

The E-Commerce Adoption of Micro and Small Enterprises in Naga City, Philippines

Ana Marie A. Binalla^{1*}, Jonathan S. Dela Cruz²

¹College of Business and Entrepreneurship, Bicol State College of Applied Sciences and Technology, Peñafrancia Ave., Peñafrancia, Naga City 4400 Philippines

Email: aabinalla@biscast.edu.ph

²College of Business and Entrepreneurship, Bicol State College of Applied Sciences and Technology, Peñafrancia Ave., Peñafrancia, Naga City 4400 Philippines

Email: jsdelacruz@biscast.edu.ph

CORRESPONDING AUTHOR (*):

Ana Marie A. Binalla
(aabinalla@biscast.edu.ph)

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ABSTRACT

E-commerce provides micro and small enterprises (MSEs) in the Philippines access to broader markets, improved customer engagement, and cost-efficient operations. However, many enterprises face challenges in fully utilizing digital technologies due to limited capacity and understanding. This study examined the adoption of e-commerce among MSEs in Naga City, using the Technology Acceptance Model (TAM), focusing on marketing, logistics, and financial operations. An explanatory mixed-method design was employed, integrating survey data from 50 registered enterprises and key informant interviews. The instrument demonstrated high reliability (Cronbach's alpha of 0.897). Findings revealed that most MSEs utilize social media, particularly Facebook, as their primary e-commerce platform. Respondents strongly agreed that e-commerce platforms are easy to use, enabling efficient communication, customization, and navigation. They also perceived high usefulness in marketing, logistics, and financial operations, particularly in reaching customers, improving inventory management, and enhancing financial decision-making. Correlation analysis showed a significant positive relationship between perceived ease of use and perceived usefulness, with the strongest association in financial operations. The study concludes that e-commerce enhances operational efficiency and performance, highlighting the need for strengthened digital literacy, localized platforms, and institutional support to sustain business growth.

Contribution/Originality: This study contributes to the existing literature by examining technology adoption among MSEs in Naga City, highlighting its role in marketing efficiency, logistics optimization, and financial monitoring, with strategic e-commerce adoption so that these MSEs could scale businesses and enhance organizational outcomes in contemporary business environments for economically-viable community.

1. Introduction

In the contemporary global economic landscape, Micro, Small, and Medium Enterprises (MSMEs) continue to serve as fundamental drivers of inclusive economic development, accounting for over 90% of all businesses and more than 50% of global employment (World Bank, 2022). Despite their substantial contribution, MSMEs—particularly in developing economies—face challenges in transitioning to digital operations. These challenges are largely attributed to limited digital literacy, inadequate technological infrastructure, and constrained innovation capacity (OECD, 2021). The disruptions caused by the COVID-19 pandemic further amplified these structural limitations, accelerating the digitization of markets while exposing critical vulnerabilities among small enterprises. Consequently, the need for systematic digital capacity building has become increasingly urgent (UNCTAD, 2022).

Within the Philippine context, recent findings by Google, Temasek, and Bain & Company highlight the rapid expansion of the country's digital economy, driven by increasing internet penetration and growing consumer trust in online services. The Philippine internet economy, valued at approximately USD 7.5 billion, is projected to reach USD 20.5 billion by 2025, reflecting the country's significant potential for digital transformation. This growth underscores the expanding role of information and communications technology (ICT) in facilitating efficient buyer-seller interactions and advancing e-commerce as a critical sector in the digital economy. The Philippine digital economy continues to exhibit strong growth potential. Currently contributing approximately 2.1% to the country's gross domestic product (GDP), it is projected to reach 5.3% by 2025, with e-commerce accounting for a significant share. Notably, micro and small enterprises constitute 99.25% of all registered establishments, underscoring their critical role in employment generation, income distribution, and overall economic development (Philippine Statistics, 2023; Philippine Institute for Development Studies, 2014). As such, a robust MSME sector is widely recognized as an indicator of a resilient and inclusive economy.

Naga City, a first-class city with a high centrality index shows strong potential for regional growth. Naga City provides a supportive environment for MSME development through a strong business ecosystem and proactive governance. Collaborative efforts among the Board of Investments, Go Negosyo, and the Department of Trade and Industry (DTI) enhance MSME support through investment promotion, capacity building, and livelihood programs. With over 270 registered MSMEs as of 2023, the city reflects increasing reliance on digital commerce, signaling both economic vitality and opportunities for e-commerce expansion.

