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ESG PRACTICES IN LAST MILE DELIVERY OPERATIONS AND THEIR IMPACT ON EFFICIENCY: A STUDY AMONG DELIVERY EMPLOYEES IN ERNAKULAM CITY

Management

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ABSTRACT

The rapid growth of e-commerce, food delivery and hyperlocal/quick commerce services has significantly increased the importance of last mile delivery operations in modern logistics. At the same time, organizations are increasingly adopting Environmental, Social and Governance (ESG) practices to enhance sustainability and operational performance. This study examines the impact of ESG practices on delivery performance efficiency among delivery employees in Ernakulam City. A quantitative research approach was adopted and primary data was collected from 300 delivery employees using a structured questionnaire. Statistical tools such as descriptive analysis, correlation and multiple regression analysis were used for data analysis. The findings reveal that ESG practices collectively have a significant positive effect on delivery performance efficiency. Among the variables, technology and process practices have the strongest influence, followed by governance and social practices, while environmental practices show a comparatively weaker impact. The study concludes that ESG practices act as strategic drivers of operational efficiency and should be effectively integrated into last mile delivery systems.

KEYWORDS

Esg Practices, Last Mile Delivery, Operational Efficiency, Logistics Management, Sustainability, Delivery Performance

INTRODUCTION

Last mile delivery has become a critical component of modern supply chain and logistics systems, especially with the rapid expansion of e-commerce, food delivery and quick commerce platforms (Ivanova, 2025). It represents the final stage of the delivery process, directly connecting businesses with customers and significantly influencing customer satisfaction and service quality.

Despite its importance, last mile delivery faces several challenges, including traffic congestion, high operational costs, delivery delays and environmental concerns (Zosu et al., 2024). These challenges reduce efficiency and increase operational complexity. In response, organisations are increasingly integrating Environmental, Social and Governance (ESG) practices into their delivery operations (Leogrande, 2024).

Environmental practices focus on reducing carbon emissions through the use of electric vehicles and fuel efficient routing. Social practices emphasise the safety, health and working conditions of delivery employees (Rahman, 2024). Governance practices ensure compliance, accountability and transparency in operations (Szentesi & Nagy, 2025). Technological advancements such as artificial intelligence (AI), Internet of Things (IoT) and GPS tracking have transformed delivery processes and improved operational efficiency (Burinskiene et al., 2025; Tsang et al., 2023).

This study aims to analyse the impact of ESG practices on delivery performance efficiency from the perspective of delivery employees in Ernakulam City, thereby contributing to both academic research and practical applications in logistics management.

Literature Review

The existing literature highlights the growing importance of sustainability and efficiency in last mile delivery operations. Studies have shown that last mile delivery accounts for a significant portion of logistics costs and carbon emissions, making it a critical focus area for optimisation (Zosu et al., 2024).

Environmental practices such as green logistics, electric vehicles and emission reduction strategies have been widely studied for their role in sustainability (Ivanova, 2025). Social practices, including employee welfare, safety and working conditions, have been found to improve workforce productivity and operational stability (Rahman, 2024). Governance practices ensure structured operations, compliance with regulations and improved coordination within logistics systems (Szentesi & Nagy, 2025).

Technological advancements play a crucial role in enhancing delivery efficiency. The use of AI-based routing, real-time tracking, IoT devices and automation has improved route optimisation, reduced delivery time and increased transparency in operations (Burinskiene et al., 2025; Tsang et al., 2023).

Most existing studies focus on individual aspects such as sustainability or technology, rather than examining the combined impact of ESG practices on operational efficiency. Additionally, limited research has been conducted from the perspective of delivery employees, who are directly involved in last mile delivery operations.

This study addresses these gaps by integrating ESG practices into a single framework and analysing their combined effect on delivery performance efficiency.

Methodology

Research Design

The study adopts a quantitative and analytical research design.

Data Collection

Primary data was collected directly from delivery employees working in last mile delivery operations in Ernakulam City (Kothari, 2004). The data was gathered using a structured questionnaire based on the variables and was distributed through Google Forms. Secondary data was collected from academic journals, research articles, books and industry reports related to ESG practices, logistics management and operational efficiency.

Sampling Design

The population of the study consists of delivery employees working in last mile delivery operations in Ernakulam City (Kothari, 2004). The estimated population ranges between 22,000 and 33,000 individuals.

A convenience sampling technique was used due to accessibility constraints. A total of 300 valid responses were collected and used for analysis. Although the ideal sample size was higher, 300 responses are considered adequate for statistical analysis.

