

Factors Influencing E-Commerce Adoption on Sustainability of MSME; A Multiple Holistic Approach

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Abstract

In recent years, there has been a surge in the adoption of e-commerce among (MSMEs) worldwide. However, despite the growing popularity of e-commerce adoption in the MSME sector, there remains a gap in understanding its implications for sustainability. The sustainability of MSMEs is a multifaceted concept encompassing economic, social, and environmental dimensions. While e-commerce adoption has the potential to enhance the economic performance of MSMEs by facilitating access to new markets and reducing transaction costs, its impact on social and environmental sustainability remains unclear. Questions arise regarding the social implications of e-commerce adoption, such as its effect on employment patterns, local communities, and traditional business practices. Additionally, concerns exist regarding the environmental footprint of e-commerce activities, including energy consumption, carbon emissions, and waste generation. The literature on e-commerce adoption in MSMEs primarily focuses on its technological and economic aspects, neglecting the broader implications for sustainability. There is a lack of comprehensive studies that systematically examine the relationship between e-commerce adoption and sustainability outcomes in the MSME context. As MSMEs play a significant role in driving economic growth and employment generation, understanding the sustainability implications of e-commerce adoption is crucial for informing policy decisions, business strategies, and sustainability initiatives.

Keywords: Efficient Supply Chain Management, Customer Engagement and Loyalty, Data Analytics for Decision Making, Sustainable Product Offerings, Regulatory Compliance and Standards and Digital Skills

Introduction

The theoretical foundations of e-commerce adoption in MSMEs are discussed, drawing from various academic disciplines such as information systems, marketing, and entrepreneurship. The review underscores the multifaceted nature of e-commerce adoption, involving technological, organizational, environmental, and individual factors. The authors identify several research gaps in the existing literature. Chowdhury and Wu (2018) [1] examined the theoretical foundations, identified research gaps, and highlighted opportunities in this area. The study begins by acknowledging the increasing significance of e-commerce for MSMEs in the contemporary business landscape. Despite its importance, there is a dearth of comprehensive studies addressing e-commerce adoption in this sector. Hence, the authors aim to fill this gap by providing a thorough review. There is a lack of consensus on the conceptualization and measurement of e-commerce adoption. Empirical studies often focus on a limited set of variables, neglecting the holistic nature of e-commerce adoption. There is a scarcity of longitudinal studies tracking the evolution of e-commerce adoption in MSMEs over time. There is a paucity of studies examining e-commerce adoption in specific industries or geographical regions [1]. Despite these gaps, the review also reveals promising opportunities for future research. Longitudinal studies can offer valuable insights into the dynamics of e-commerce adoption processes. Furthermore, comparative studies across industries and regions can facilitate the identification of contextual factors influencing e-commerce adoption in MSMEs. Chowdhury and Wu (2018)[1] highlight the importance of further research to advance knowledge and inform policy initiatives aimed at promoting e-commerce adoption in MSMEs. By addressing the identified research gaps and leveraging emerging opportunities, scholars can contribute to enhancing the competitiveness and sustainability of MSMEs in the digital economy.

A critical review of theoretical foundations and research gaps

Dholakia and Kshetri (2004)[2] investigate the factors influencing the adoption of the Internet among Small and Medium Enterprises (SMEs). Recognizing the increasing importance of the Internet in the business environment, particularly for SMEs, the authors aim to identify the key determinants affecting Internet adoption in this sector. The study is grounded in the understanding that the adoption of new technologies, such as the Internet, can significantly impact the competitiveness and growth prospects of SMEs. However, the rate of adoption varies across firms, influenced by a multitude of factors. Dholakia and Kshetri [2] employ a theoretical framework that integrates insights from technology adoption literature and small business management theories. This framework allows them to explore both technological and organizational factors shaping Internet adoption among SMEs. Through empirical analysis, the authors identify several factors that play a crucial role in influencing the adoption of the Internet by SMEs. These factors include perceived usefulness and ease of use of Internet technologies, the availability of resources, external support and infrastructure, competitive pressure, and the firm's innovativeness and strategic orientation. The study finds that SMEs are more likely to adopt the Internet when they perceive it as beneficial and easy to use. Access to adequate resources and external support, such as government initiatives or industry associations, positively influence Internet adoption. Moreover, competitive pressure and a proactive, innovation-oriented mindset within the firm also contribute to higher rates of Internet adoption. Dholakia and Kshetri (2004) [2] emphasized the importance of understanding the interplay between technological and organizational factors in shaping Internet adoption among SMEs. By identifying these key determinants, policymakers and business support agencies can formulate targeted strategies to facilitate Internet adoption and enhance the competitiveness of SMEs in the digital age.