The study seeks to contribute to the development of innovative technology-driven business solutions that support micro and small enterprises in Naga City and similar contexts. Anchored on the Technology Acceptance Model (TAM), the study aims to examine the determinants of ICT adoption, particularly perceived usefulness and perceived ease of use, in relation to e-commerce platforms. It further explores how MSEs integrate digital tools into their marketing, logistics, and financial operations, while identifying key challenges and opportunities associated with technology adoption. Ultimately, the study aspires to provide insights that can inform policy, enhance entrepreneurial capacity, and support the sustainable growth of small enterprises.

1.1. Research Objectives

The present study investigated the experiences of micro and small enterprises (MSEs) in utilizing information and communications technology (ICT), particularly e-commerce platforms. Specifically, the research achieved the following objectives:

- i. Determined the level of perceived ease of use of e-commerce platforms among MSEs in Naga City.
- ii. Assessed the perceived usefulness of e-commerce platforms in terms of marketing operations, logistics activities, and financial management among the MSEs in Naga City.
- iii. Examined the significant positive relationship between perceived ease of use and perceived usefulness of e-commerce technologies among MSEs in Naga City.
- iv. Proposed strategic interventions or innovative approaches may be proposed to address the opportunities and challenges associated with the e-commerce experiences of MSEs in Naga City.

2. Literature Review

2.1. The Theoretical Framework of the Technology Adoption Model towards E-Commerce

The study utilized the technology acceptance model (TAM) in determining the experience of micro and small enterprises in terms of the level of acceptance of the use of e-commerce platforms in aid of their day-to-day operations. The technology acceptance model is an information systems theory that explains how to encourage users to accept and utilize new technology. It has been one of the most influential models of technology acceptance, with two primary factors influencing an individual's intention to use technology: perceived ease of use and perceived usefulness. The primary objective of TAM is to shed light on the acceptance of technology in order to predict the behavior of and provide a theoretical explanation for the successful implementation of technology (Marikyan, D. & Papagiannidis, S., 2023). TAM represents the behavior, as the outcome predicted by perceived ease of use, perceived usefulness, and behavioral intention. Technology acceptance is a three-stage process, whereby external factors (system design features) trigger cognitive responses (perceived ease of use and perceived usefulness), which in turn, form an effective response (attitude toward using technology), influencing use behavior (Davis, 1989).

In line with this, Harvanti and Subriyadi (2020), posited that the acceptance of e-commerce is interesting to learn as a reference to determine the right strategy to use now and in the future. Bangisan et al. (2023) further espoused that technological, organizational, and environmental factors, as well as individual characteristics of the owners could possibly influence the MSMEs decisions to adopt and further utilize e-commerce. The study examined the perspectives on the part of the seller or business owner on the ease of use and the usefulness of e-commerce platform along with their marketing operations, logistics activities, and financial operations that could lead to technology adoption and application. This can also provide favorable mechanisms that could support the implementation of an e-commerce platform.

Perceived usefulness is defined as the extent to which an individual believes that the use of a particular system enhances job performance. In contrast, perceived ease of use refers to the degree to which an individual perceives that utilizing a system requires minimal effort. These constructs jointly shape users' attitudes toward technology, which subsequently influence their behavioral intention to adopt and actual system usage.

Furthermore, TAM posits a causal relationship between perceived ease of use and perceived usefulness, wherein systems that are easier to use are more likely to be perceived as useful. This interrelationship ultimately strengthens users' intention to adopt the technology. Perceived ease of use indirectly affects behavioral intention through its influence on perceived usefulness, thereby reinforcing the overall adoption process.

