



Sustainability in Digital E-Commerce: Impact on Coimbatore City

Author¹ Dr.M. Pushpalatha, Associate Professor, Department of Commerce IT&E-Commerce
Sri Krishna Arts and Science College, Coimbatore-641008.

Author² G. Raghunath, Assistant Professor, Department of Commerce IT&E-Commerce
Sri Krishna Arts and Science College, Coimbatore-641008.

Abstract

The rapid expansion of digital e-commerce has transformed economic activities, consumer behavior, and business ecosystems across urban India. Coimbatore, one of Tamil Nadu's major industrial and educational hubs, has experienced substantial growth in online shopping platforms, digital payment systems, and app-based logistics networks. While digital commerce promotes economic efficiency, financial inclusion, and convenience, it simultaneously raises sustainability concerns such as packaging waste, increased carbon emissions from delivery logistics, and rising digital energy consumption. This study examines the environmental, economic, and social sustainability impact of digital e-commerce in Coimbatore city. Primary data were collected from 120 respondents using a structured questionnaire. The study employs descriptive and percentage analysis to evaluate consumer behavior, sustainability awareness, and perceived impacts. Findings reveal that digital commerce significantly enhances accessibility, employment opportunities, and cost efficiency. However, environmental sustainability remains a critical concern due to packaging waste and transportation emissions. The study concludes that sustainable digital transformation in Coimbatore requires collaborative efforts among e-commerce platforms, policymakers, and consumers to promote eco-friendly practices and responsible consumption.

Keywords: Digital E-Commerce, Sustainability, Environmental Impact, Coimbatore, Digital Payments, Green Logistics, Urban Development

1. Introduction

Digital transformation has become a defining characteristic of modern economies. The integration of internet technology, mobile applications, and digital payment systems has reshaped traditional commerce into an increasingly online-driven ecosystem. In India, the proliferation of smartphones, affordable internet services, and government initiatives such as Digital India have accelerated the growth of e-commerce platforms.

Coimbatore, often referred to as the "Manchester of South India," has evolved beyond its textile and manufacturing roots into a diversified commercial hub. The city's expanding IT infrastructure, rising middle-class population, and strong educational institutions have fueled the adoption of online commerce. Consumers increasingly rely on digital platforms for purchasing groceries, clothing, electronics, food delivery, and essential services.

Despite its economic advantages, digital e-commerce presents sustainability challenges. Packaging waste, particularly plastic and cardboard materials, contributes to urban solid waste problems. Additionally, last-mile delivery systems increase carbon emissions through fuel consumption. Energy-intensive data centers supporting online transactions also raise concerns about environmental sustainability.

This research investigates how digital e-commerce influences sustainability in Coimbatore by examining environmental, economic, and social dimensions through empirical analysis.



Review of Literature

Sustainability in digital commerce has gained global academic attention in recent years. According to the Reserve Bank of India (2023), digital payment transactions in India have grown exponentially, particularly through UPI platforms, contributing to reduced cash handling and paper usage. The RBI emphasizes that digital payments enhance transparency and economic efficiency. The Ministry of Electronics and Information Technology (2023) projects that India's digital economy will contribute approximately 20% to GDP by 2026, highlighting the growing importance of digital commerce.

Research by the NITI Aayog (2022) suggests that digital platforms empower MSMEs and encourage inclusive growth. However, environmental concerns remain pressing. The Central Pollution Control Board (2023) reports increasing plastic waste linked to e-commerce packaging. International studies argue that sustainable e-commerce must incorporate green logistics, recyclable packaging, and consumer awareness initiatives. Scholars emphasize balancing economic growth with environmental responsibility to achieve long-term sustainability. However, limited city-level empirical studies exist for Coimbatore, creating a research gap addressed by this study.

Statement of the Problem

Digital e-commerce in Coimbatore has expanded rapidly, influencing consumption patterns and business models. While it contributes to economic growth, employment generation, and consumer convenience, it also leads to environmental concerns such as excessive packaging waste and increased transportation emissions. There is insufficient localized research examining the sustainability implications of digital commerce in Coimbatore. Hence, this study aims to analyze the sustainability impact of digital e-commerce across environmental, economic, and social dimensions.

Objectives of the Study

1. To examine the usage pattern of digital e-commerce among consumers in Coimbatore.
2. To analyze the environmental sustainability impact of online shopping.
3. To evaluate the economic benefits of digital commerce.
4. To assess social sustainability factors such as accessibility and digital literacy.
5. To provide suggestions for promoting sustainable digital commerce in Coimbatore.