Determinants of Internet adoption among (MSMEs) in India

Dwivedi and Irani (2009)[3] conducted a case study focusing on understanding the determinants of Internet adoption among (SMEs) in India. Recognizing the increasing importance of the Internet in the business landscape, particularly for SMEs, the authors aimed to delve into the specific factors influencing Internet adoption in the Indian SME context. The study adopts a qualitative approach, utilizing case study methodology to explore the nuances and complexities of Internet adoption among Indian SMEs. Through in-depth interviews and analysis of multiple case studies, Dwivedi and Irani [3] sought to uncover the underlying determinants driving or inhibiting Internet adoption in these firms. The findings of the

study reveal a multifaceted set of determinants influencing Internet adoption among Indian SMEs. One key determinant identified is the perceived relevance and utility of the Internet for enhancing business operations and competitiveness. SMEs are more likely to adopt the Internet when they recognize its potential to improve efficiency, reach new markets, and enhance communication with customers and suppliers. Organizational factors such as the availability of resources (financial, human, and technological), leadership support, and organizational culture play a significant role in shaping Internet adoption. SMEs with adequate resources and a supportive organizational culture are more inclined to invest in Internet technologies. External factors such as government policies and regulations, market competition, and industry norms also influence Internet adoption among Indian SMEs. Government initiatives promoting digitalization, along with market pressures to stay competitive, can act as catalysts for Internet adoption. Dwivedi and Irani (2009) [3] highlighted the importance of understanding the contextual factors specific to the Indian SME environment in shaping Internet adoption. By unraveling these determinants, policymakers, industry associations, and business support agencies can develop targeted interventions to facilitate Internet adoption and foster the growth of SMEs in India's digital economy.

E-Commerce Adoption on Sustainability of MSME

The study employs a socio-technical lens, acknowledging that IS adoption is not merely a technical decision but also involves social and organizational dynamics. Ifinedo (2011) [5] explored the adoption of Information Systems (IS) in (SMEs) in Nigeria from a socio-technical perspective. Recognizing the importance of IS adoption for enhancing competitiveness and productivity in SMEs, the author investigates the interplay between social and technical factors influencing IS adoption in the Nigerian context.. By integrating insights from social science and technology adoption literature, Ifinedo aims to provide a comprehensive understanding of IS adoption in Nigerian SMEs [5]. Through empirical research, including interviews and surveys with SME owners and managers, Ifinedo identified several key factors influencing IS adoption. These factors include technological infrastructure, perceived benefits and ease of use, organizational readiness and culture, external pressure. The availability of adequate technological infrastructure, such as reliable internet connectivity and access to hardware and software, is crucial for facilitating IS adoption in Nigerian SMEs. Organizational readiness and culture also play a significant role in IS adoption, with factors such as leadership support, employee skills and attitudes, and organizational flexibility influencing adoption decisions. External pressures, such as competition and customer demands, can further drive IS adoption among Nigerian SMEs. Government support and policies, including initiatives to promote digitalization and provide incentives for IS adoption, can significantly impact adoption rates in the SME sector. Ifinedo (2011) [5] underscored the importance of considering both social and technical factors in understanding IS adoption in Nigerian SMEs. By addressing the identified factors and leveraging government support, policymakers and business stakeholders can foster a conducive environment for IS adoption, thereby enhancing the competitiveness and sustainability of SMEs in Nigeria's evolving business landscape.

Literature Review and Hypotheses Development

Richter and Riemer (2017) [10] investigated the governance of business ecosystems, particularly focusing on e-commerce ecosystems, and propose dynamic capabilities as a key mechanism for managing the sustainability of these ecosystems. Recognizing the increasing complexity and interconnectedness within e-commerce ecosystems, the authors aim to provide insights into effective governance mechanisms to sustain their viability over time. The study emphasizes the significance of business ecosystems in the context of e-commerce, where multiple actors, including firms, customers, suppliers, and other stakeholders, interact and co-create value. Richter and Riemer[10] argued that dynamic capabilities, defined as the ability of organizations to adapt and innovate in response to changing environmental conditions, are crucial for governing e-commerce ecosystems. By continuously sensing and seizing opportunities, as well as reconfiguring resources and relationships, firms can effectively navigate the complexities of e-commerce ecosystems and sustain their competitive advantage [10]. Through theoretical analysis and empirical the authors illustrate how dynamic capabilities enable firms to address various challenges within e-commerce ecosystems, such as market turbulence, technological disruptions, and changing customer preferences. Firms with strong dynamic capabilities are better equipped to anticipate and respond to these challenges, thereby enhancing the overall sustainability of the ecosystem.