Furthermore, the development of technology presents e-commerce as an alternative buying and selling place to physical stores. The use of technology such as e-commerce tools can enable MSEs to explore the many opportunities that can benefit the economic performance of their business. However, some factors affect the adoption and application of the use of technology specifically for online business, such as technical capability and its costs as found by Wymer and Regan (2005). They said that these factors are perceived barriers to adopting e-commerce technology. Moreover, personal, social, and cultural factors are significant drivers in adopting digital technology as corroborated by Bangisan et al. (2023). They concluded that there is a significant relationship between the MSMEs profile and the extent of e-commerce application. Kanayo et al. (2024) also identified significant drivers of e-commerce adoption such as organizational, economic, and environmental. It was further recommended to invest in trainings and foster supportive leadership in collaboration with government agencies that can enhance access to necessary infrastructure and financial support.

Existing literature consistently underscores the positive impact of ICT adoption on enterprise performance. Kanayo et al. (2024) identify cost-benefit considerations, access to finance, and enabling environments as key adoption drivers, while Wirdiyanti et al. (2023) emphasize improvements in business performance and financial inclusion. E-commerce adoption also provides strategic advantages, including enhanced market reach, improved brand visibility, and reduced operational costs, enabling MSEs to overcome geographic and resource constraints (Wymer and Regan, 2025).

Despite these benefits, challenges persist. Capistrano et al. (2023) note that limited capability and uneven adoption hinder effective ICT utilization. Similarly, Pal et al. highlight the role of perceived ease of use and user satisfaction in influencing continued engagement. Further, Bangisan et al. (2023) and Harvanti & Subriyadi (2020) stress the importance of technological, organizational, environmental, and individual factors in shaping adoption.

2.2. The E-Commerce Models for Micro and Small Enterprises

The expansion of digital commerce is increasingly supported by a dynamic ecosystem that includes government-led innovation initiatives, accessible financial services, consumer-oriented platforms, and ongoing infrastructure development. Empirical evidence from We Are Social (Kemp, 2021) highlights evolving trends in internet usage, mobile connectivity, and e-commerce adoption. Although online purchasing participation remains relatively

modest, the rapid growth of both Business-to-Business and Business-to-Consumer transactions indicates strong potential for market expansion, driven by changing consumer behavior and the growing centrality of digital platforms.

E-commerce is a business model that allows businesses and consumers to make purchases or sell things online. It has evolved and innovation has found creative ways to deal with the changing business ecosystem (Reed, 2024). Four major models can be adopted by micro and small businesses using their e-commerce platform. These are the business-to-consumer (B2C) businesses, business-to-business (B2B) business model, business-to-business-to-consumer (B2B2C), business-to-government (B2G), consumer-to-business (C2B), and consumer-to-consumer (C2C) businesses. All these business models can be utilized by micro and small businesses however the application will depend on what you are selling, who is your customers, what are your capabilities, and what is your product positioning. The respondents of the study are micro and small enterprises engaged in retail and service industry utilizing different e-commerce business models. Overall, the literature emphasizes that while e-commerce enhances efficiency and competitiveness, strengthening digital capabilities, supportive policies, and institutional collaboration remains critical to sustaining MSME growth and maximizing the benefits of digital transformation.

3. Research Methods

3.1. Research Design

This study employed an explanatory mixed-methods research design to provide a comprehensive understanding of the findings. The quantitative phase was conducted initially, wherein survey data were collected and analyzed to identify patterns and relationships among the variables. These results were subsequently corroborated and enriched through qualitative data obtained from key informant interviews, thereby enhancing the validity and depth of the overall analysis.

3.2. Participants and Sampling

The respondents of the study were drawn from the registry of businesses maintained by the Department of Trade and Industry – Camarines Sur Provincial Office for the period 2022 to 2023. These enterprises were categorized as micro and small enterprises (MSEs), with particular emphasis on those actively utilizing e-commerce platforms in their routine business operations. A total of 50 participants, representing both retail and service sectors, consented to participate in the study and responded to the research invitation.

3.3. Instrumentation

A researcher-developed survey questionnaire was designed as the primary data collection instrument and underwent expert validation to ensure content adequacy and relevance. The instrument's reliability was assessed using Cronbach's Alpha, yielding a coefficient of $\alpha = 0.897$, which indicates a high level of internal consistency among the items.

The questionnaire comprised multiple sections. The first section captured the respondents' business profile, including type of business, years of operation, number of

employees, type of e-commerce platform utilized, budget allocation for e-commerce activities, and duration of platform usage. The second section measured key constructs derived from the Technology Acceptance Model (TAM). Specifically, it assessed perceived usefulness of the e-commerce platform from the perspective of sellers, with emphasis on its contribution to marketing, logistics, and financial operations. It also examined perceived ease of use, focusing on the extent to which the platform is considered user-friendly and manageable.