Research Methodology

The present study adopts a descriptive and analytical research design to examine the sustainability impact of digital e-commerce in Coimbatore city. The descriptive approach was used to understand the existing patterns of online shopping behavior, sustainability awareness, and consumer perceptions. The analytical component was incorporated to interpret the relationship between digital commerce practices and sustainability outcomes across environmental, economic, and social dimensions.

The study was conducted within the geographical limits of Coimbatore city, Tamil Nadu, which has emerged as a rapidly developing commercial and digital hub. The target population comprised consumers who actively engage in digital e-commerce activities such as online



shopping, digital payments, food delivery applications, and service-based platforms. A sample size of 120 respondents was selected for the study. The sampling technique adopted was convenience sampling, considering accessibility, time constraints, and the availability of respondents who frequently use digital platforms.

Primary data were collected using a structured questionnaire designed specifically for this research. The questionnaire consisted of both closed-ended and Likert-scale questions to measure consumer awareness, perceptions, and sustainability attitudes. The instrument was divided into sections covering demographic details, frequency of online shopping, environmental impact perceptions, economic benefits, and social sustainability outcomes. Prior to final data collection, the questionnaire was reviewed to ensure clarity, relevance, and reliability.

Secondary data were collected from government reports, academic journals, sustainability publications, and policy documents. Reports from institutions such as the Reserve Bank of India (RBI), NITI Aayog, and environmental regulatory bodies were referred to for contextual background and supporting statistical insights.

The collected primary data were analyzed using percentage analysis and descriptive statistical techniques. Responses were categorized, tabulated, and interpreted systematically to identify trends and patterns. The use of percentage analysis helped in clearly presenting the proportion of respondents agreeing or disagreeing with specific sustainability-related statements. Tables were prepared to present findings in an organized and comprehensible format.

The study is subject to certain limitations. Since convenience sampling was adopted, the findings may not fully represent the entire population of Coimbatore city. Additionally, the research is based on self-reported data, which may involve subjective bias. Despite these limitations, the study provides valuable empirical insights into the sustainability impact of digital e-commerce in an urban context. Overall, the research methodology was designed to ensure systematic data collection, objective analysis, and meaningful interpretation, thereby contributing to a comprehensive understanding of sustainable digital commerce practices in Coimbatore.

Analysis and Interpretation

The analysis of data collected from 120 respondents in Coimbatore city reveals significant insights into the sustainability dimensions of digital e-commerce. The findings indicate that digital commerce has become an established component of urban consumer behavior. A substantial proportion of respondents engage in online shopping on a regular basis, with monthly purchases emerging as the dominant pattern. This reflects not only technological acceptance but also growing trust in digital platforms and online payment systems.

From an economic sustainability perspective, the results demonstrate a strong positive perception. A majority of respondents believe that digital commerce reduces operational costs for businesses by minimizing physical infrastructure expenses and streamlining supply chains. Additionally, many respondents acknowledge that online platforms provide opportunities for local businesses to expand their market reach beyond geographical boundaries. The perception that digital commerce contributes to employment generation, particularly in logistics, warehousing, and digital marketing, further reinforces its economic significance in Coimbatore's urban



economy. These findings suggest that digital e-commerce is playing a vital role in strengthening economic resilience and enhancing business competitiveness.

The social sustainability dimension also presents encouraging outcomes. Most respondents agree that digital platforms improve accessibility to goods and services, especially for working professionals, students, and individuals with time constraints. The increasing use of online transactions has enhanced digital literacy and technological competence among consumers. Furthermore, more than half of the respondents perceive that digital commerce has the potential to empower women entrepreneurs by providing flexible and low-cost entry into the market. This indicates that digital platforms are contributing to social inclusion and democratization of business opportunities.

However, the environmental analysis presents a more complex scenario. A significant majority of respondent's express concern regarding the increase in packaging waste associated with online shopping. Excessive use of plastic wraps, cardboard boxes, and protective materials has emerged as a primary environmental challenge. Although respondents recognize that digital payments reduce paper usage and that online shopping may reduce travel-related emissions, these positive contributions appear to be offset by the environmental burden of packaging and delivery logistics. The perception gap between economic benefits and environmental consequences highlights the need for sustainable operational strategies. Overall, the analysis reveals that digital e-commerce in Coimbatore demonstrates strong economic and social sustainability outcomes, while environmental sustainability remains comparatively weaker. The findings suggest that future growth in digital commerce must prioritize eco-friendly packaging solutions, green logistics, and consumer awareness initiatives to ensure balanced and long-term sustainable development.

