ABOUT THE INSTITUTION

The growth and development of the nation is largely depended upon the spread of education and intelligence to the people. Having this idealistic vision, two great philanthropists of Pollachi, Late. Shri. S.P. Nallamuthu Gounder and Late. Arutchelver Padmabhushan Dr. N.Mahalingam formed an organization called Pollachi Kalvi Kazhagam, which started Nallamuthu Gounder Mahalingam College in 1957, to impart holistic education with an objective to cater to the higher educational needs of those who wish to aspire for excellence in knowledge and values. The College has achieved greater academic distinctions with the introduction of Autonomous System from the Academic year 1987-88. The college has been Re-Accredited by NAAC with A++ and it is an ISO 9001: 2015 Certified Institution. The total student strength is around 5000+. Having celebrated its Diamond Jubilee in 2017, the college has blossomed into a premier Post-Graduate and Research Institution, offering 26 UG, 11 PG and 13 Ph. D. Programmes, in addition to Diploma and Certificate Courses. The college has been ranked within Top 101-150 in India by NIRF 2024 and ranked 18th as best Commerce Institution in India by Outlook-ICARE Ranking 2024

ABOUT THE DEPARTMENT

The PG Department of Commerce with International Business is established in the year 2002 with a prime motto to uplift the rural students to know the edge in the specialized field of International Business. The curricula is designed and developed at regular interval, once in a year. The PG programme is catering students from multidiscipline, the course is framed in-order to fulfil the needs and wants of the students and industry as well. The UG programme in the same discipline is initiated as a mark of the Diamond Jubilee Year of the College in 2017. The Department focuses on nurturing entrepreneurial skills, leadership qualities and preparing the students as leader of future.It involves the students in various Skill Development Programme, Orientation Programme, Workshop and Extension Activities. It keenly concentrates on the recent trends prevailing in the environment, update its curriculum to match it with the industrial needs and enrich the students accordingly, so as to get success with the help of Team Work. The Strength of the Department is its Qualified Faculty Team which always focuses on achieving the goals of Student and College as well.

ISBN 978-93-94004-44-3

One Day National Seminar on
ARTIFICIAL INTELLIGENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT
ETHICAL IMPLICATIONS IN AUTOMATION, TRANSPARENCY & SUSTAINABILITY

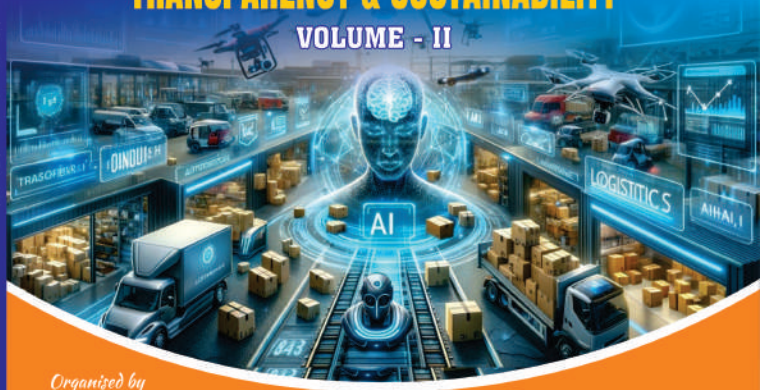
VOLUME - II

ICSSR Sponsored

One Day National Seminar on

ARTIFICIAL INTELLIGENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT ETHICAL IMPLICATIONS IN AUTOMATION, TRANSPARENCY & SUSTAINABILITY

VOLUME - II



Organised by

PG DEPARTMENT OF COMMERCE WITH INTERNATIONAL BUSINESS

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

An Autonomous Institution Affiliated to Bharathiar University
Re-Accredited with A+ + by NAAC & ISO 9001:2015 Certified
NIRF Ranking 101 -150
Pollachi, Coimbatore – 642001 Tamil Nadu

Editors in Chief
Dr. D.Divya | Dr. G.Vignesh

ARTIFICIAL INTELLIGENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT ETHICAL IMPLICATIONS IN AUTOMATION, TRANSPARENCY & SUSTAINABILITY