Additionally, an open-ended component was included to elicit respondents' insights regarding the challenges they encountered and the opportunities they identified in using their respective e-commerce platforms. The finalized instrument consisted of 26 items adapted from a modified TAM framework. Data collection was conducted through direct administration of the questionnaire by the researchers, allowing for immediate clarification of responses and the inclusion of follow-up questions. This approach facilitated a deeper understanding of respondents' experiences and provided supplementary qualitative insights to support the study's findings.

3.4. Data Analysis

To analyze the data collected, A descriptive research approach was utilized to characterize the indicators associated with each variable. Specifically, mean scores were computed for each indicator to generate composite measures representing the variables used in subsequent analyses. To examine the relationship between perceived ease of use and perceived usefulness of the e-commerce platform, Pearson's correlation coefficient (r) was employed. Additionally, frequency and percentage distributions were calculated to describe the business profiles of the selected micro and small enterprises in Naga City. For the qualitative component, thematic analysis was applied to systematically interpret the data obtained from the key informant interviews. This approach facilitated the identification of recurring patterns, themes, and insights that complemented the quantitative findings, thereby providing a more nuanced understanding of e-commerce adoption among the respondents.

The interpretation of mean values followed a seven-point Likert scale with the following descriptive equivalents: 1.00–1.85 (strongly disagree), 1.86–2.71 (disagree), 2.72–3.57 (somewhat disagree), 3.58–4.43 (neither agree nor disagree), 4.44–5.29 (somewhat agree), 5.30–6.15 (agree), and 6.16–7.00 (strongly agree). This scaling facilitated a sound assessment of respondents' perceptions regarding the constructs under investigation.

To examine the relationships among variables, Pearson's correlation coefficient (r) was utilized. Specifically, the analysis determined the association between perceived ease of use and perceived usefulness of e-commerce platforms across three functional dimensions: marketing, logistics, and financial operations. In addition, correlation analysis was conducted to further explore the relationship between overall e-commerce platform usage and its perceived usefulness within these domains. The strength of the relationships was interpreted based on the guidelines proposed by Evans (1996): 0.00–0.19 (very weak), 0.20–0.39 (weak), 0.40–0.59 (moderate), 0.60–0.79 (strong), and 0.80–1.00 (very strong). This analytical approach provided a robust basis for evaluating the degree of association among the study variables and for drawing meaningful inferences regarding technology adoption among micro and small enterprises.

4. Results

This section presents the findings and corresponding interpretations of the data gathered in relation to the specific objectives of the study. It provides a descriptive analysis of the respondents' profiles, including type of business, years of operation, number of employees, e-commerce platforms utilized, corresponding budget allocation, and length of experience in using digital platforms.

The results indicate that, among the 50 micro and small enterprises (MSEs) surveyed, the majority (43%) are engaged in manufacturing activities, followed by those in the retail sector (35%), and service-oriented businesses (22%). In terms of operational longevity, 35% of the enterprises have been in operation for less than one year, while 26% have operated for two years, another 26% for more than three years, and 13% for more than five years. These findings suggest a relatively young and evolving business landscape among the respondents.

With regard to the adoption of e-commerce platforms, a substantial proportion (83%) of respondents rely on social media platforms, particularly Facebook, as their primary digital channel for business transactions. Meanwhile, 9% utilize established e-commerce marketplaces such as Shopee, and another 9% engage with local online delivery applications. This distribution highlights the predominant reliance on accessible and user-friendly platforms, reflecting the importance of perceived ease of use and familiarity in technology adoption among MSEs.

4.1. The Perceived Ease of Use of e-commerce platforms for micro and small enterprises in Naga City.

Perceived ease of use is defined as the degree to which an individual believes that utilizing a particular system or technology requires minimal effort (Davis, 1989). A system that is perceived as easy to use is more likely to enhance operational efficiency, improve user experience, and foster continued usage and user loyalty.

