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Impact of E-Commerce and Digital Marketing Adoption on the Financial and Sustainability Performance of MSMEs during the COVID-19 Pandemic: An Empirical Study

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Abstract: The COVID-19 pandemic has remarkably affected the business processes and performance of micro-, small-, and medium-sized enterprises (MSMEs) across the world. MSMEs have had to adopt and implement numerous strategies to sustain their businesses, and their financial and sustainability performance has been impacted by their choice of e-commerce (EC) platforms and digital marketing (DM) strategies. The objective of this research was to explore the effects of EC and DM platforms and strategies on facilitating MSMEs' financial and sustainability performance amid the devastating COVID-19 pandemic. This study gathered data from 212 MSMEs from three districts of Bangladesh. A partial least squares structural equation modeling (PLS-SEM) approach was undertaken, to test the hypothesized model. The findings revealed that e-commerce had a significant association with MSMEs' financial performance and sustainability amid the pandemic. It was also observed that digital marketing strategies had a substantial impact on MSMEs' financial performance. However, the linkage between DM strategies and MSMEs' sustainability was found to be insignificant. Furthermore, it was found that the financial performance of MSMEs mediated the relationship between e-commerce adoption and their sustainability performance. These findings contribute to the extant technology adoption literature, by exploring the role of e-commerce and digital marketing on firms' financial outcomes amid a global pandemic. Managers and policymakers of small businesses can learn several things from this study, and understand how crucial digital commerce and digital marketing are to their success and long-term survival.

Keywords: E-commerce; digital marketing; sustainability; MSMEs; COVID-19



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1. Introduction

Electronic commerce (EC) has gained remarkable importance as a technology medium for firms to serve their consumers, increase their geographic reach, react to external pressure, and cut expenses [1,2]. The introduction of EC has compelled many firms to have a digital footprint, and to capitalize on the opportunities provided by the internet [3]. The growth of e-commerce has enabled businesses to engage with prospective consumers in new ways: hence, the decline of physical stores is imminent [4]. Literature suggests that in the emerging digital economy, e-commerce platform adoption substantially affects transaction cost, delivery speed, customer satisfaction, and the subsequent performance of the firm [5]; however, developing a sustainable competitive edge, in an environment that commodifies items and enables simple imitation through rapid access to information about competitors'

offers, is challenging. Despite significant advances in global e-commerce adoption (ECA), a significant gap persists between MSMEs and large, well-established businesses [6]. MSMEs increasingly utilize information and communication technology (ICT)-based EC to achieve competitive advantages and exposure to international markets [7]. Both buyers and sellers can benefit substantially from the adoption and use of EC [8]—gains that can also be realized by MSMEs [9]. Prior EC literature suggests that only a few studies have emphasized the adoption and usage of EC exclusively in MSMEs [10]. Additionally, despite the tremendous growth of ECA among MSMEs, implementation has remained relatively low [11], and large firms have reaped more benefits than MSMEs, in terms of enhanced sales and cost savings [12]. However, the COVID-19 pandemic has influenced MSMEs to adopt EC to maintain financial performance and sustain their businesses [13]. Many brick-and-mortar small businesses adopted technological platforms to reach their customers amid the pandemic. Therefore, it is crucial to assess whether the ECA of MSMEs has facilitated superior financial and sustainability performance.

The advent of the internet and the application of conventional marketing tactics have led to the formation of digital marketing approaches that have been adopted and implemented by both small and large businesses [14–16]: these businesses leverage data science and online marketing tactics to boost product sales, brand recognition, and market penetration [16]. Despite the well-known advantages of DM, little is understood concerning small business digital marketing adoption (DMA), as the majority of the DM literature draws on large corporations [15]. Additionally, despite the growing popularity of DM, and its significance in boosting MSMEs' customer base and brand awareness [17,18], studies on the role of DMA on MSMEs' financial performance and sustainability are scarce. Most of the studies on DM mainly focus on how firms' DMA affect their consumer behavior [19–21]; however, the question remains: how does DMA affect both MSMEs' financial and sustainability performance? This study examined the direct and indirect effects of DMA on MSMEs' performance and sustainability.

MSMEs in Bangladesh, like those in other developing nations, are attracting special attention from policymakers, economists, and financial experts, because of their significant contribution to GDP; however, MSMEs still fall short of their maximum potential, due to several constraints that hinder growth and sustainability [22]. MSMEs are the economic powerhouse of Bangladesh, directly employing 7.8 million people, and indirectly supporting another 31.2 million [23]. MSMEs account for around 25% of Bangladesh's GDP, but have the capacity to contribute far more. In 2013, small businesses in the manufacturing sector grew by 6.76 percent. As a result, MSMEs have contributed substantially to Bangladesh's overall economic growth, which benefits from cheap labor and rapid job creation [24]. The COVID-19 outbreak has impacted all facets of life and business, but the hardest-hit MSMEs have taken the brunt of the attack. Many firms have been closed permanently, while others have endured income loss [25]. Economic turmoil has exacerbated pre-existing issues, such as a lack of access to financing, poor market connectivity, a scarcity of skilled workers, and a dearth of export markets [23]. Numerous academics and senior managers have emphasized digital transformation as one of the first defensive steps towards assuring sustainability during all severe catastrophes, including limited connectivity, supply, delivery, and physical functioning [26,27]. Studies have focused increasingly on the digitalization of MSMEs, advocating the development of a new digital business economy, and proposing a variety of digital transition pathways [28]. Ruixin et al. [29] argue that transitioning to e-commerce, digital marketing, online sales, and logistics is optimal for resilience. Utilizing internet technology, MSMEs may monitor operations, have access to financial data, and manage inventories and revenues. Studies suggest that MSMEs may achieve sustainability by migrating to an online environment, to develop digital strategies and use IT for assessment and digital value chain models [29]. Consequently, it is crucial to comprehend how MSMEs with fewer resources and financial restrictions may combat the consequences of COVID-19, by embracing technological advancements.

Additionally, there has been a dynamic shift in customer purchasing behavior, as an increasing number of customers are purchasing online frequently [30]. This trend has accelerated amid the pandemic, prompting MSMEs to adopt technological innovations, such as EC and DM. As a result, overall EC sales surged by 70–80% in a matter of months in 2020 [31]. Additionally, given remote workforces and limited resources, marketing teams have been under pressure to accomplish more with less, and to achieve a strong return on investment amid the pandemic. Numerous marketing teams are allocating resources to digital and internet platforms, with the aim of more effectively targeting specific demographics and delivering quantifiable outcomes [32]. However, no study has investigated how ECA and DMA have helped Bangladeshi MSMEs improve their financial performance and sustainability during the pandemic: thus, the objective of this research was to examine the role of ECA and DMA in improving the sustainability of MSMEs.

