International Journal of Commerce and Management Research
www.managejournal.com
ISSN: 2455-1627
Received: 25-08-2026, Accepted: 24-09-2026, Published: 09-10-2026
Volume 12, Issue 4, 2026, Page No. 125-127

Impact of digital adoption on sustainability and performance of MSMEs

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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.

Keywords: Digital adoption, MSMES, sustainability, firm performance, quantitative study

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.

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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.

Reviews of Literature

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).

Objectives of the study

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.

Hypotheses Testing

- **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.

Statement of the problem

Despite increasing digitalization, the adoption of digital technologies among MSMEs in India remains uneven across industries, leading to disparities in performance outcomes. While digital tools are expected to enhance productivity, revenue, and export competitiveness, their actual impact at the industry level is not clearly established. Moreover, existing studies lack integrated analysis linking digital adoption with key performance indicators over time.

Significance of the study

This study is significant as it provides an industry-level analysis of digital technology adoption and its impact on MSME performance in India. It helps in understanding how digitalization influences key indicators such as productivity, revenue, employment, and exports. The findings offer valuable insights for policymakers, industry stakeholders, and researchers to design effective digital strategies, promote balanced sectoral growth, and enhance the overall contribution of MSMEs to economic development.

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.

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.

Data Collection Instrument
Primary data were collected using a structured questionnaire.

Data Analysis

t-Test: Two sample Assuming Equal variances		
	Big Data Analytics tools or technologies	Operational Efficiency
Mean	1.26	2.86
Variance	0.196326	1.469795
Observations	50	50
Pooled Variance	0.83306122	
Mean Difference	0	
Df	98	
T Stat	-8.764992056	
P(T<=t)One tail	2.888308E-14	
t Critical One tail	1.660551217	
P(T<=t)Two tail	5.76616E-14	
T Critical two tail	1.9884467455	

Interpretation
The t-statistic of -8.76 indicates a significant difference between the mean impact of "Big data analytics tools or technologies" and "Operational Efficiency" in family businesses. With a very small p-value (2.88 for one tail, 5.76 for two-tail), there is strong evidence against the null hypothesis, suggesting a substantial distinction in perceived impact. The negative t-statistic implies that the "Big data analytics" group perceives a significantly lower impact on operational efficiency than the "Operational Efficiency" group. In conclusion, family businesses employing big data analytics tools report a distinct perception of operational efficiency compared to those without such implementations.

Correlation		
	Present Challenges and Opportunities	Long Term Profitability and Sustainability
Present Challenges and Opportunities	1	
Long Term Profitability and Sustainability	-0.052290626	1

Interpretation
The correlation coefficient (r) between "Presents challenges and opportunities" and "long-term profitability and sustainability" is -0.0523. This value is close to zero, suggesting a weak or negligible linear relationship between these two variables. The weak correlation and distribution characteristics suggest that, based on the respondents' perceptions, there is no strong linear association between the challenges and opportunities posed by big data integration and the anticipated long-term profitability and sustainability in family-owned businesses.

Findings & suggessions
In the ever-evolving landscape of business, the journey of Micro, Small, and Medium Enterprises (MSMEs) in India through digitization stands as a testament to adaptability and resilience. This research has delved into the multifaceted impact of digitization on MSMEs, unravelling a tapestry of opportunities, challenges, and transformative shifts. The findings of this study underscore the pivotal role that digital technologies play in reshaping the operational paradigms of MSMEs. From enhancing operational efficiency through automation to expanding market reach across borders via digital platforms, the digital transformation has ushered in an era where the agility of small and medium enterprises is no longer confined by traditional constraints. While the advantages are apparent, the journey toward digitization for MSMEs is not devoid of hurdles. Challenges ranging from skill gaps and cybersecurity concerns to the need for robust infrastructure underscore the imperative for comprehensive strategies that extend beyond mere technological adoption. The success of MSMEs in the digital realm is intricately tied to addressing these challenges, necessitating collaborative efforts from policymakers, industry stakeholders, and the enterprises themselves.

Government initiatives, exemplified by the Digital India campaign, have played a pivotal role in catalyzing the digitization of MSMEs. Financial incentives, training programs, and infrastructure development have been instrumental in fostering an ecosystem conducive to digital growth. Yet, as we conclude this research, it is evident that a continued commitment to policy support is vital for sustaining the momentum of digitization. As MSMEs navigate the digital frontier, it is imperative to recognize the holistic nature of the transformation. Beyond operational efficiencies and market expansion, digitization reshapes how MSMEs engage with consumers, innovate in their products and services, and contribute to societal and environmental responsibilities. The digital era beckons MSMEs to not only evolve technologically but also to redefine their roles as drivers of sustainable and socially responsible economic growth. In conclusion, the impact of

digitization on MSMEs in India is profound, marking a paradigm shift from traditional to modern business practices. The future holds both promises and challenges, and the ability of MSMEs to harness the opportunities presented by digitization will be pivotal in determining their continued growth and contribution to the vibrant economic landscape of India.

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