Table 1: Mean and Standard Deviations of Perceived Ease of Use

Perceived Ease of Use	Mean	SD
We can easily communicate and interact with our customers' urgent concerns using the e-commerce platform.	6.4	0.7
Our e-commerce platform can be easily used for product customization.	6.3	0.8
There is easy access to big data (these are information used to show patterns, trends, and associations).	6.2	0.9
The platform's user interface (UI) is understandable and easy to navigate.	6.1	0.9
We find it easy to do what we actually want it to do.	5.9	0.9
Learning to operate our e-commerce platform is easy.	5.8	1.0
Average Score	6.1	0.9

Note: Interpretation of the mean scores

3.58-4.43 = neither agree nor disagree,

4.44-5.29 = somewhat agree,

5.30-6.15 = agree,

6.16-7.00 = strongly agree

As presented in Table 1, the findings indicate that the selected micro and small enterprises (MSEs) in Naga City generally perceive their chosen e-commerce platforms as highly user-friendly, with an overall mean score of 6.1 (SD = 0.9). Specifically, respondents reported that e-commerce platforms facilitate efficient communication and interaction with customers, particularly in addressing urgent concerns (M = 6.4, SD = 0.7). Moreover, these platforms enable businesses to customize products and services in response to customer demands (M = 6.3, SD = 0.8).

The results further reveal that respondents perceive e-commerce platforms as easily accessible through the internet, allowing them to obtain relevant business information such as market patterns, trends, and associations (M = 6.2, SD = 0.9). Additionally, the user interface (UI) of the platforms is considered intuitive and easy to navigate (M = 6.1, SD = 0.9), while the overall functionality supports business owners in accomplishing their operational tasks with relative ease (M = 5.9, SD = 0.9). Respondents also indicated that learning to operate their selected e-commerce platforms is relatively straightforward (M = 5.8, SD = 1.0).

These findings suggest that respondents possess a functional level of familiarity with the technological tools they utilize, which positively influences their perception of ease of use. This aligns with the assertion of Gefen and Straub (2000) that users' intrinsic characteristics, such as prior experience and technological competence, significantly shape their perceptions of system usability. However, it is important to note that limited digital literacy may still pose challenges for some users, particularly when confronted with complex interfaces, potentially reducing perceived ease of use and hindering technology adoption.

4.2. The perceived usefulness of the e-commerce platform along with marketing operations, logistics, and financial activities to micro and small enterprises in Naga City.

The perceived usefulness of e-commerce platforms was examined in relation to three key functional areas of business operations among micro and small enterprises (MSEs) in Naga City: marketing, logistics, and financial activities. Consistent with the Technology Acceptance Model, perceived usefulness is defined as the degree to which an individual believes that using a particular system enhances job performance (Davis, 1989). In the context of this study, perceived usefulness pertains to the extent to which e-commerce platforms support and improve the execution of marketing strategies, inventory and supply chain processes, and financial management activities.

4.2.1. Perceived Usefulness along Marketing

As presented in Table 2, the findings indicate that respondents demonstrate a high level of agreement regarding the usefulness of e-commerce platforms in supporting marketing operations (M = 6.3, SD = 0.9). In particular, MSEs strongly agree that the use of e-commerce significantly enhances their ability to reach a wider customer base (M = 6.7, SD = 0.5). The platforms also enable access to a diverse range of digital marketing tools, thereby facilitating more dynamic and flexible promotional strategies (M = 6.5, SD = 0.6).

Furthermore, respondents recognize e-commerce as a critical enabler of geographical market expansion (M = 6.4, SD = 0.7), allowing businesses to transcend physical

boundaries and access broader markets. This expanded reach also supports more effective customer retargeting strategies ($M = 6.4$, $SD = 0.7$) and enhances the ability of enterprises to respond promptly to changing market demands ($M = 6.1$, $SD = 0.9$). Additionally, respondents agree that the use of e-commerce contributes to the reduction of marketing-related costs ($M = 5.6$, $SD = 1.0$), further reinforcing its value in improving overall business efficiency.