The dearth of research on the impact of ECA and DMA on the financial performance and sustainability of MSMEs served as the impetus for this research, which fills the gap, and adds to the current body of knowledge in different ways. Firstly, this research drew insights from the resource-based view (RBV), to conceptualize the role of e-commerce and digital marketing mechanisms in enhancing organizational performance and sustainability. Our empirical findings extended the scope of the RBV framework in an emerging economy context. Secondly, this study assessed how MSMEs have adopted and implemented EC and DM. The focus on MSMEs' different technological adoptions, to sustain their businesses during the COVID-19 pandemic, yielded key insights, as MSMEs are strong drivers of emerging economies' growth [24]. Thirdly, this research identified the direct linkage between ECA and MSME performance, ECA and sustainability, and DMA and performance. These findings will provide insights to policymakers and business managers, recommending they incorporate innovation and digital platforms into their operations, to attain superior financial output and sustainability. Finally, this research established the mediating role of firms' financial performance in the linkages between ECA and sustainability, as well as between DMA and the sustainability of MSMEs. Thus, this study adds to the EC, DM, and sustainability literature, by highlighting that ECA and DMA drive more robust financial performance and subsequent sustainability.

The remaining sections of this paper are organized as follows: the second portion reviews pertinent literature on EC, the ECA of Bangladeshi MSMEs, DM in MSMEs, EC adoption and firms' performance and sustainability, and DM adoption and firms' performance and sustainability. Section 3 discusses the research methods, including sampling and data-gathering strategies, variables, and analysis techniques. Section 4 summarizes the findings, followed by a discussion in Section 5. Finally, the essential theoretical and practical implications of ECA and DMA on the sustainability of MSMEs, through improved performance, are discussed, followed by a discussion of research limitations and future directions.

2. Literature Review and Hypotheses Development

2.1. Theoretical Background

The resource-based view (RBV) of firms has emerged as the central theoretical basis of strategic management [33], and has been used in strategic marketing [34]. As per Barney et al. [35], the RBV emerged from evolutionary economics, specifically from the research of economist Penrose [36], who asserted that “services yielded by resources are a function of the way in which they are used—exactly the same resource when used for different purposes or in different ways and combined with different types or amounts of other resources provides a different service or set of services” (p. 25). According to Penrose's [36] reasoning, an organization's distinctiveness derives from the way it combines its resources and capabilities. Barney [35] underlined that, according to RBV theory, enterprises must have unique resources and competencies to contribute to industry rivalry, in order to gain competitive advantage. Numerous studies have established a correlation between technological innovation and corporate performance [37]. In addition, enterprises

can obtain a competitive advantage by combining their resources and competencies in a manner challenging for rivals to replicate. Some businesses employ the open innovation strategy to its full extent, while others depend heavily on close innovation; however, open innovation, similar to the usage of e-commerce, is a continual activity that functions as a competitive advantage-generating capability [38]. Prior e-commerce literature has drawn upon the RBV to conceptualize e-commerce as a crucial resource that can boost a firm's performance [34,38,39]. Voola et al. [34] employed the RBV to investigate the complementary impacts of marketing and technological capabilities on adopting e-commerce and subsequent company performance. The adoption of e-commerce can strengthen a company's competitive edge: for instance, the resources devoted to a transactional website may decrease retail expenses or enhance revenue and market share, generating greater economic rent [40]. Frequently, e-commerce capabilities are firmly integrated into a company's resource base and business activities. The degree to which e-commerce is incorporated into a business varies, as enterprises' resource endowments vary [41]. Straub and Klein [42] contend that e-commerce provides a corporation with a resource that cannot be replaced or replicated (such as customer data and shared information). Furthermore, digitally transformed e-businesses can empower consumers to create value by information sharing and engaging in online communities [8]. Additionally, digital marketing capabilities can be regarded as a unique organizational resource, enhancing a firm's competitive advantage and sustainability performance [43,44]. Thus, we drew upon the RBV of firms to assess the role of ECA and DM in improving their financial and sustainability performance.

2.2. E-commerce Adoption

There is no uniform definition of EC, as different authors have proposed their own definitions. Turban [45] defined EC as "the process of buying, selling, transferring, or exchanging products, services, and/or information via computer networks, mostly Internet and intranets". From a B2C viewpoint, EC can be defined as "the buying and selling of information, products, and services via computer networks" [46]. Extensive research has established a positive connection between innovation adoption, such as e-commerce, and performance [47]. In the e-commerce usage context, there is substantial evidence that e-commerce adoption delivers a range of strategic advantages to firms [48]: for instance, e-commerce saves operating costs, expands market opportunities [49], improves supply chain efficiency, and enables stronger customer relationships [50].

Additionally, empirical research suggests that e-commerce adoption is positively associated with a company's financial performance [50,51]: for instance, [51] observed that e-commerce adoption enhances competitive edge, characterized by differentiation, cost reduction, innovation, development, and alliance formation. Wu et al. [28] reported a positive correlation between ECA and four measures of the performance of firms: efficiency, sales performance, client satisfaction, and relationship development. Hussain et al. [38] drew upon the technological, organizational, and environmental (TOE) model and diffusion innovation (DOI) theory, to show the positive linkage between e-commerce adoption and firm performance. Additionally, e-commerce is likely to promote access to new markets or expansion into existing ones [52], and to increase system integration between customers and suppliers [53].