Volume - II

Editors in Chief

Dr. D. Divya | Dr. G. Vignesh

Sponsored by

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH (ICSSR),

New Delhi

Organised by

PG DEPARTMENT OF COMMERCE WITH INTERNATIONAL BUSINESS

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

An Autonomous Institution Affiliated to Bharathiar University

Re-Accredited with A++ by NAAC & ISO 9001:2015 Certified

NIRF Ranking 101 -150

Pollachi, Coimbatore – 642001 Tamil Nadu

Artificial Intelligence in Logistics and Supply Chain Management Ethical Implications in Automation, Transparency & Sustainability

Editors in Chief: **Dr. D. Divya**
Dr. G. Vignesh

Editors : **Dr. B. Rohini**
Mrs. M. Ragaprabha

First Edition: 2025

Volume: II

ISBN : 978-93-94004-44-3

Price: Rs. 650

Printed at
SHANLAX PUBLICATIONS
61, 66 T.P.K. Main Road
Vasantha Nagar
Madurai – 625003
Tamil Nadu, India

Ph: 0452-4208765,
Mobile: 7639303383
email:publisher@shanlaxpublications.com
web: www.shanlaxpublications.com

WOMEN ENTREPRENEURS IN THE AI-POWERED LOGISTICS REVOLUTION

Dr. A. Anandhiprabha
Assistant Professor
Department of Commerce – Banking and Insurance
Nallamuthu Gounder Mahalingam College, Pollachi, Tamilnadu.
anandhiaruchamy@gmail.com

Abstract

The integration of Artificial Intelligence (AI) in logistics is transforming supply chain efficiency through automation, predictive analytics, and real-time data processing. However, women entrepreneurs remain significantly underrepresented in AI-driven logistics due to systemic barriers such as gender bias, limited funding access, and networking constraints. This study examines the participation of women in AI-powered logistics, analyzing key challenges and opportunities. Using a descriptive research design and survey data from 424 women entrepreneurs, the study highlights AI adoption trends, business ownership patterns, and financial disparities. Findings indicate that while AI improves operational efficiency and cost reduction, gender disparities persist, limiting women's full participation. Increased AI education, policy interventions, and inclusive funding mechanisms are essential to fostering a gender-equitable AI logistics sector. By addressing these challenges, the industry can unlock the potential of women-led AI-driven logistics startups, contributing to a more diverse, innovative, and sustainable global supply chain.

Keywords: *Women Entrepreneurs, AI-Powered Logistics, Gender Inclusivity, Supply Chain Innovation, Funding Barriers*

Introduction

The global logistics industry is undergoing a transformative shift with the rapid integration of Artificial Intelligence (AI), reshaping supply chains through automation, predictive analytics, and real-time data processing. AI-powered logistics solutions are enhancing efficiency, reducing operational costs, and improving decision-making across the supply chain. As industries embrace AI-driven innovations, the logistics sector is becoming more dynamic, intelligent, and capable of meeting growing global demands. However, despite the immense potential of AI in revolutionizing logistics, women entrepreneurs remain significantly underrepresented in this evolving landscape.

Women in logistics face persistent challenges, including gender bias, restricted access to funding, and limited professional networking opportunities. Traditional barriers have historically prevented women from fully participating in tech-driven industries, and the logistics sector is no exception. Although women have played key roles in supply chain management, their presence in AI-powered logistics startups remains relatively low. Yet, the increasing adoption of AI presents a unique opportunity for women entrepreneurs to disrupt the industry, lead innovative startups, and contribute to shaping the future of intelligent logistics.

With AI-driven platforms enabling automation in inventory management, route optimization, and demand forecasting, women entrepreneurs are leveraging these technologies to improve operational efficiency and enhance competitiveness. The rise of AI-powered logistics startups led by women demonstrates that, when provided with the right resources and support, female entrepreneurs can drive industry-wide advancements. However, despite this progress, the gender gap remains substantial, and women continue to face structural and systemic challenges

in scaling AI-driven businesses. As AI continues to redefine logistics, fostering a more inclusive environment for women entrepreneurs is crucial for unlocking the full potential of this technology. Policymakers, investors, and industry stakeholders must work together to create supportive frameworks that enable women-led businesses to thrive. By addressing funding inequalities, enhancing AI education for women, and implementing gender-inclusive policies, the logistics sector can move toward a more diverse and innovative future. Through this study, we aim to contribute to the broader discourse on women's empowerment in AI-powered industries and advocate for a logistics revolution that is both technologically advanced and gender-inclusive.

