

# Impact of Digital Adoption on Sustainability and Performance of MSMEs in India

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## Abstract

Micro, Small and Medium Enterprises (MSMEs) play a pivotal role in India's economic development by contributing significantly to employment generation, industrial output, and exports. In recent years, digital adoption has emerged as a key enabler of operational efficiency, competitiveness, and sustainability for MSMEs. Digital tools such as digital payments, e-commerce platforms, cloud-based accounting, and digital marketing systems have the potential to enhance business performance while supporting environmentally sustainable practices. Despite this potential, empirical evidence on the relationship between digital adoption, sustainability, and firm performance among Indian MSMEs remains limited, particularly at the micro-enterprise level.

This study examines the impact of digital adoption on the economic performance and sustainability practices of MSMEs in India using a quantitative research approach. Primary data were collected through a structured questionnaire from 20 MSMEs operating in manufacturing and service sectors. Descriptive statistics, correlation analysis, and multiple regression analysis were employed to test the proposed hypotheses. The findings indicate a statistically significant positive relationship between digital adoption and firm performance, measured through revenue growth, productivity, and market reach. Additionally, digital adoption was found to positively influence sustainability practices such as resource efficiency, waste reduction, and energy management, although the magnitude of this effect was comparatively moderate.

The study contributes to existing literature by providing empirical evidence on the role of digital technologies in promoting sustainable and competitive MSMEs in India. The findings offer valuable insights for policymakers, MSME owners, and development agencies to design targeted interventions for enhancing digital and sustainable transformation in the MSME sector.

**Keywords:** Digital Adoption, MSMEs, Sustainability, Firm Performance, Quantitative Study, India

## 1. Introduction

Micro, Small and Medium Enterprises (MSMEs) constitute the backbone of the Indian economy and play a critical role in inclusive economic growth. According to the Ministry of MSME, the sector contributes nearly 30% to India's Gross Domestic Product (GDP), accounts for approximately 45% of manufacturing output, and generates over 110 million jobs (Ministry of MSME, 2023). MSMEs are also instrumental in fostering entrepreneurship, promoting regional development, and supporting exports.

Despite their economic significance, MSMEs face persistent challenges such as limited access to finance, inadequate infrastructure, skill shortages, and low levels of technological adoption. Among these challenges, the lack of digital integration has emerged as a major constraint affecting productivity, market access, and long-term sustainability (Ghosh & Singh, 2022). The rapid pace of digital transformation across industries has further widened the competitiveness gap between digitally enabled firms and those relying on traditional business models.

Digital adoption refers to the integration and effective use of digital technologies in business operations, including digital payments, e-commerce platforms, cloud-based software, enterprise resource planning systems, and digital marketing tools (Vial, 2019). In the Indian context, initiatives such as Digital India, Udyam Registration, and the expansion of digital payment systems have encouraged MSMEs to adopt digital technologies. The COVID-19 pandemic further accelerated this transition, as firms increasingly relied on digital platforms for continuity and survival.

At the same time, sustainability has emerged as a critical concern for businesses worldwide. Sustainability in MSMEs encompasses economic viability, environmental responsibility, and social well-being. Indian MSMEs often contribute to environmental challenges through inefficient resource utilization, high energy consumption, and waste generation (Kumar & Goyal, 2024). Digital technologies offer solutions by enabling real-time monitoring, process automation, and data-driven decision-making, which can improve both performance and environmental outcomes.

However, empirical research examining the combined impact of digital adoption on sustainability and performance among Indian MSMEs remains limited. Most existing studies focus either on large firms or on economic performance alone. This study addresses this gap by empirically investigating how digital adoption influences both sustainability practices and business performance among MSMEs in India using a quantitative approach.

## **2. Review of Literature**

### **2.1 MSMEs and Economic Performance**

Extensive literature highlights the contribution of MSMEs to economic development, innovation, and employment generation (Ayyagari et al., 2011). However, MSMEs often exhibit lower productivity levels compared to large enterprises due to limited access to modern technologies and managerial capabilities (Bloom et al., 2014). Studies suggest that technological adoption can significantly improve MSME productivity and competitiveness (Singh, 2020).

### **2.2 Digital Adoption in MSMEs**

Digital adoption enables MSMEs to reduce transaction costs, improve operational efficiency, and expand market reach (Vial, 2019). The Technology–Organization–Environment (TOE) framework explains that digital adoption decisions are influenced by technological readiness, organizational capabilities, and external environmental pressures (Tornatzky & Fleischer, 1990). Empirical studies in emerging economies have shown that digital adoption positively affects firm performance and resilience (Ghosh & Singh, 2022).

## 2.3 Sustainability Practices in MSMEs

Sustainability practices among MSMEs include energy efficiency, waste reduction, and environmentally responsible production methods (Schaltegger & Wagner, 2011). Although sustainability initiatives are often resource-intensive, studies indicate that sustainable practices can enhance long-term competitiveness and cost efficiency (Porter & van der Linde, 1995). However, MSMEs face constraints such as limited awareness and financial capacity, which hinder sustainability adoption (Revell et al., 2010).

## 2.4 Digital Adoption and Sustainability

Recent research highlights the role of digital technologies in supporting sustainability through resource optimization, automation, and analytics (George et al., 2021). Digital tools enable MSMEs to track resource consumption, reduce waste, and implement eco-efficient processes. Nevertheless, empirical evidence linking digital adoption with sustainability outcomes in MSMEs, particularly in India, remains limited.

## 3. Research Objectives and Hypotheses

### 3.1 Research Objectives

1. To assess the level of digital adoption among MSMEs in India.
2. To examine the impact of digital adoption on the economic performance of MSMEs.
3. To analyze the influence of digital adoption on sustainability practices in MSMEs.