This study postulates that ECA at the level of firms is a crucial driver of MSMEs' financial performance. There are several rationales behind this assumption. To begin with, e-commerce adoption improves MSMEs' performance, by optimizing and streamlining business processes [3]. Numerous papers in the extant literature have discovered that EC can substantially reduce transaction costs, while facilitating more effective management of internal operations in MSMEs [54,55]. According to Santarelli and D'Altri [55], establishing a robust e-commerce competence enables enterprises to cut transaction fees tied to external distribution channels. Lohrke et al. [54], drawing on the transaction-cost economics (TCE) theory, hypothesized and confirmed the notion that MSMEs with a high degree of information specificity would be more likely to use EC than those with less specific infor-

mation: this is mainly because ECA could help them cut down on the costs of providing specialized customer service. The second organizational mechanism via which ECA drives the performance of MSMEs is improved marketing competence. One of the most glaring weaknesses of MSMEs is their size and resource limitation when compared to their larger counterparts: as a result, MSMEs confront substantial obstacles in discovering and expanding their customer base and competing against international rivals [56]; by strengthening their e-commerce (e-business) capabilities, MSMEs can boost their global exposure, attract new customers—despite geographical barriers [3]—and serve existing customers more efficiently and comfortably, as their customers can access the e-commerce network from anywhere and at any time [57]. Drawing upon the RBV, Hussain et al. [38] reported that the application of e-commerce as technological openness may captivate worldwide consumer relationships with the seller, thereby improving MSMEs' performance. Thus, this study hypothesizes that:

H1: *E-commerce adoption significantly affects MSMEs' performance.*

This research also argues that e-commerce adoption drives small firms' sustainability practices. To attract and retain consumers worldwide, small firms must assess if their operations are ecologically, socially, and economically sustainable. The following is a fundamental definition of sustainable development: "The basic sustainable development is to consider whether the needs of and the impact of traders are in equilibrium with the ecosystem's ability to produce and recover" (Oláh et al. [58], p. 5). Furthermore, prioritizing the preservation of natural resources for future generations may be defined as development [59]. Businesses should manufacture green products, and merchants should offer items that benefit the environment and the ecological system. As per Bratt et al. [60], there is no common definition of sustainability: what it entails differs according to the issue under consideration; likewise, for MSMEs to be more sustainable when it comes to e-commerce, the three pillars of sustainability must be implemented [58].

According to Carvalho et al. [61], the current economic situation makes it challenging for MSMEs of all sizes to adopt a sustainable and green strategy: this is only achievable if they market their items to their customers through technology. E-commerce is often a successful instrument of trade, particularly for marketing and sales of globally diverse items and services, and it may considerably benefit businesses by boosting efficiency, lowering inventory, increasing revenues, and improving customer satisfaction. Many MSMEs are adopting e-commerce, because it may help them improve their economic and environmental performance, resulting in better long-term sustainability [13]. Chen and Zhang [62] argue that e-commerce adoption could offer MSMEs a sustainable competitive edge, if they could properly use the technology. Mangiaracina [63] reviewed 56 articles on the environmental implications of e-commerce adoption, and concluded that e-commerce substantially affects firms' energy usage, gas emissions, waste disposal, traffic mileage, and subsequent environmental sustainability. As a result, the following hypothesis was proposed in this study:

H2: *E-commerce adoption positively impacts MSMEs' sustainability.*

2.3. Digital Marketing Adoption

The advent of the internet and the application of traditional marketing techniques have resulted in the evolution of DM strategies that are used on a routine basis by both MSMEs and large corporations, to drive sales, boost brand awareness [64], and overcome obstacles to entry into new markets [16,65]. DM can be defined as "the practice of promoting products and services using digital distribution channels via computers, mobile phones, smartphones, or other digital devices" (Smith [66], p. 86). The adoption of digital platforms has altered how marketers interact with customers. Notwithstanding the well-established advantages of digital marketing, little is known concerning small business digital marketing, as most of the DM literature concentrates on large enterprises [17,67]. Large companies

are likely to have mobile-friendly websites, and they can employ external professionals to manage SEO projects, and social media marketing agencies to build and execute campaigns, while smaller firms must develop, adapt, and improve their own marketing campaigns, using social networking sites [68]. Small firms would benefit significantly from engaging in and implementing a digital marketing strategy, and the absence of such a strategy exacerbates the performance gap between large and small companies, by limiting their potential to access target audiences and drive sales growth [15]. Thus, small firms, in comparison to large businesses, have distinct digital footprints and rates of technology acceptance [69], necessitating an in-depth study of their digital marketing practices.

Prior studies have revealed that MSMEs are still in the early stages of digital marketing channel adoption [70,71], and that company size significantly impacts adoption, with microbusinesses being the slowest adopters [72]. Larger organizations are more likely to possess the resources and expertise necessary to implement new digital channels and solutions [52] successfully. Previously conducted research has examined the adoption of electronic marketing in MSMEs from an internal and external viewpoint [73]. In the case of small firms, the commonly adopted resource-based theory of the firm [74] implies that resources account for most of the decision-making in small enterprises, and that exogenous factors play a minor role. Utilizing current resources, MSMEs create capabilities that eventually bring value to enterprises and enhance their competitiveness. When conducting e-commerce sales activities, MSMEs may build digital marketing competencies to take advantage of online platforms, digital customer engagements, and digital customer service [75].

Marketing in a small business differs from marketing in a large corporation [76]: it is much more intuitive, competence-based, network-centric, and time- and finance-constrained. While small businesses have always been good at being able to serve niche markets and build strong customer relationships, these abilities have been reduced, to some extent, by internet-enabled businesses of all sizes [14]. Due to the lower transaction costs associated with entering markets controlled by MSMEs, the threat of entrance by larger regional, local, and multinational firms is stronger. This creates a dilemma: either jump on the digital marketing bandwagon without fully comprehending the ramifications, or wait and risk being left behind by competitors already utilizing the internet and e-marketing [77]. The RBV theory [78] underlines that enterprises should possess the distinctive resources and capabilities to enjoy a competitive edge in the industry. Numerous studies have discovered consistent relationships between innovation facilitated by technology and corporate performance [37]. Enterprises can create a competitive advantage by combining their resources and competencies in a manner challenging for rivals to replicate [38]. Some businesses are committed to an open innovation strategy in its entirety, while others depend on close innovation; however, open innovation, such as using digital marketing solutions, is a continual process that has acted as an enhancer of competitive advantage capacity and as a performance driver. Earlier research has argued that MSMEs might benefit from incorporating the internet into their marketing strategy in a variety of ways, including promoting products and services online, advertising in more marketplaces at a lower cost, utilizing e-mail as a marketing tool, and lowering the cost of printing components, such as catalogs and glossy leaflets [14]. Additionally, they could increase their reputation by developing a professional image through the creation of an effective website, by responding to product and service-related inquiries in multiple languages, and by conducting research in overseas markets [79]. MSMEs with a higher penetration of online marketing are more likely to accomplish superior business performance in terms of customer growth, revenue growth, and market share [80]. Thus, this study hypothesized that:

H3: *Digital marketing adoption positively impacts MSMEs' performance.*

This study also postulates that digital marketing adoption drives sustainability in MSMEs. Digital marketing can be considered a technological driver of a sustainable competitive edge, as it is the quickest and most convenient method of branding products and services, and conveying information and ideas directly through the internet [81].