Review of Literature

The role of women in AI-driven industries has been a growing area of academic and industry research. According to a report by UNESCO (2023), women represent only 22% of AI professionals globally, highlighting a significant gender gap in the field. This underrepresentation extends to AI-powered entrepreneurship, where women-led startups face greater funding challenges than their male counterparts. A study by West and Sundaram (2022) found that women-founded AI startups receive only 2% of total venture capital funding, despite demonstrating higher returns on investment. These findings suggest that while women have the potential to drive AI innovation, systemic barriers continue to limit their participation and success in AI-driven businesses, including logistics.

Artificial Intelligence is transforming logistics by optimizing supply chains, reducing costs, and enhancing decision-making through real-time data analytics (Christopher &Holweg, 2021). AI applications such as predictive analytics, automated warehousing, and machine learning-driven route optimization have revolutionized logistics operations, enabling businesses to achieve greater efficiency. Research by Ivanov et al. (2022) highlights that AI adoption in logistics can reduce operational costs by up to 40% and improve delivery accuracy by 30%, making it a crucial factor for competitive advantage. However, studies also suggest that women entrepreneurs in logistics face significant skill gaps in AI adoption, limiting their ability to fully capitalize on these technological advancements.

Women entrepreneurs in AI-driven logistics face numerous challenges, including access to funding, gender bias, and limited networking opportunities (McKinsey & Company, 2023). A study by Patel and Sharma (2022) indicates that over 40% of women in logistics entrepreneurship cite access to capital as their primary barrier, compared to 25% of male entrepreneurs. Furthermore, gender bias in AI decision-making processes and hiring algorithms has been documented as a persistent issue (Kirkpatrick, 2021). Despite these barriers, women-led businesses in logistics are proving to be highly resilient, with some leveraging AI to create innovative, sustainable, and inclusive logistics solutions that cater to diverse market needs.

Government policies play a crucial role in fostering gender inclusivity in AI-powered logistics. The European Commission's 2023 report on Women in Digital Economy highlights policy-driven initiatives aimed at increasing female participation in AI-related fields, including logistics and supply chain management. Countries such as Canada, Germany, and India have introduced AI-focused grants, mentorship programs, and financial incentives to support women entrepreneurs. A study by Chen et al. (2023) emphasizes that regions with strong gender-focused

AI policies experience higher participation rates of women in AI-driven startups, suggesting that targeted interventions can bridge the gender gap in logistics entrepreneurship.

The future of AI-powered logistics presents both challenges and opportunities for women entrepreneurs. Research by Deloitte (2024) predicts that female-led AI startups in logistics could grow by 300% by 2030**,** driven by increased access to AI education, digital financial tools, and supportive policies. Additionally, the rise of sustainable AI solutions in logistics, such as eco-friendly supply chains and carbon-neutral delivery models, provides new opportunities for women entrepreneurs to lead innovation. Studies also suggest that companies with diverse leadership teams in AI and logistics demonstrate higher profitability and greater adaptability to market changes**,** reinforcing the business case for gender-inclusive AI entrepreneurship.

Statement of the Problem

Despite the rapid advancement of AI-powered logistics and its transformative impact on supply chain efficiency, women entrepreneurs remain significantly underrepresented in this sector. While AI-driven logistics solutions offer immense potential for innovation, cost reduction, and operational optimization, systemic barriers such as gender bias, restricted access to funding, and limited professional networks continue to hinder the active participation and success of women entrepreneurs in AI-driven logistics. Existing research highlights the gender disparity in AI-related industries, with women-founded startups receiving disproportionately low venture capital funding and encountering challenges in scaling their businesses. Furthermore, skill gaps in AI adoption, biases in hiring algorithms, and inadequate government support further exacerbate these challenges, limiting the ability of women entrepreneurs to leverage AI technologies effectively.

