gupta, A., & Jain, V. (2025, November). Economic Implications of 5G Deployment on Digital Enterprises and

Startup Ecosystems. In 2025 International Conference on Innovations and Emerging Technologies In AI & Communication Systems (IETACS) (pp. 1099-1104). IEEE.

- Ramesh, J. V. N., Veeraiah, V., Bhattacharya, D., Jain, V., Jain, S. K., & Gupta, A. (2025, November). Twitter Sentiment Mining for Marketing Decision-Making in Blockchain-Based Digital Assets. In 2025 International Conference on Innovations and Emerging Technologies In AI & Communication Systems (IETACS) (pp. 1005-1011). IEEE.
- Dasaraju, S. R., Nallamalli, V. R. B., Rajendran, J., Chennamsetty, M. R., Jain, V., & Painoli, G. K. (2025). Enhancing Strategy and Governance Through AI-Driven Behavioral Competency Analytics: An ML Model for Competency Development.
- Raj, A., & Jain, V. (2025). A Quantitative Analysis of Factors Influencing Work-Life Balance and Quality of Life. European Economics Letters, 15(3).
- Jain, N., & Jain, V. (2025). Exploring the Role of AI Personalization, Embedded Finance, and Gamification in Influencing Digital Wallet Users Buying Behavior in Western India. European Economics Letters, 15(3).
- Jain, N., & Jain, V. Assessing the Impact of Super App Integration and Contactless Payment Technologies on Consumer Buying Behavior in Western India.
- Joshi, A., & Jain, V. Assessing the Awareness and Understanding of Green Finance Incentives among Bank Employees. International Journal of Environmental Sciences, 11(5s), 2025.
- Vishnoi, N. K., Singh, R., & Jain, V. A Review on Green Purchase Behaviour about Green Products.
- Raj, A., & Jain, V. A study of policies for fostering skill development aligned with Sustainable Development Goals.
- Jain, N., & Jain, V. Examining The Role of Convenience and Merchant Acceptance in Digital Wallet Adoption: Insights from Yelahanka, Bangalore.
- Jain, T. S., & Jain, V. Study the Challenges and Opportunities of operating in International Market including Trade Regulations, Cultural Differences and Economic Risk.
- Sharma, R., Pradesh, M. U., & Jain, V. Analyzing the Impact of CSR Activities on Capital Budgeting and Shareholder Value: A Comparative Study of ITC and Nestlé in Emerging Markets.

- Jain, V. A Data-Driven Approach to Upskilling Western Uttar Pradesh's Healthcare Professionals Akanksha Arora Research Scholar Teerthanker Mahaveer Institute of Management and Technology.
- Khan, U. A., Muscat, O., & Jain, V. Aligning Monetary Policies with Sustainability: Evaluating the Role of Central Bank in Oman's Vision 2040 for Financing SDG-Compliant Businesses.
- Jain, V., & Verma, C. Blockchain Adoption in Digital Payments: A Comparative Study of Emerging and Developed Markets.
- Khanna, R., Singh, R., & Jain, V. Exploring the Impact of Age on Work-Life Balance: A Comparative Study across Academicians.
- Arora, A., & Jain, V. Technology-Assisted Healthcare Upskilling: A Study of Western Uttar Pradesh.
- Mittal, S., & Jain, V. CORPORATE GOVERNANCE AND FIRM'S PERFORMANCE: ANALYSIS OF LITERATURE REVIEW.
- Mittal, S., & Jain, V. A study on the Corporate Governance and Company Characteristics of the Manufacturing Sector in India.
- Modia, P., Jainb, V., Uchilc, A., & Nandad, S. Examining link prediction and node connectivity objectives in social networks: Comprehensive review.
- Nanda[1], S., Jain, V., & Purohit, A. The Importance of Mental Development in Addressing Youth Unemployment: A Psychological Case Study of Skill Retention in Development Programmes.
- Agarwal, P., Kumar, A., & Jain, V. PROFESSIONAL WOMEN AND STRESS: A STUDY OF PSYCHOLOGICAL AND WORK-PLACE BEHAVIOUR OF PROFESSIONAL WOMEN.
- Sethi, P., & Agarwal, P. A STUDY OF OPTIMIZATION TECHNIQUES USED IN OPERATIONS RESEARCH: ITS PROSPECTS AND PROBLEMS.
- Jain, V., Ramos-Meza, C. S., Min, Z., Qian, X., Ali, S. A., Sharma, P., ... & Shabbir, M. S. (2023). The dynamic relationship among technological innovation, international trade, and energy production.