Today, digital marketing, as the optimal medium for understanding how customers behave and engage with businesses through the internet, has become critical for communicating and promoting companies' sustainable actions [82]. Chaffey and Ellis-Chadwick [83] contend that numerous businesses—including retail, manufacturing, wholesale, and many others—are leveraging smart digital marketing as a component of their overall sustainable marketing strategies. As sustainability has emerged as one of the most significant concerns of our day, many modern MSMEs from the developed economies have already managed to include sustainability initiatives in all of their marketing efforts, including traditional and digital marketing strategies, communications, and other strategies [84]. Drawing evidence from the Pakistani textile industry, Sheikh et al. [18] argue that digital marketing adoption has minimized the tangible and intangible expenses of communication, enabling firms' marketing managers to connect with prospective consumers, thus leading to sustainable performance. With technological improvements in marketing allowing the firms to observe, evaluate, and customize with more precision than in the past, the concept of partnership at scale may aid the sustainability initiatives of businesses through a wider sharing of information [85]. Based on the above discussion, the following hypothesis has been posited:

H4: *Digital marketing adoption positively impacts MSMEs' sustainability.*

2.4. Firm Performance and Sustainability

A thorough review of the sustainability literature revealed that the majority of it was devoted to the effect of corporate sustainability on company performance; however, research on the impact of firms' financial performance on sustainability practices is scant [86,87]. As sustainability practice is crucial for firms' long-term performance, it has been necessary to investigate whether profitable firms invest more in sustainability practices. Artiach et al. [88] argue that business size, profitability, and growth are strongly connected with a high volume of investment in organizational sustainability; profitable businesses may invest extensively in sustainability programs, as they help businesses sustain their competitiveness. According to the resource-based perspective, companies investing in sustainable practices have superior resources [89]. Prior studies have suggested that organizations with adequate resources may invest in corporate sustainability. Obrenovic et al. [90] contend that businesses with an interconnected and digital structure, a shorter and more diverse supply chain, an agile and adaptable culture, a shared leadership and workforce, innovative digitalization and internet technologies, and a financial contingency plan, can withstand the COVID-19 pandemic crisis. Sustainability is positively linked with financial performance, as firms with stronger underlying resources are the most likely to invest in sustainable production, which leads to superior financial performance [88]. Businesses that pursue a proactive sustainability strategy are the most likely to have greater financial capital and managerial abilities [91]. Increasing an enterprise's financial resources leads to its superior sustainability performance [89]. Therefore, this study posited the following hypothesis:

H5: *Firm performance positively impacts MSMEs' sustainability.*

The extant literature indicates that the evidence on linkages between EC and sustainability, and digital marketing adoption and sustainability, is inconclusive. Some scholars have reported a positive association between ECA and MSMEs' sustainability [13,62]; however, some researchers argue that e-commerce does not always positively impact organizational sustainability [92]. The inconsistency in findings may be due to the presence of mediating variables between e-commerce adoption and sustainability interplay. This study argues that firms' financial performance plays a mediating role in the linkage between MSMEs' ECA and sustainability; likewise, the linkage between MSMEs' digital marketing adoption and sustainability performance is not always direct. As digital marketing drives superior financial performance [14,79,80], and MSMEs with better financial positions invest more in sustainability programs [89,91], this study posits that firm performance may have a

mediating role in digital marketing adoption and MSMEs' sustainability association. Thus, this study hypothesizes that:

H6: A firm's performance mediates the relationship between e-commerce adoption and sustainability.

H7: A firm's performance mediates the relationship between digital marketing adoption and sustainability.

Table 1 contains a list of acronyms and terminologies used in the paper.

Table 1. List of abbreviations and terminologies used in this research.

Abbreviation	Explanation
MSME	Micro-, small-, and medium-sized enterprises
EC	E-commerce
ECA	E-commerce adoption
DM	Digital marketing
DMA	Digital marketing adoption
PLS-SEM	Partial least squares structural equation modeling
TCE theory	Transaction-cost economics theory
AVE	Average variance extracted
CR	Composite reliability
VIF	Variance inflation factor
HTMT	Heterotrait-monotrait correlation ratio

Based on our review of the literature, the following conceptual framework was developed (Figure 1):

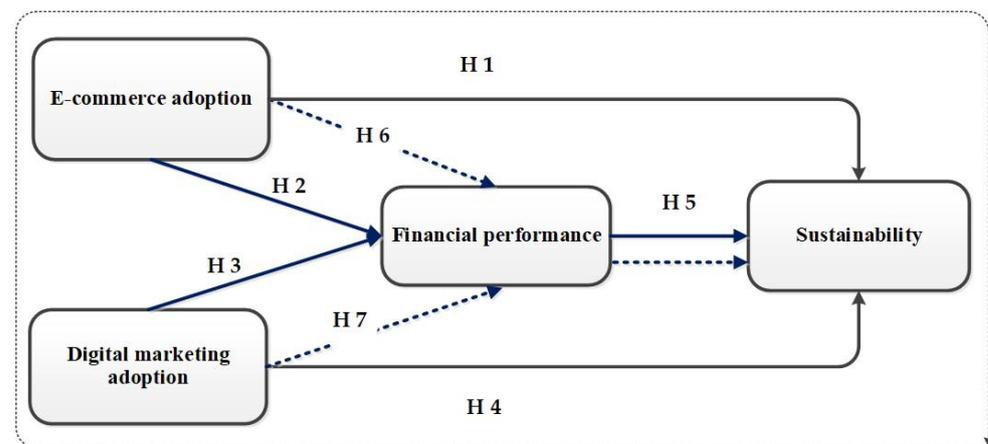


Figure 1. Conceptual Model.

3. Research Methods

3.1. Measures

All the model's propositions were evaluated using multiple questionnaire items. All indicators were culled from previously published research. Some items were modified to fit the study's context. The exogenous variables were quantified, using a 7-point Likert scale. Prior to the primary investigation, a survey instrument was developed, using the procedure indicated by Mishra et al. [93] and Hair et al. [94]. Three MSME professionals were given a complete set of the study's constructs. They were then asked to judge the degree to which they believed these items accurately measured their respective notions on a 3-point Likert scale: "3" indicated "a large extent"; "2" meant "slightly"; and "1" meant "not at all". The survey instrument contained all questions that were not scored "1" by any of the professionals but were marked "3" by at least two professionals.