This study seeks to examine the participation of women entrepreneurs in AI-powered logistics, identify key challenges they face, and explore potential solutions for fostering greater inclusivity. By analyzing AI adoption trends, financial barriers, and gender disparities, the research aims to contribute to the discourse on women's empowerment in AI-driven industries. The findings will provide insights into policy recommendations, investment opportunities, and support mechanisms necessary to bridge the gender gap and enhance women's leadership in the AI-powered logistics revolution.

Objectives of the Study

This study aims to

- To examine the participation of women entrepreneurs in AI-powered logistics.
- To identify key challenges faced by women in AI-driven logistics businesses.
- To assess the impact of AI adoption on women-led logistics startups.
- To explore strategies for promoting greater inclusivity and support for women in AI-powered logistics.

Methodology

Research Design

This study employs a descriptive research design to analyze the participation, challenges, and opportunities for women entrepreneurs in AI-powered logistics. The study uses both quantitative

and qualitative approaches to gain insights into AI adoption, business ownership, and the barriers faced by women in this sector.

Data Collection Method

Primary data was collected through a structured questionnaire, designed to capture demographic details, AI adoption trends, business challenges, and future prospects. The questionnaire included closed-ended questions to quantify responses and Likert scale-based questions to measure perceptions regarding funding access, gender bias, and AI's impact on business operations.

Sample and Sampling Technique

The study surveyed 424 women entrepreneurs and professionals in AI-driven logistics. A purposive sampling technique was employed to ensure representation from women engaged in logistics, whether as startup founders, corporate employees, or aspiring entrepreneurs. The respondents were categorized based on age, experience, business ownership, and AI adoption levels.

Data Analysis Method

The collected data was analyzed using descriptive statistics, including:

- Frequency distributions and percentages to summarize demographic information, AI adoption trends, and challenges.
- Measures of central tendency (mean, median, mode) to interpret responses regarding the impact of AI on logistics.

Findings were presented through tables and percentages to illustrate patterns in AI usage, funding disparities, gender biases, and networking opportunities.

Scope and Limitations

The study focuses on women entrepreneurs in AI-powered logistics, particularly in terms of their challenges, AI adoption levels, and future opportunities. However, the study is limited by:

- **Geographical constraints**, as responses may not represent global trends.
- **Self-reported data**, which may include biases in responses.
- **Limited sample size**, restricting generalization to all women in AI logistics.

Despite these limitations, the study provides valuable insights into the role of women in AI-driven logistics and highlights areas for further research and policy recommendations.

Result and Discussion

The study examines key demographic factors, AI adoption trends, challenges, and future prospects for women entrepreneurs in AI-powered logistics. The data provides insights into their professional backgrounds, business ownership, and the extent of AI integration in logistics operations. Additionally, it highlights barriers such as funding constraints and gender bias while exploring opportunities for growth, sustainability, and global collaboration in the sector.

Table 1 : Demographic Information of Women in AI-Driven Logistics

Category	Sub-category	Frequency (n)	Percentage (n = 424)
Age	18-25	150	35.42%
	26-35	180	42.50%
	36 and above	94	22.08%
Experience in Logistics	0-5 years	160	37.74%
	6-10 years	140	33.02%
	10+ years	124	29.24%
AI-Based Logistics Startup Founder	Yes	85	20.08%
	No	339	79.92%
Education Level	High School	60	14.15%
	Bachelor's Degree	180	42.45%
	Master's Degree	140	33.02%
	PhD/Doctorate	44	10.38%
Employment Type	Self-Employed	110	25.94%
	Corporate Employee	190	44.81%
	Freelancer	64	15.09%
	Government Sector	60	14.15%
Business Ownership	Owns a Logistics Business	95	22.40%
	Works in a Logistics Firm	245	57.78%
	Aspiring Entrepreneur	84	19.81%