Table 2: Mean and Standard Deviations of Perceived Usefulness along Marketing

Perceived Usefulness along Marketing	Mean	SD
The use of an e-commerce platform help us reach more customers.	6.7	0.5
The use of an e-commerce platform as a marketplace enabled my business to explore a variety of marketing tools.	6.5	0.6
The use of e-commerce platforms is an opportunity for geographical expansion.	6.4	0.7
The use of an e-commerce platform makes it easier for us to retarget customers.	6.4	0.7
The use of an e-commerce platform enabled us to respond quickly to market demand.	6.1	0.9
The use of an e-commerce platform reduced our marketing costs.	5.6	1.0
Average score	6.3	0.9

Note: Interpretation of the mean scores

3.58-4.43 = neither agree nor disagree,

4.44-5.29 = somewhat agree,

5.30-6.15 = agree,

6.16-7.00 = strongly agree

These findings underscore the strategic role of e-commerce as an integrated marketing tool that aligns with contemporary digital marketing practices. As highlighted by Booker (2024), the synergistic relationship between e-commerce and digital marketing enables businesses to leverage online platforms not only for transactional purposes but also as comprehensive channels for customer engagement, brand positioning, and market expansion.

E-commerce serves as a critical enabler of network expansion and market integration among micro and small enterprises (MSEs) in Naga City. Through digital platforms, businesses gain enhanced access to broader markets, develop deeper insights into consumer behavior through business analytics, and implement more targeted and context-responsive marketing strategies. These capabilities collectively strengthen the capacity of enterprises to optimize their online presence and improve overall competitiveness in the digital marketplace.

4.2.2. Perceived Usefulness along Logistics

From an operational perspective, e-commerce logistics encompasses the processes and systems required to efficiently manage the distribution of goods and services to online consumers (Mecalux, 2023). In this study, the perceived usefulness of e-commerce platforms in supporting logistics activities was examined. As presented in Table 3, the findings indicate that MSEs in Naga City generally agree on the usefulness of e-commerce platforms in facilitating logistics operations, with an overall mean score of 5.9 ($SD = 1.0$).

This suggests that respondents recognize the role of digital platforms in enhancing coordination, streamlining delivery processes, and improving the overall efficiency of supply chain activities within their businesses.

Table 3: Mean and Standard Deviations of Perceived Usefulness along Logistics

Perceived Usefulness along Logistics	Mean	SD
The use of an e-commerce platform as a marketplace enabled my business to send shipment to customers the soonest possible time.	6.1	0.9
The use of an e-commerce platform as a marketplace reduced our store setup cost.	6.0	0.9
The use of an e-commerce platform enabled us to utilize optimally different logistic partners.	6.0	0.8
The use of an e-commerce platform helps us improve our inventory management.	6.0	0.9
The use of the e-commerce platform reduced our operating costs.	5.7	0.9
The use of an e-commerce platform reduced our storing/warehousing costs.	5.6	1.3
Average score	5.9	1.0

Note: Interpretation of the mean scores

3.58-4.43 = neither agree nor disagree, 4.44-5.29 = somewhat agree,

5.30-6.15 = agree,

6.16-7.00 = strongly agree

The respondents likewise expressed agreement regarding the utility of e-commerce platforms as marketplaces that facilitate the prompt delivery of goods to customers (M = 6.1, SD = 0.9). These platforms were also perceived to contribute to the reduction of initial set-up costs (M = 6.0, SD = 0.9), the efficient optimization of logistics partnerships (M = 6.0, SD = 0.89), and the enhancement of inventory management systems (M = 6.0, SD = 0.9). Furthermore, the respondents agreed that the adoption of e-commerce minimizes operating costs associated with logistics activities (M = 5.7, SD = 0.9) as well as storage expenses (M = 5.6, SD = 1.3).

These findings suggest that e-commerce serves as a valuable mechanism for optimizing the logistics operations of micro and small enterprises (MSEs), particularly through improved inventory control, storage efficiency, and delivery network integration. Consistent with the literature, the perception of usefulness tends to emerge when technology users experience positive outcomes and enhanced business performance (Lin et al., 2023).

4.2.3. Perceived Usefulness along Finance

Financial tools and features embedded within e-commerce platforms act as enabling mechanisms that support business growth and expansion (Singh & Singh, 2024), primarily by reducing costs and facilitating the rapid processing of information. The present study further examined the perceived usefulness of selected e-commerce platforms in terms of financial services and capabilities. As reflected in Table 4, MSEs in Naga City demonstrated strong agreement regarding the financial utility of e-commerce platforms (M = 6.2, SD = 0.9).