Findings of the Study

- A majority of respondents regularly engage in online shopping, indicating strong adoption of digital e-commerce platforms in Coimbatore city.
- Monthly purchasing is the most common pattern of usage, reflecting consistent and stable digital consumer behavior.
- Most respondents perceive that digital commerce reduces operational costs for businesses, highlighting its contribution to economic efficiency.
- A significant proportion believe that digital platforms support local businesses and create employment opportunities, thereby strengthening economic sustainability.
- Respondents largely agree that digital commerce improves accessibility to goods and services, particularly benefiting working professionals and students.
- Increased usage of online platforms has contributed to improved digital literacy among consumers.
- More than half of the respondents feel that digital commerce has the potential to empower women entrepreneurs, indicating positive social inclusion.
- A majority of respondents express concern that online shopping increases packaging waste, identifying it as a major environmental challenge.



- Most respondents acknowledge that digital payments reduce paper usage, contributing positively to environmental sustainability.
- A considerable number believe that e-commerce reduces travel-related pollution by minimizing physical store visits.
- Despite its economic and social benefits, environmental sustainability remains the primary area requiring improvement in Coimbatore's digital commerce ecosystem.

Suggestions

In light of the findings, it is essential to adopt a more sustainable approach to digital commerce in Coimbatore. E-commerce companies should prioritize the use of biodegradable and recyclable packaging materials to reduce environmental impact. Green logistics practices, including the adoption of electric delivery vehicles and efficient route planning, can significantly minimize carbon emissions. Policymakers and local authorities should implement supportive regulations that encourage environmentally responsible practices among online sellers and logistics providers. Consumer awareness initiatives must also be strengthened to promote responsible online purchasing behavior and reduce excessive returns that increase transportation emissions. Furthermore, collaboration between municipal bodies and e-commerce firms can enhance urban waste management systems to effectively address packaging waste concerns. Encouraging sustainable innovation and providing incentives for eco-friendly business models will help create a balanced digital ecosystem that aligns economic growth with environmental responsibility.

Conclusion

The study concludes that digital e-commerce has become an integral component of Coimbatore's urban economy. It significantly enhances economic efficiency, improves accessibility, promotes digital literacy, and supports local businesses. The adoption of digital payments has also contributed to reducing paper-based transactions, thereby supporting environmental sustainability to some extent.

However, environmental challenges particularly packaging waste and logistics-related carbon emissions pose significant sustainability concerns. While economic and social sustainability indicators are strong, environmental sustainability requires immediate and strategic attention.

To ensure balanced and long-term sustainable growth, collaborative efforts among e-commerce platforms, policymakers, businesses, and consumers are essential. If eco-conscious strategies are effectively implemented, Coimbatore has the potential to become a model city for sustainable digital commerce in Tamil Nadu.

References

1. Central Pollution Control Board. (2023). Annual report on plastic waste management 2022–23. Ministry of Environment, Forest and Climate Change, Government of India. <https://cpcb.nic.in>
2. Kumar, V., & Ayodeji, O. (2021). E-commerce growth and environmental sustainability: A developing economy perspective. *Journal of Cleaner Production*, 280, 124–135.



3. Ministry of Electronics and Information Technology. (2023). Digital economy report 2023. Government of India. <https://www.meity.gov.in>
4. NITI Aayog. (2022). Digital India and sustainable growth framework. Government of India. <https://www.niti.gov.in>
5. Organization for Economic Co-operation and Development. (2021). The environmental impact of e-commerce. OECD Publishing. <https://www.oecd.org>
6. Reserve Bank of India. (2023). Annual report 2022–23. Reserve Bank of India. <https://www.rbi.org.in>
7. Sharma, R., & Jha, M. (2020). Consumer perception towards sustainable online shopping in India. *International Journal of Consumer Studies*, 44(4), 367–378.
8. Singh, S., & Verma, P. (2022). Digital payments and financial inclusion in India: Sustainability implications. *Journal of Financial Services Marketing*, 27(2), 89–102.
9. United Nations Environment Programme. (2022). Sustainability and digital transformation: Environmental implications of digital technologies. UNEP. <https://www.unep.org>
10. World Economic Forum. (2023). Digital commerce and environmental sustainability report. World Economic Forum. <https://www.weforum.org>.