The measurement items for this research were adopted from the existing literature pertaining to this research subject. Seven items were adopted from the study [95], to measure

the ECA of MSMEs amid the COVID-19 pandemic. The measures were used to examine MSMEs' ECA in advertising and marketing, online sales and purchases, customer service, and information exchange with key business partners. The extent of e-commerce use was estimated, using an index established by combining seven items pertaining to internet use for different commercial operations: (1) advertising and marketing; (2) online sales; (3) after-sales customer service and support; (4) online purchases; (5) exchange of operational data with suppliers; (6) exchange of operational information with business customers; and (7) formal integration of identical business operations with suppliers or other business associates [95]. The digital marketing adoption of MSMEs was measured by utilizing five items from Ritz et al. [15]. In this study, digital marketing refers to the digital marketing tools and technologies that support information exchange activities with partners. The study examined MSME's adoption of different digital marketing tools and technologies to reach their partners efficiently during the pandemic. The respondents were asked whether they used different DM platforms—such as Facebook pages, websites, YouTube channels, SEO, and blog content—using a 7-point Likert scale [15]. Next, the financial performance of the sample firms was measured, using four items adopted from Agyabeng-Mensah et al. [96]. The sample firms were asked about their sales, return on assets, earnings per share, and net profit margin growth during the COVID-19 pandemic. Finally, we measured the sustainability of the MSMEs, using five items from Imran et al. [97].

3.2. Data Collection and Sample

To evaluate the proposed hypotheses, the authors surveyed entrepreneurial MSMEs in four sectors: wholesale and retail enterprises; pharmacies; restaurants; and electronics stores. These MSMEs were chosen, because they functioned in a competitive and dynamic environment that required innovation for development and success. Additionally, by selecting entrepreneurial MSMEs, we concentrated on those that produced tangible goods, and hence sold and transported them using technological innovations.

A self-administered questionnaire was designed, to obtain data on the effect of ECA and DMA on the performance and sustainability of MSMEs. To assure the survey instrument's validity, it was pre-tested on three academic scholars and five managers from each of the four industries. Minor changes to the survey questionnaire were made in response to comments from the pilot survey. The survey data was gathered from managers of MSMEs who had a comprehensive idea of their organization's operations and performance. The survey was distributed to 290 MSMEs, with a cover letter outlining the study's objectives, and emphasizing that participation was voluntary. Additionally, respondents were assured that their responses would remain confidential, and would be utilized exclusively for academic research reasons. Following a reminder, 212 complete and usable questionnaires were returned, representing a response rate of 74%. The data for this research were collected between June and November 2021.

3.3. Respondents' Profile

The final dataset included responses from 212 MSME managers in Bangladesh. The majority of respondents (92%) had been employed by their firm for at least one year, and had held their current/recent managerial position for at least one year (81%). Most of the managers (84%) were between the ages of 25 and 50, and had completed some sort of post-secondary education (74%). On average, 58% of the organizations served customers directly, 15% served other businesses, and 27% served both individuals and businesses directly. While 39% of the enterprises were in the wholesale and retail sectors, 26% were in the restaurant industry, 21% were in pharmacies, and 14% were in electronics stores. Four age groups were used: 3 years (17%); 3–5 years (31%); 6–10 years (29%); and >10 years (23%). Apart from these characteristics, 54% of the enterprises had fewer than 20 staff, 32% had between 21 and 50 staff, and 14% had more than 50 people.

3.4. Data Analysis Technique

This study utilized partial least squares path modeling (PLS-SEM) to test the proposed hypotheses. This technique was especially well-suited for this model, as it allowed for estimating many complex structural associations between variables, and analyzing their mediating influence. Additionally, PLS-SEM did not require a large sample size to produce accurate results [98–100]. We believe that PLS-SEM was a better fit for our research than CB-SEM, as it is a causal-predictive technique of SEM that stresses prediction in evaluating statistical models, and whose structure is intended to provide causal explanations [101–103]. The model was constructed from a causal standpoint [104]. SmartPLS 3.3.3 software was used to conduct the PLS-SEM analysis: this included a range of statistical techniques for deriving an understanding of the complex interactions between one or more predictor variables and one or more dependent variables [105]. A bootstrap procedure, based on 10,000 subsamples, was utilized to investigate the hypotheses. SEM generated both a measurement and a structural model. The measurement model established the relationship between the measured and latent variables, whereas the structural model investigated the relationships between the latent variables. As random errors were computed and removed, only general variance remained. Different convergent and divergent validity criteria were used to assess the structural model specification's validity. The research findings are reported below.

4. Results

4.1. Measurement Model

To test the measurement model, the constructs' reliability and validity were investigated (Figure 2). Table 2 summarizes all findings. Standardized factor loadings were used to determine the items' reliability: the popular rule of thumb states that these factor loadings must be more than 0.6 [106]—except for one indicator, this rule was followed. The indicator which was not omitted was retained because it had a value of 0.59, which was close to the recommended value [107]. Additionally, construct reliability was determined using Cronbach's alpha, composite reliability, and average variance extracted (AVE). The findings suggested that all the constructs had an acceptable level of reliability, as indicated by values greater than 0.7. When convergent validity was considered, the same conclusion was reached [108]. The findings indicated that the AVE in all variables was more than 0.5 [104].

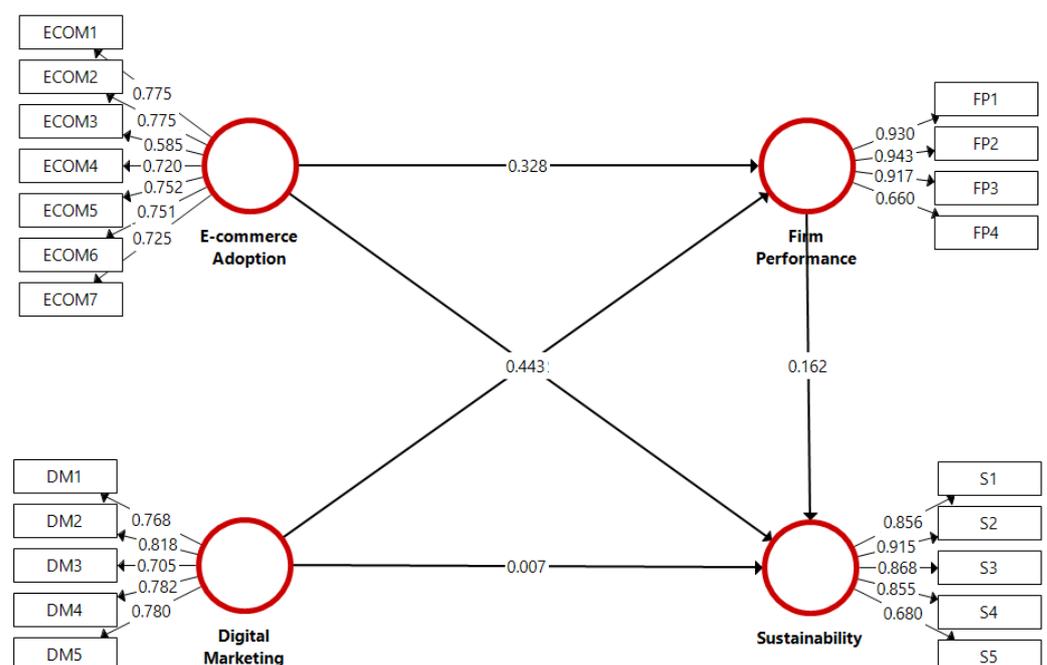


Figure 2. Measurement Model.