Table 2 : AI Adoption and Its Impact on Logistics

Category	Sub-category	Frequency (n)	Percentage (n = 424)
Use of AI in Business	Yes, regularly	95	22.43%
	Yes, occasionally	180	42.50%
	No, but interested	100	23.58%
	No, not interested	49	11.49%
AI Impact on Logistics	Significantly improved	110	25.93%
	Somewhat improved	175	41.27%
	No major impact	90	21.18%
	Not sure	49	11.62%
Reduction in Operational Costs	10-20% reduction	90	21.18%
	21-40% reduction	130	30.56%
	41% and above reduction	75	17.65%
	No impact	125	29.61%

Table 3 : Challenges Faced by Women Entrepreneurs in AI Logistics

Category	Sub-category	Frequency (n)	Percentage (n = 424)
Access to Funding	Major challenge	170	40.50%
	Moderate challenge	110	26.25%
	Minor challenge	85	20.25%
	No challenge	55	13.00%
Gender Bias in AI Logistics	High	130	30.95%
	Medium	150	35.71%
	Low	110	26.19%
	No bias experienced	30	7.14%
Networking Opportunities	Ample opportunities	90	21.42%
	Limited opportunities	210	50.00%
	No access to networks	120	28.57%

Table 4 : Future Prospects and AI Trends in Logistics

Category	Sub-category	Frequency (n)	Percentage (n = 424)
Increased AI Adoption	More women entering AI-driven logistics roles	230	54.25%
Rise of Women-Led AI Unicorns	Projected 300% growth in female-led AI firms by 2030	180	42.45%
Sustainable AI Innovations	More eco-friendly logistics solutions led by women entrepreneurs	200	47.17%
Cross-Border AI Collaboration	Women-led firms driving global trade efficiency	160	37.74%

Results and Discussion

The demographic data highlights a significant proportion of women in AI-driven logistics ventures aged between 26-35 (42.50%), followed by 18-25 (35.42%), and a smaller group of 36 and above (22.08%). In terms of experience, most respondents have 0-5 years (37.74%) in the logistics sector, with 33.02% having 6-10 years, and 29.24% possessing more than 10 years of experience. Entrepreneurial participation remains low, with only 20.08% of respondents being founders of AI-based logistics startups, indicating a gap in business leadership roles among women in this domain.

In the AI adoption segment, 42.50% of women use AI occasionally, while 22.43% integrate it regularly into their logistics operations. A considerable proportion (23.58%) have not yet implemented AI but express interest, while 11.49% remain uninterested. The impact of AI on logistics efficiency is evident, with 41.27% of respondents acknowledging improvements and 25.93% noting significant positive effects. However, 21.18% believe AI has had no major impact, and 11.62% remain uncertain about its effectiveness.

The financial impact of AI adoption in logistics varies. A notable 30.56% of businesses reported a 21-40% reduction in operational costs, while 21.18% observed a modest 10-20% cost

decrease. However, 17.65% of respondents saw cost reductions exceeding 41%**,** suggesting that AI implementation can yield substantial financial benefits under optimal conditions. Interestingly, 29.61% of respondents saw no impact on costs, indicating that AI's effectiveness depends on its application and scale.

Women in AI-powered logistics continue to face significant challenges. The most pressing issue is funding access, with 40.50% of respondents identifying it as a major challenge, followed by 26.25% experiencing moderate difficulties. Gender bias remains a concern, as 30.95% of women report high levels of bias in the sector, while 35.71% experience it at a medium level. Networking limitations also pose a substantial barrier, with 50.00% of respondents citing limited opportunities, and 28.57% indicating no access to professional networks. These findings emphasize the need for increased support structures, mentorship programs, and funding initiatives tailored for women entrepreneurs in AI logistics.

Looking ahead, AI-driven logistics is expected to witness significant growth, with projections indicating a 300% increase in women-led AI startups by 2030. Sustainable AI solutions and cross-border trade collaborations present promising opportunities for female entrepreneurs in logistics. Increased AI adoption will likely encourage more women to enter AI-driven logistics roles, with 54.25% of respondents optimistic about this trend. Furthermore, 42.45% foresee a rise in women-led AI unicorns, reflecting a shifting landscape toward greater gender inclusivity.