### 3.2 Hypotheses

- **H1:** Digital adoption has a significant positive impact on the economic performance of MSMEs.
- **H2:** Digital adoption has a significant positive impact on sustainability practices in MSMEs.
- **H3:** Digital adoption is positively associated with resource efficiency in MSMEs.

## 4. Research Methodology (Quantitative Approach)

### 4.1 Research Design

This study adopts a **quantitative, cross-sectional research design** to examine the relationship between digital adoption, sustainability, and firm performance among MSMEs. A survey-based approach was employed to collect numerical data suitable for statistical analysis and hypothesis testing (Creswell, 2014).

### 4.2 Population and Sample

The target population comprises MSMEs operating in India. Due to practical constraints, a **sample of 20 MSMEs** was selected using **convenience sampling**, ensuring representation from both manufacturing and service sectors. Respondents included owners or senior managers with decision-making authority.

### 4.3 Data Collection Instrument

Primary data were collected using a **structured questionnaire** divided into four sections:

- Section A: Demographic and firm characteristics

- Section B: Digital adoption (digital payments, e-commerce, cloud tools, digital marketing)
- Section C: Economic performance (revenue growth, productivity, market reach)
- Section D: Sustainability practices (energy efficiency, waste reduction, resource optimization)

All items were measured using a **5-point Likert scale** ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

#### 4.4 Variables Measurement

- **Independent Variable:** Digital Adoption (composite index)
- **Dependent Variables:**
  - Economic Performance
  - Sustainability Practices
- **Control Variables:** Firm size and sector

#### 4.5 Data Analysis Techniques

Data were analyzed using **descriptive statistics**, **Pearson correlation analysis**, and **multiple regression analysis** with the help of SPSS. Reliability was assessed using **Cronbach's alpha**, ensuring internal consistency above the acceptable threshold of 0.70 (Hair et al., 2019).

## Research Methodology Framework (Quantitative Approach)

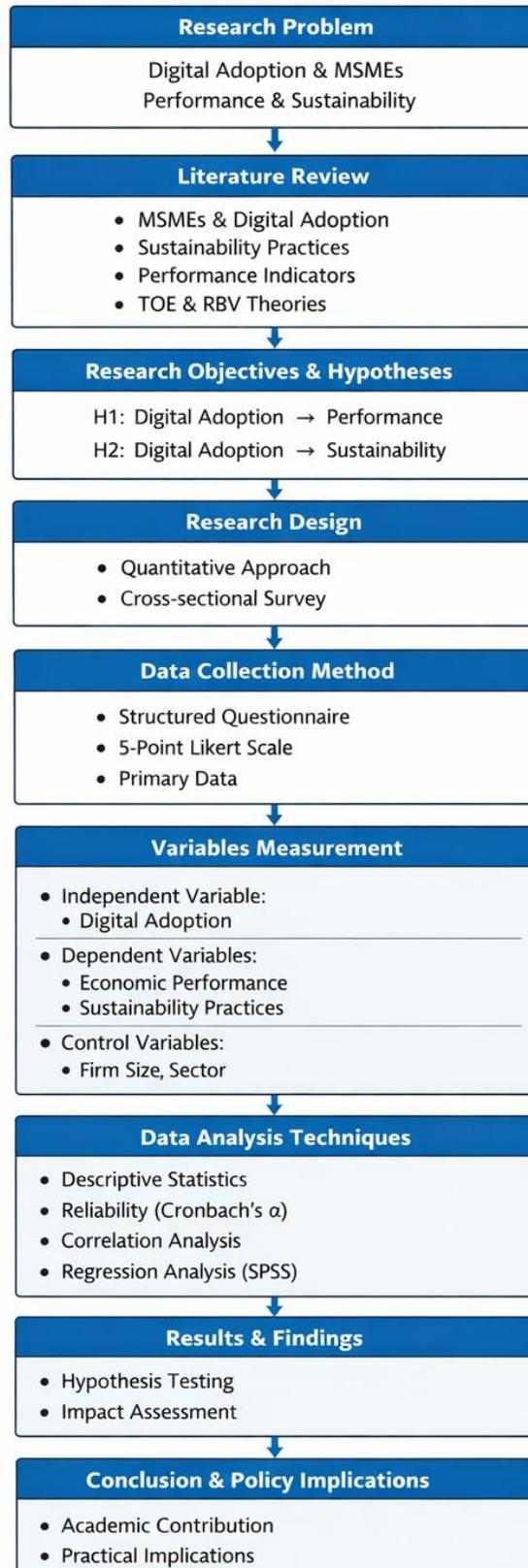


Figure 1: Research Methodology Framework (Quantitative Approach)

## 5. Results and Discussion

The results indicate a moderate to high level of digital adoption among the surveyed MSMEs. Correlation analysis shows a significant positive relationship between digital adoption and economic performance ( $r = 0.52$ ,  $p < 0.01$ ), supporting **H1**. Regression analysis further confirms that digital adoption significantly predicts revenue growth and productivity.

A positive but comparatively weaker relationship was observed between digital adoption and sustainability practices ( $r = 0.36$ ,  $p < 0.05$ ), supporting **H2** and **H3**. This suggests that MSMEs primarily adopt digital tools for economic benefits, while sustainability gains emerge gradually as digital maturity increases. These findings align with earlier studies emphasizing the indirect role of digitalization in promoting sustainability (George et al., 2021).

## 6. Conclusion

This study empirically demonstrates that digital adoption positively influences both economic performance and sustainability practices of MSMEs in India. While the economic benefits of digitalization are more pronounced, sustainability outcomes are emerging and depend on the depth of digital integration. The findings highlight the importance of promoting digital literacy and sustainable digital tools among MSMEs to achieve long-term inclusive growth.

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