Table 2. Reliability and Validity.

Constructs	Items	Factor Loadings	Cronbach's Alpha	CR	AVE
Digital Marketing	DM1	0.768	0.831	0.880	0.595
	DM2	0.818			
	DM3	0.705			
	DM4	0.782			
	DM5	0.780			
E-commerce Adoption	ECOM1	0.775	0.852	0.887	0.531
	ECOM2	0.775			
	ECOM3	0.585			
	ECOM4	0.720			
	ECOM5	0.752			
	ECOM6	0.751			
	ECOM7	0.725			
Firm Performance	FP1	0.930	0.886	0.925	0.758
	FP2	0.943			
	FP3	0.917			
	FP4	0.660			
Sustainability	S1	0.856	0.892	0.922	0.703
	S2	0.915			
	S3	0.868			
	S4	0.855			
	S5	0.680			

CR = Composite reliability; AVE = average variance extracted.

Using the following equation from Hair et al. [104], we measured CR:

$$CR = \frac{(\sum_{i=1}^n FL_i)^2}{(\sum_{i=1}^n FL_i)^2 + (\sum_{i=1}^n ME_i)} \quad (1)$$

Here, FL_i denotes the standardized outer loadings of measurement item i , n is the number of items reflecting a factor, and ME_i is the measurement error of the item i . ME_i was calculated as: $(\sum 1 - FL_i^2)$.

Drawing on Hair et al. [104], we measured AVE with the following equation:

$$AVE = \frac{(\sum_{i=1}^n FL_i)^2}{n} \quad (2)$$

The Fornell–Larcker criterion and the heterotrait-monotrait correlation ratio (HTMT) were employed, to determine discriminant validity. The findings are summarized in Table 3. As can be observed, the correlations between each set of constructs were not greater than the square root of their AVE. According to Roldán and Sánchez-Franco [109], to attain enough discriminant validity, the diagonal elements in the related rows and columns must be substantially greater than the off-diagonal ones. As illustrated in Table 3, this requirement stood true for all the measuring constructs. As a result, the Fornell–Larcker criterion was satisfied [110]. Between each pair of constructs, the level of HTMT fluctuated between 0.251 and 0.657. In no situation was the stipulated maximum value of 0.85 surpassed [110]. Thus, the findings established the measurement model's discriminant validity (Table 4).

Table 3. Fornell–Larcker Criterion.

	Digital Marketing	E-commerce Adoption	Firm Performance	Sustainability
Digital Marketing	0.771			
E-commerce Adoption	0.414	0.729		
Firm Performance	0.579	0.511	0.87	
Sustainability	0.225	0.387	0.32	0.839

Note: values in the diagonal represent the square root of average variance extracted (AVE) of each construct.

Table 4. HTMT Criterion.

	Digital Marketing	E-Commerce Adoption	Firm Performance	Sustainability
Digital Marketing				
E-commerce Adoption	0.480			
Firm Performance	0.657	0.582		
Sustainability	0.251	0.433	0.364	

4.2. Results of Hypotheses Testing

The variance inflation factor (VIF) was used to assess the structural model's multicollinearity before hypotheses testing. It was revealed that all the VIF values were less than the recommended value (3.3), suggesting no presence of severe collinearity and common method bias [111]. Harman's single-factor test was conducted, following the criteria of Podsakoff et al. (2003), and the findings revealed that an exploratory factor analysis that included all variables provided a single element, which accounted for 33.7% of the total variance. As the value was below the maximum threshold of 50%, no common method bias (CMB) was observed. The structural model assessment revealed that the model had moderate-to-substantial explanatory power, explaining 42.4% of the variance in firm performance, and 17% of the variation in sustainability [112]. Additionally, Table 5 contains the path coefficients, standard errors, and t-values for each hypothesis.

Table 5. Results of Hypotheses Testing.

Hypotheses	Coefficients	t-Statistics	Remarks
H1: E-commerce Adoption → Firm Performance	0.332 (0.066) ***	4.993	Supported
H2: E-commerce Adoption → Sustainability	0.307 (0.083) ***	3.622	Supported
H3: Digital Marketing → Firm Performance	0.444 (0.064) ***	6.93	Supported
H4: Digital Marketing → Sustainability	0.005 (0.091)	0.051	Not supported
H5: Firm Performance → Sustainability	0.161 (0.077) **	2.106	Supported
H6: E-commerce Adoption → Firm Performance → Sustainability	0.053 (0.028) **	1.914	Supported
H7: Digital Marketing → Firm Performance → Sustainability	0.071 (0.036) **	2.006	Supported

** $p < 0.01$, *** $p < 0.001$.

Firstly, ECA had a significant positive impact on MSMEs' financial performance amid the COVID-19 pandemic ($\beta_1 = 0.332$, $t = 4.993$, $p = 0.000$); therefore, H1 was confirmed. Moreover, ECA also strongly influenced MSMEs' sustainability ($\beta_2 = 0.307$, $t = 3.622$, $p = 0.000$), supporting H2. Next, digital marketing had a significant and positive association with the performance of the firms ($\beta_3 = 0.444$, $t = 6.930$, $p = 0.000$), confirming H3. However, the findings revealed that digital marketing had no impact on MSMEs' sustainability ($\beta_4 = 0.005$, $t = 0.051$, $p > 0.05$): thus, H4 was rejected. Finally, this study confirmed a positive and significant association between MSMEs' performance and sustainability ($\beta_5 = 0.161$, $t = 2.106$, $p < 0.05$), supporting H5.

Table 5 also depicts the mediating relationship among the constructs. The findings indicate that the firms' financial performance significantly mediated the linkage between ECA and MSMEs' sustainability ($\beta_6 = 0.053$, $t = 1.914$, $p < 0.05$), supporting H6. The firms' performance was also observed to have had a strong and positive mediating effect on

digital marketing and on MSMEs' sustainability linkage ($\beta_7 = 0.071$, $t = 2.006$, $p < 0.05$): thus, hypothesis H7 was also confirmed (Figure 3).