The findings highlight the transformative role of AI in logistics while also underscoring the barriers that still exist for women in the field. By addressing funding gaps, fostering inclusive education, and promoting gender-equitable AI policies, the industry can fully harness the potential of AI-driven supply chain transformations.

Conclusion

The AI-powered logistics revolution presents a unique opportunity for women entrepreneurs to innovate and lead. By addressing funding gaps, fostering inclusive education, and supporting female-led enterprises, the industry can harness the full potential of AI-driven supply chain transformations. Women entrepreneurs are poised to play a pivotal role in shaping the future of logistics through AI integration. Ethical AI use, gender diversity, and sustainable solutions will define the next phase of AI-driven logistics, ensuring a more inclusive and efficient global supply chain system.

References

1. Chen, L., Kim, S., & Tan, W. (2023). *Women in AI: A Global Perspective on Entrepreneurship and Inclusion*. Cambridge University Press.
2. Christopher, M., & Holweg, M. (2021). *Supply Chain 4.0: AI, Digital Transformation, and Logistics Optimization*. Pearson.
3. Deloitte. (2024). *AI and Gender Diversity in the Logistics Sector: Future Trends and Challenges*. Deloitte Insights.
4. European Commission. (2023). *Women in Digital Economy: AI, Innovation, and Policy Interventions*. European Union Publications.
5. Ivanov, D., Tsipoulanidis, A., & Schönberger, J. (2022). *Global Supply Chain and Operations Management: A Decision-Oriented Introduction to AI Applications*. Springer.

6. Kirkpatrick, K. (2021). "Bias in AI: Addressing Gender Disparities in Machine Learning Models." *Communications of the ACM, 64*(2), 20-23.
7. McKinsey & Company. (2023). *Diversity Matters: Women in AI and the Future of Digital Transformation*. McKinsey Reports.
8. Patel, R., & Sharma, K. (2022). "Women Entrepreneurs and Venture Capital: The AI Startup Dilemma." *Journal of Business & Technology Innovation, 14*(3), 45-63.
9. UNESCO. (2023). *AI for Gender Equality: Bridging the Digital Divide in Technology-Driven Sectors*. UNESCO Publishing.
10. West, M., & Sundaram, A. (2022). *The Gender Gap in AI Startups: Barriers and Breakthroughs in Female-Led Enterprises*. Oxford University Press.
11. Wright, P., & Davidson, J. (2023). "AI-Powered Logistics: Enhancing Efficiency and Inclusivity in Global Supply Chains." *Journal of Supply Chain Management, 59*(1), 78-92.
12. Zhang, T., & Chen, Y. (2024). "Sustainable AI in Logistics: Opportunities for Women Entrepreneurs." *International Journal of AI & Business, 17*(4), 110-126.
13. Agarwal, P., & Banerjee, S. (2022). "The Impact of AI on Women-Led Businesses: A Case Study of the Logistics Sector." *Women & Technology Journal, 9*(2), 34-50.
14. Soni, G., & Jain, P. (2023). *AI in Logistics and Supply Chain: Barriers and Future Prospects for Women Entrepreneurs*. Elsevier.
15. Smith, J., & Gupta, A. (2024). "AI-Powered Supply Chains: Innovations, Challenges, and Gender Inclusivity." *Harvard Business Review, 102*(5), 55-67.
16. OECD. (2023). *Women in AI: Addressing Systemic Barriers in Innovation and Entrepreneurship*. OECD Publishing.
17. World Economic Forum. (2023). *The AI Gender Gap: How Women Are Shaping the Future of Technology and Logistics*. WEF Reports.
18. Bhatia, R., & Kumar, N. (2022). "The Role of AI in Enhancing Women Entrepreneurship in the Logistics Sector." *International Journal of Business & AI, 11*(1), 15-30.
19. Davis, R., & Liu, X. (2023). "Financial Inclusion and AI Startups: The Gender Gap in Venture Capital Funding." *Finance & AI Journal, 20*(3), 88-104.