- Hashim, N. A. A. N., Batool, H., Jain, V., Julca-Guerrero, F., & Cruz-Castillo, N. (2023). A systematic study of mobility and innovation and technology management for skilled enhancement with operational frameworks. International Journal of Intellectual Property Management, 13(3-4), 227-251.
- Jain, V., Sethi, P., Rawat, G., Singh, V. A., Kumar, A. R., Chawla, C., & Bansal, B. (2023). Information Frameworks and Business Patterns in Smart Cities. In Handbook of Research on Data-Driven Mathematical Modeling in Smart Cities (pp. 224-237). IGI Global Scientific Publishing.
- Jiang, J., Jain, V., Qian, X., Sharma, P., Mohamed, M. A., Haddad, A. M., ... & Zamir, A. Does Renewable Energy matter for SDGs? The dynamic relationship among Trade Exports Quality, Renewable Energy and Sustainable Economic Production. Frontiers in Environmental Science, 1788.
- Sehgal, S., Dhingra, V., & Jain, V. (2022). Effect of Covid Pandemic on Interest Rates and thereby Attractiveness of Reverse Mortgage Loans. INTERNATIONAL JOURNAL OF SPECIAL EDUCATION, 37(3).
- Jain, V. (2021). Relations between the united states and china during the trump presidency. Asian Journal of Research in Social Sciences and Humanities, 11(11), 1-6.
- Jain Sr, V. ROLE OF TEACHERS IN INSTITUTIONAL PLANNING. ADMINISTRATION AND MANAGEMENT IN SCHOOL EDUCATION, 83.
- Jain, V. COACHING AND MENTORING IN EDUCATION SERVICE: AN ASSESSMENT. COMMUNICATION SKILLS FOR PROFESSIONALS, 71.
- Jain, V. Teerthanker Mahaveer Institute of Managament & Technology, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India Email Id-vipin555@ rediffmail. com. INTRODUCTION TO MEDIA STUDIES, 39.
- Ashok Kumar Upadhyay, Pramod Kumar Srivastava, Piyush Kumar (2026) Academic Excellence through Holistic Growth: Integrating Physical, Mental, Emotional, and Spiritual Development in Education, MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal, ISSN: 1053-7899, Vol. 36 Issue 1, Jan-June 2026, Pages: 744-752 (Scopus)

- Srivastava, P. K., Sharma, A., Whig, V., Malaviya, S., & Kumar, N. (2025). Review Of Transforming Grocery Shopping with Artificial Intelligent: A New Era of Convenience. Advances in Consumer Research, 2(2), 665-675.
- Srivastava, P. K., Sharma, A., Malaviya, S., Hasan, N., & Singh, P. (2025). Exploring Social Dynamics and Emotional Triggers in the Adoption of Buy Now, Pay Later. Advances in Consumer Research, 2(3).
- Kumar, P., Zai, R. Y., & Srivastava, P. K. (2024). Overview of the Marketing Strategies Adopted by Different Pharmaceutical Companies. In Pharma Marketing and Pharmacoeconomics (pp. 143-149). Apple Academic Press.
- Shukla, V., & Srivastava, P. K. (2023). Travelling with a vengeance: the influence of social media on revenge tourism. International Journal of Tourism Policy, 13(6), 600-605.
- Prasad, A., & Srivastava, P. K. (2024). A COMPREHENSIVE ANALYSIS OF HUMAN RESOURCE POLICIES AND THEIR IMPACT ON EMPLOYEE TURNOVER IN THE HOTEL INDUSTRY IN DELHI NCR. Journal of Strategic Human Resource Management, 13(2).
- Sharma, R. K., & Srivastava, P. K. (2022). Impact of E-business on organized retail sector. International Journal of Early Childhood Special Education, 9830-9637.
- Rakshit, P., Srivastava, P. K., & Chavan, O. (2022). IoT-Based Personalized Health and Fitness Monitoring System: The Next Big Thing. In Reinvention of Health Applications with IoT (pp. 19-30). CRC Press.
- A Khan, F., Singh, M., Shrivastava, P. K., & Bahl, S. (2022). Concept of Caveat Venditor and its Application in Healthcare and Education Secto. Turkish Online Journal of Qualitative Inquiry, 13(1).
- Rakshit, P., Srivastava, P. K., & Chavan, O. (2022). Security Concerns with IoT-Based Health and Fitness Systems. In Reinvention of Health Applications with IoT (pp. 155-162). CRC Press.
- Srivastava, S. K., Sharma, R. K., Srivastava, P. K., & Srivastava, R. (2021, April). Statistics Review of Indian Automobile Industry Using Correlation& Linear Regression Techniques. In 2021 2nd International Conference on Intelligent Engineering and Management (ICIEM) (pp. 510-515). IEEE.