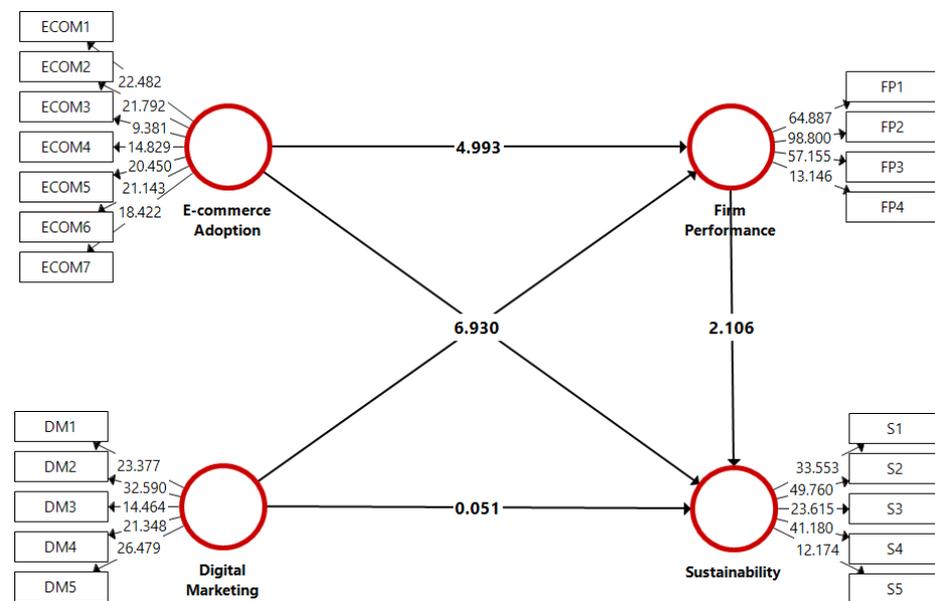


Figure 3. Structural model.

5. Discussion

The COVID-19 pandemic has substantially changed the operational processes of businesses. In particular, the MSME industry faced the most brutal blow amidst the deadly pandemic [30]: many small firms had to shut down their businesses, and almost all the MSMEs witnessed severe sales and profit declines. Regarding nation selection, the authors chose Bangladesh as an empirical study context for various reasons [113,114]. MSMEs are the backbone of Bangladesh's economy, making for around 25% of the country's GDP, and have the potential to contribute much more. Moreover, as a developing economy, Bangladesh is making tremendous advances in technology adoption, which has contributed to the growth of several industries, including MSMEs; however, vulnerable Bangladeshi MSMEs have borne the brunt of the COVID-19 pandemic. In light of the COVID-19 pandemic, it is crucial to analyze how Bangladeshi MSMEs might embrace technological and digital platforms such as e-commerce and DM, to sustain their operations. Thus, this study was intended to address the different adaptability mechanisms that MSMEs adopted, to sustain their businesses during the pandemic. For instance, many brick-and-mortar businesses adopted different EC platforms to sell and deliver goods and services. Additionally, many companies adopted customer-centric digital marketing strategies to sustain their businesses. Thus, this study surveyed 212 MSMEs in Bangladesh, to assess the effect of ECA and DMA on MSMEs' sustainability through superior firm performance.

Firstly, this study observed that ECA, amid the COVID-19 pandemic, strongly affected the financial performance of firms. Businesses that adopted e-commerce platforms for online sales, online purchases, advertising and marketing, and supply chain integration, achieved superior performance during the pandemic. Our finding is in line with Abebe [3] and Hussain et al. [115], who also argue that adopting e-commerce facilitates MSMEs to enhance their overall performance. E-commerce is perceived as a platform for engaging with other business partners, which results in improved firm performance [38]. Secondly, the findings revealed that e-commerce adoption promotes organizational sustainability. E-commerce adoption can reduce business waste and energy costs, which spurs improved environmental performance, ensuring corporate sustainability. This finding is similar to [58,63], who reported a significant association between e-commerce usage and sustainability. Owing to its efficiency and efficacy, e-commerce is more beneficial, resulting in

financial growth, higher profitability, expanded customer bases, and enhanced value added to the output, all of which have led to a more sustainable production process [58]. Sustainability can be attained through e-commerce adoption by improving asset allocation, cost-cutting of industrial production and management, and building capacity to adapt quickly to changing consumer demands, thereby increasing customer satisfaction [116].

Next, the findings suggested that DM had a critical effect on firms' financial performance amid the COVID-19 pandemic. A substantial volume of extant literature has confirmed the strong effect of digital marketing on MSMEs' performance [117,118]. Tolstoy et al. (2022) asserted that MSMEs leverage existing resources to develop competencies that ultimately add value to businesses and help them compete more effectively. SMEs may develop digital marketing capabilities to take advantage of digital interfaces, digital customer interactions, and digital client services when they engage in e-commerce sales operations. In a similar vein, Chatterjee and Kar [119] concluded that Indian MSMEs that adopted DM mechanisms achieved superior sales and overall business performance. Our findings also corroborate those of Franco et al.'s [120], who reported that MSMEs implementing DM are connected to social networks, particularly Facebook, and that their cost-cutting motivations affect both financial (profitability) and non-financial metrics (human resource results).

Furthermore, this study identified an insignificant linkage between digital marketing and MSMEs' sustainability. The findings suggest that digital marketing did not strongly affect businesses' sustainability practices amid the pandemic: however, these findings contradict those of [84,85] Dumitriu et al. [84], who argued that digital marketing tools, along with a few other marketing elements, improve MSMEs' brand equity, thereby driving the growth and sustainability of the firms. The digitization of nearly every area of business and organizational activity has resulted in the emergence of massive datasets for analysis purposes, which may be used to provide actionable insights for generating sustainable value, using big data and analytical tools [85]. The findings may differ owing to the differences in the country and industry contexts of the studies. The MSMEs in Bangladesh are still in the beginning phase of introducing and implementing sustainable business practices.