Variables in the Study

- **Dependent Variable:** Operational Efficiency in Last Mile Delivery
- **Independent Variables:**

1. Environmental Practices, 2. Social Practices, 3. Governance Practices. 4. Technology and Process Practices

Reliability and Data Analysis

Reliability of the questionnaire was tested using Cronbach's Alpha and all variables showed values above 0.7, indicating acceptable internal consistency.

Data analysis was conducted using SPSS software. The following statistical tools were used: 1. Descriptive Analysis, 2. Correlation Analysis, 3. Multiple Regression Analysis

These tools helped in examining the relationship and impact of ESG practices on delivery performance efficiency.

Results and Interpretation

The descriptive analysis indicates that respondents generally have a positive perception of ESG practices implemented in their organisations. The mean value for operational efficiency is 3.969, indicating a high level of perceived efficiency. Among the independent variables, Technology and Process Practices recorded the highest mean (4.225), followed by Governance (3.981), Social (3.975) and Environmental practices (3.894).

The sample composition shows that 78% of respondents are male and 22% are female, with a majority (88.7%) belonging to the age group of 21–30 years. Sector wise, respondents are mainly engaged in Hyperlocal and Quick Commerce (35.3%), followed by Food Delivery (31.7%), Courier/Logistics (27%) and E-commerce (6%).

Correlation analysis reveals that all ESG variables have a positive relationship with delivery performance efficiency. Technology and Process Practices show the strongest correlation ($r = 0.484$), followed by Governance Practices ($r = 0.438$).

The regression analysis shows that ESG practices collectively explain 33.5% of the variation ($R^2 = 0.335$) in delivery performance efficiency. The model is statistically significant ($p < 0.001$).

Among the variables:

- Technology and Process Practices ($\beta = 0.252$) have the strongest influence
- Governance Practices ($\beta = 0.246$) are also significant
- Social Practices ($\beta = 0.144$) show moderate impact
- Environmental Practices are not statistically significant

These findings indicate that technology adoption and governance mechanisms are key drivers of operational efficiency in last mile delivery systems.

CONCLUSION

The study concludes that ESG practices play a significant role in enhancing delivery performance efficiency in last mile delivery operations. While all ESG dimensions contribute positively, technology and process practices emerge as the most influential factor. Governance and social practices also play an important role by ensuring structured operations and improving employee wellbeing. Environmental practices, although essential for sustainability, have a relatively limited direct impact on efficiency in the current context.

Organizations should therefore prioritize technology adoption, strengthen governance frameworks, and improve employee working conditions to achieve higher operational efficiency. The study highlights that ESG practices are strategic tools for improving logistics performance.

REFERENCES

1. Bryman, A., & Bell, E. (2015). *Business research methods* (4th ed.). Oxford University Press.
2. Burinskiene, A., Gruzauskas, V., & Byčenkaitė, E. (2025). Applying digital technologies to sustainable delivery.
3. Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.
4. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.
5. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297–334.
6. Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.
7. George, N., & Andrejs Cekuls. (2023). Addressing the moral conundrum: Integrating informal e-waste workers into sustainable management systems. In Rural Development 2023: Bioeconomy for the Green Deal: The 11th International Scientific Conference, 26–28 September 2023: Proceedings (pp. 298–303). https://doi.org/10.15544/RD.2023.011
8. George, N., & Andrejs Cekuls. (2024). Driving sustainable e-waste recycling behaviors in India: Challenges, models, and solutions. In Proceedings of the 23rd International Scientific Conference "Engineering for Rural Development" (Vol. 23, pp. 1098–1105). Latvia University of Life Sciences and Technologies. https://www.iitf.lbtu.lv/conference/proceedings2024/Papers/TF227.pdf
9. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
10. Ivanova, U. (2025). Enhancing last-mile delivery efficiency: A lean-based framework.
11. Kothari, C. R. (2004). Research methodology*: Methods and techniques* (2nd ed.). New Age International.
12. Leogrande, A. (2024). Integrating ESG principles into smart logistics.
13. Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 140*, 1–55.
14. Rahman, S. M. M. (2024). Employee welfare and its impact on logistics performance.
15. Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
16. Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill-building approach* (7th ed.). Wiley.
17. Szentesi, S., & Nagy, G. (2025). Sustainable logistics networks and CSR integration.
18. Tsang, Y. P., Choy, K. L., Wu, C. H., Ho, G. T. S., & Lam, H. Y. (2023). Smart logistics and digital transformation in supply chain management.
19. Zosu, S., Amaghionyeodiwe, L., Oyetunji, A., & Adeyemi, K. (2024). Last-mile delivery optimization: Balancing cost and sustainability.