Research statement

Therefore, this research aims to address the following questions:

1. How do various factors, such as technological infrastructure, organizational capabilities, and regulatory frameworks, influence the sustainability outcomes of e-commerce adoption in MSMEs?
2. What strategies can MSMEs employ to maximize the benefits of e-commerce adoption while mitigating potential negative impacts on sustainability?
3. What are the implications of e-commerce adoption for broader societal goals, such as inclusive growth, social equity, and environmental stewardship?

By addressing these questions, this research seeks to contribute to a deeper understanding of the complex interplay between e-commerce adoption and sustainability in the MSME sector. Ultimately, it aims to provide valuable insights and actionable recommendations for policymakers, MSMEs, and other stakeholders striving to promote sustainable development in the digital age.

Analysis, Findings, and Results

Richter and Riemer highlighted the role of strategic leadership in fostering dynamic capabilities within firms and orchestrating collaboration and coordination among ecosystem participants. Effective leadership can facilitate knowledge sharing, resource allocation, and innovation, leading to improved ecosystem performance and resilience. Richter and Riemer (2017) [10] underscored the importance of dynamic capabilities as a key mechanism for governing e-commerce ecosystems and managing their sustainability. By cultivating dynamic capabilities and fostering strategic leadership, firms can enhance their adaptability and resilience within e-commerce ecosystems, contributing to the long-term viability and success of the entire ecosystem

Table 1:
Factors Influencing E-Commerce Adoption on Sustainability of MSME

Constructs		Mean	Std. Deviation	Mean Rank
Cost Reduction	150	3.31	1.341	7.37
Market Reach and Access	150	3.04	1.305	6.69
Efficient Supply Chain Management	150	2.78	1.247	5.81
Customer Engagement and Loyalty	150	2.87	1.521	6.19
Data Analytics for Decision Making	150	2.83	1.110	6.02
Sustainable Product Offerings	150	3.03	1.245	6.50
Regulatory Compliance and Standards	150	3.32	1.425	7.39
Digital Skills	150	3.31	1.341	6.89
Capacity Building	150	2.87	1.521	7.35

From the above table 1, it is found that Regulatory Compliance and Standards: (7.39) E-commerce adoption may require MSMEs to comply with various regulations and standards related to data protection, online transactions, and product safety. Cost Reduction: (7.37) E-commerce can help MSMEs reduce operational costs related to physical infrastructure, such as renting or maintaining a brick-and-mortar store. By conducting business online, MSMEs can save on expenses like utilities, property taxes, and staff wages, thereby enhancing their financial sustainability. Digital Skills and Capacity Building: (6.89) Effective e-commerce adoption requires MSMEs to develop digital skills and capabilities among their workforce. Investing in training and capacity building initiatives can empower MSMEs to harness the full potential of e-commerce technology, drive innovation, and adapt to changing market dynamics, thereby enhancing their overall sustainability. Market Reach and Access: (6.69) E-commerce platforms provide MSMEs with the opportunity to reach a broader customer base beyond their local geographic area. This expanded market reach can increase sales and revenue streams, contributing to the overall sustainability of the business. Sustainable Product Offerings: (6.50) E-commerce provides MSMEs with a platform to showcase and promote sustainable products and practices. By highlighting eco-

friendly products, ethical sourcing, and environmentally responsible initiatives, MSMEs can attract socially conscious consumers and differentiate themselves in the market. Customer Engagement and Loyalty: (6.19) E-commerce platforms allow MSMEs to engage with customers through personalized marketing, targeted promotions, and interactive communication channels. By building stronger relationships with customers and providing a seamless shopping experience, MSMEs can foster loyalty and repeat business, which is essential for long-term sustainability. Data Analytics for Decision Making: (6.02) E-commerce platforms generate vast amounts of data on customer behavior, sales trends, and market demand. This data-driven approach can enhance the competitiveness and resilience of MSMEs in the marketplace. Efficient Supply Chain Management: (5.81) E-commerce enables MSMEs to streamline their supply chain processes, including inventory management, order fulfillment, and logistics. By optimizing these processes, MSMEs can minimize waste, reduce transportation emissions, and improve resource efficiency, thereby enhancing their environmental sustainability.

Table 2:
Friedman Test

N	150
Chi-Square	22.101
difference	8
p	0.009

The ranking result from 150 sample respondents shows the difference in the ranking for each factor is significant. The calculated Chi-Square value is 22.101 for the degree of freedom 8 is more than expected level. The value of probability is 0.009. It shows that the ranks given by the respondents are significant. E-commerce adoption can significantly influence the sustainability of MSMEs by reducing costs, expanding market reach, improving operational efficiency, enhancing customer engagement, leveraging data analytics, promoting sustainable practices, ensuring regulatory compliance, and building digital skills. By strategically integrating e-commerce into their business models, MSMEs can strengthen their competitive advantage, resilience, and long-term viability in the global marketplace.