Additionally, small businesses in Bangladesh do not have access to big data and other advanced analytical tools, as digital marketing practices are a new phenomenon in the industry. Yasmin et al. [121] argued that Bangladeshi small firms face numerous challenges while adopting digital marketing mechanisms, including a lack of technical know-how, skilled human resources, infrastructure, unwillingness to embrace digital transformation, and implementation costs. Thus, we argue that, to ensure long-term sustainability, Bangladesh MSMEs must adopt digital marketing tools. Next, we observed the strong effect of MSMEs' performance on their sustainability during the COVID-19 pandemic. Artiach et al. [88] corroborated this conclusion, demonstrating that organizations with more robust growth and financial success are more likely to invest in sustainable business practices.

Finally, the empirical findings reported the positive and robust mediating impact of the performance of firms on e-commerce adoption sustainability and digital marketing sustainability linkages, thus supporting H6 and H7. Our statistical analyses demonstrated that firms that had adopted e-commerce platforms for selling their products generated a higher level of financial outcome, that could be invested in sustainable operations. Additionally, many MSMEs adopted digital marketing tools and techniques to reach their potential customers, which improved their performance, leading to sustainability. To our best knowledge, this is the first research that addresses how e-commerce and digital marketing adoption enhanced MSMEs' financial returns, which could be invested to generate superior sustainability performance amid the COVID-19 pandemic.

6. Conclusions

This study aimed to determine the effect of e-commerce adoption and digital marketing tactics on the financial performance and sustainability of MSMEs in Bangladesh. Entrepreneurs of MSMEs in Bangladesh provided the primary data, which was then an-

alyzed using PLS-SEM techniques, to evaluate the study's validity, reliability, model fit, and structural model, in order to assess the study hypotheses. The statistical evidence showed that ECA significantly impacted the financial performance and sustainability of MSMEs during the COVID-19 pandemic. The results also revealed that digital marketing strategies significantly impacted the financial performance of MSMEs. However, we could not establish a significant linkage between the adoption of DM and the sustainability of MSMEs. The financial performance of micro-, small-, and medium-sized enterprises played a crucial role in mediating the relationship between ECA and sustainability. In light of this, substantial theoretical and policy implications, limitations, and directions for future study in the subject area were addressed in further detail.

6.1. Theoretical Implications

The findings of this research have critical implications for academics, MSMEs, managers, and marketing practitioners in Bangladesh, through the promotion of e-commerce and digital marketing adoption to boost MSMEs' financial performance and, consequently, their sustainability performance. Our findings contribute to the existing knowledge of firms' technology adoption and sustainability performance. E-commerce and digital marketing are two aspects of modern technology adoption in firms' operations. This research extends the extant literature by uncovering how these technological factors facilitate MSMEs to undertake sustainability initiatives that boost performance. This paper adds to the sustainability literature by addressing the effect of digital technologies on organizational sustainability through improved financial outcomes. Our extensive literature review revealed that most of the research on this issue was conducted in developed economies and on large corporations. There is a paucity of knowledge on how e-commerce and digital marketing can benefit MSMEs in an emerging economy context. Hence, this scholarship also contributes to the small business literature by illustrating how MSMEs can sustain their industry amid the COVID-19 pandemic, by changing their business strategies with the help of advanced technologies. Finally, this scholarship also adds to the RBV literature, by conceptualizing e-commerce and DM as crucial organizational resources of firms, which necessitate dynamic capabilities, to influence firms' financial and sustainability performance.

6.2. Managerial Implications

This study has substantial managerial implications for the managers of MSMEs. Firstly, those MSMEs who adopted e-commerce platforms for product selling and delivering observed a positive effect on their financial performance. Thus, this study proposes that MSMEs shift to e-commerce platforms from conventional brick-and-mortar businesses. MSMEs need to train their employees with the necessary technical training programs to support organizational performance and sustainability via adopting e-commerce in their regular operations. Secondly, digital marketing tools and strategies were observed to be beneficial for MSMEs amid the pandemic; hence, this research suggests that MSMEs learn and practice digital marketing tools and techniques, to ensure business sustainability. Small businesses must be serious about the prospects for online platforms and technology to have a direct impact on their success. They should understand that developing an online presence by itself is unlikely to directly lead to an increase in revenue [122] and, therefore, should view digital marketing channels as effective business instruments that require continual resourcing and control [118].

Employees must be trained in big data analytics, social media analytics, and other advanced digital marketing tools to ensure customer satisfaction and loyalty. These digital marketing techniques will help MSMEs predict customer demands, so as to offer tailor-made products and services. However, this study revealed that Bangladeshi MSMEs could not exploit digital marketing techniques to boost firm performance during the pandemic. Although digital marketing adoption has facilitated superior business performance in developed countries, it has not driven MSMEs' performance in Bangladesh. Thus, Bangladeshi MSMEs need proper training and education regarding advanced digital

marketing tools to meet customers' demands. In this respect, the SME Foundation of Bangladesh and Bangladesh Bank can play a dynamic role in educating, promoting, and monitoring MSMEs' e-commerce and digital marketing activities, to facilitate organizational and national sustainability growth. Although much more needs to be done to achieve a sufficient level of sustainability performance in MSMEs, technology and innovation will determine the likelihood of long-term sustainability; consequently, the government must provide rewards and benefits for MSMEs, depending on their sustainability practices, to boost the technology adoption, such as e-commerce and digital marketing, that could lead to superior sustainability performance.

6.3. Limitations and Future Research Directions

This empirical study has produced a more sophisticated and context-specific comprehension of e-commerce and digital marketing practices in a sector still heavily reliant on traditional business growth and relationship development. It has highlighted the critical need for e-commerce platforms and digital marketing technologies to bolster traditional businesses' performance and sustainability. This study has certain limitations, which also provide the opportunity for further research. Firstly, as this study is exploratory in nature, its conclusions cannot be applied to other sectors, industries, or geographic regions. Given that the study was conducted during a pandemic and economic slump, data collected at other times in the economic cycle may provide different results, implying that these enterprises should be investigated at other periods in the economic cycle as well. Secondly, this research investigated an entrepreneurial MSMEs sample that included wholesale and retail businesses, pharmacies, restaurants, and electronics stores. The adoption of e-commerce and digital marketing techniques may be more crucial for these entrepreneurial MSMEs than for other MSMEs: thus, future studies may expand these observations to MSMEs working in service sectors or to manufacturing MSMEs with a lower degree of technology adoption, by examining the results' parallels and disparities. Finally, Bangladesh was considered the empirical setting, considering the importance of entrepreneurial MSMEs and digitalization: however, these circumstances may have had a significant influence on the outcomes. As a result, the function of an e-commerce platform and digital marketing competence may vary for enterprising MSMEs in countries with varying levels of institutional support and infrastructure for digitization and sustainable business practices. A cross-country comparison of these potential discrepancies may merit further investigation.

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