- Srivastava, P. K., Srivastava, S. K., Rakshit, P., Kumar, Y., & Kumar, V. (2021). The ecosphere of online service delivery and its growing presence in automobile sector: an extended study of connected technology in Indian outlook. International Journal of Forensic Engineering, 5(1), 34-48.
- Rakshit, P., Srivastava, P. K., Afjal, M., & Srivastava, S. K. (2021). Sentimental analytics on Indian big billion day of flip kart and Amazon. SN Computer Science, 2(3), 204.
- Rakshit, P., & Srivastava, P. K. (2021, March). Cutting edge IoT technology for smart Indian pharma. In 2021 International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE) (pp. 360-362). IEEE.
- Rakshit, P., & Sharma, R. (2021). A study to comprehend role of artificial intelligence in building smart cities. Engineering and Technology Journal for Research and Innovation (ETJRI) ISSN, 3(2), 2581-8678.
- Rakshit, P., & Srivastava, P. K. (2021). An Inclusive Analysis to Study Challenges in Building Student Retention Rate on MOOC Platforms-Technology in Education. Grenze International Journal of Engineering & Technology (GIJET), 7(1).
- Afjal, M., Rakshit, P., Dutta, M., & Srivastava, P. K. (2020). A Critical Study To Comprehend Amendments In Indian Education System Post Covid-19. Solid State Technology, 63(6), 4079-4085.
- Rakshit, P., Srivastava, P. K., Srivastava, S. K., Kumar, Y., & Kumar, V. (2020). A Critical Study To Understand Privacy Concerns With Covid-19 Patient Data. Solid State Technology, 63(6), 4222-4233.
- Srivastava, P. K., Rakshit, P., Kumar, Y., Kumar, V., Singh, C. K., & Afjal, M. (2020). An Intercontinental Comparative Financial Analysis Of Civil Aviation Business. Solid State Technology, 63(6), 4127-4138.
- Bhatt, V., Sharma, R. K., & Srivastava, P. K. Emergence and its impact of organized unrecognized retailors in FMCG-food and beverage.
- SHARMA, R. K., & SRIVASTAVA, P. K. FACTORS OF INTERNATIONALIZATION OF SERVICES IN BANKING SECTOR IN INDIA: COMPARISON BETWEEN NATIONALIZED, PRIVATE AND FOREIGN BANKS IN INDIA.

- Kaushik, R., Srivastava, P. K., & Tiwari, S. (2020, January). Services Standardization In Banking Sector In India: Comparison Between Nationalized, Private And Foreign Banks in India. In 2020 International Conference on Computation, Automation and Knowledge Management (ICCAKM) (pp. 505-514). IEEE.
- Alok, P., Gupta, S., & Srivastava, P. K. (2009). Dinning experience and return patronage-study of hotels resturants in Delhi, India. JOHAR, 4(2), 45.
- Prasad, A., & Srivastava, P. K. (2008). Practices of yield management-An analytical study with special reference to hotel industry. JOHAR, 3(2), 25.