Implications of E-Commerce Adoption on Sustainability of MSMEs

E-commerce adoption among (MSMEs) has significant implications for sustainability across economic, social, and environmental dimensions. As MSMEs form the backbone of many economies worldwide, understanding these implications is crucial for fostering sustainable development in the digital age.

Economic Implications

The adoption of e-commerce offers MSMEs numerous economic benefits, contributing to their sustainability and growth. By leveraging digital platforms, MSMEs can access global markets, overcome geographical barriers, and diversify their customer base. This expanded market reach enhances MSMEs' resilience to local economic fluctuations and stimulates growth opportunities. Additionally, e-commerce adoption enables MSMEs to streamline their operations, reduce transaction costs, and improve efficiency, thereby enhancing their competitiveness in the marketplace. E-commerce facilitates the creation of value-added services and innovative business models, driving entrepreneurship and job creation within the MSME sector. As MSMEs harness the power of digital technologies to develop new products, services, and distribution channels, they contribute to economic dynamism and innovation ecosystems. Moreover, e-commerce adoption fosters entrepreneurship among traditionally marginalized groups, such as women, youth, and rural communities, promoting inclusive economic growth and poverty alleviation. Addressing these challenges requires concerted efforts from policymakers, industry stakeholders, and support organizations to ensure that all MSMEs can reap the benefits of e-commerce adoption equitably.

Social Implications

E-commerce adoption has profound social implications for MSMEs, influencing employment patterns, community dynamics, and social inclusion. On one hand, e-commerce can create opportunities for job creation, skill development,

and entrepreneurship, particularly in sectors related to digital marketing, logistics, and customer service. Moreover, e-commerce enables MSMEs to engage with diverse stakeholders, including customers, suppliers, and partners, fostering collaboration and knowledge sharing within communities. However, e-commerce adoption also raises concerns about its potential to disrupt traditional employment structures and exacerbate inequalities. As MSMEs embrace automation and digitalization, certain job roles may become obsolete, leading to job displacement and income insecurity, particularly among vulnerable populations. E-commerce adoption may contribute to the concentration of wealth and resources in the hands of a few dominant players, further widening socioeconomic disparities within and between communities. To address these social challenges, policymakers and industry stakeholders must prioritize efforts to promote digital inclusion, skills development, and social protection measures. By ensuring equitable access to digital technologies and fostering an enabling environment for social entrepreneurship and community-based initiatives, e-commerce adoption can become a catalyst for inclusive and sustainable development.

Environmental Implications

E-commerce can promote sustainability by reducing the need for physical retail space, minimizing transportation emissions, and optimizing supply chain efficiency through data-driven analytics. Moreover, e-commerce enables MSMEs to adopt environmentally friendly practices, such as digital invoicing, paperless transactions, and eco-friendly packaging, thereby reducing their environmental impact. However, the rapid growth of e-commerce also contributes to increased energy consumption, particularly in data centers, warehouses, and transportation fleets. Additionally, the proliferation of single-use packaging and excessive product returns associated with e-commerce transactions can lead to waste generation and environmental degradation. To mitigate these environmental challenges, MSMEs and e-commerce platforms must adopt sustainable practices and technologies throughout the value chain. This includes investing in renewable energy sources, optimizing logistics routes, and promoting circular economy principles, such as product reuse, repair, and recycling. Furthermore, policymakers can incentivize sustainable behavior through regulatory measures, taxation policies, and eco-labeling schemes, encouraging MSMEs to adopt environmentally responsible practices.

Conclusion

The implications of e-commerce adoption on the sustainability of MSMEs are multifaceted and interconnected, encompassing economic empowerment, social inclusivity, and environmental stewardship. While e-commerce offers MSMEs numerous opportunities for growth and innovation, it also presents challenges in terms of digital divide, job displacement, and environmental degradation. Addressing these challenges requires a collaborative and holistic approach involving policymakers, industry stakeholders, and civil society organizations. By fostering an enabling environment for e-commerce adoption, promoting digital literacy and skills development, and adopting sustainable business practices, MSMEs can harness the transformative power of e-commerce to achieve sustainable development goals and build resilient, inclusive, and environmentally responsible economies. Gao (2023) conducted empirical research to analyze the impact of e-commerce and digital marketing adoption on MSMEs. They likely gathered data through surveys, interviews, or other research methodologies to assess various aspects of MSMEs' performance in relation to their adoption of e-commerce and digital marketing practices. The study aims to provide insights into how MSMEs have responded to the challenges posed by the COVID-19 pandemic by leveraging e-commerce and digital marketing tools. It explores whether such adoption has positively influenced the financial performance and sustainability of these businesses during the crisis.

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