The respondents likewise exhibited strong agreement regarding the role of e-commerce platforms as sources of information and analytical insights that support operational optimization and more informed decision-making, while simultaneously contributing to increased income and sales ($M = 6.4, SD = 0.8$). In addition, they strongly concurred that the utilization of e-commerce platforms enables businesses to achieve financial savings by reducing expenditures related to rent, maintenance, and other associated overhead costs ($M = 6.2, SD = 0.8$). Moreover, the respondents affirmed that these platforms provide access to critical financial metrics—such as sales and revenue—which are instrumental in guiding timely and strategic business decisions ($M = 6.2, SD = 0.8$). However, there was comparatively lower agreement regarding the use of e-commerce as a mechanism for price reduction or the adoption of low pricing strategies ($M = 5.7, SD = 0.8$).

Table 4: Mean and Standard Deviations of Perceived Usefulness along Finance

Perceived Usefulness along Finance	Mean	SD
The use of an e-commerce platform provides more insights for optimization and better-informed decisions.	6.4	0.8
The use of an e-commerce platform enabled us to apply strategies for growth (such as market penetration and market development)	6.3	0.8
The use of an e-commerce platform improved our sales and income.	6.3	0.8
The use of an e-commerce platform as a marketplace enabled my business to save finances (such as paying rent, maintenance, etc.)	6.2	0.8
The use of an e-commerce platform enabled us access to financial metrics (such as sales and revenues)	6.2	0.8
The use of an e-commerce platform allowed us to set lower prices.	5.7	0.8
Average score	6.2	0.9

Note: Interpretation of the mean scores

3.58-4.43 = neither agree nor disagree, 4.44-5.29 = somewhat agree,

5.30-6.15 = agree,

6.16-7.00 = strongly agree

Given that financial resources constitute a fundamental pillar of business success, these findings underscore the increasingly essential role of e-commerce as a catalyst for enterprise expansion and growth. Consistent with extant literature, the likelihood of technology adoption increases when users perceive clear advantages in terms of reliability, efficiency, and convenience (Ullah et al., 2022). Furthermore, the integration of digital banking, financial technology (fintech), and management accounting systems represents a critical component of e-commerce payment infrastructures. In support of this, the *Autonomous Last Mile Delivery Market Size Report 2024–2032* highlights perceived usefulness as the most significant determinant of user acceptance, surpassing other influencing factors.

4.3. The relationship of perceived ease of use with perceived usefulness of the e-commerce technology.

Drawing from the Technology Acceptance Model proposed by Fred Davis (1989), it is posited that the perceived ease of use of a technology significantly influences its perceived usefulness. In essence, even if a system is capable of delivering valuable functionalities, its complexity may hinder user adoption and acceptance. Within this framework, the present study investigated the relationship between these two core constructs of the model in the

context of micro and small enterprises (MSEs) in Naga City as users of e-commerce platforms.

Table 5 presents the descriptive statistics and correlation analysis of the variables under study. A Pearson correlation analysis was employed to assess the relationship between perceived ease of use and perceived usefulness of e-commerce across the domains of marketing, logistics, and finance. The results indicate that the overall mean scores for perceived usefulness in logistics ($M = 5.9$, $SD = 0.6$) and finance ($M = 5.9$, $SD = 0.8$) reflect a general agreement among respondents regarding the utility of e-commerce in supporting routine business operations.

Specifically, MSEs recognized the advantages of e-commerce in facilitating the identification of logistics partners, enhancing inventory management processes, improving overall inventory control, and mitigating costs associated with warehousing and shipping.

Table 5: Means, Standard Deviations, and Correlations of the Study Variables

Variables	Mean	SD	1	2	3	4
Perceived Ease of Use	6.1	0.9	-			
Perceived Usefulness - Marketing	6.3	0.9	0.44*	-		
Perceived Usefulness - Logistics	5.9	1.0	0.43*	0.56	-	
Perceived Usefulness - Finance	6.2	0.9	0.75*	0.59	0.43	-

Note: Interpretation of the mean scores

3.58-4.43 = neither agree nor disagree, 4.44-5.29 = somewhat agree,

5.30-6.15 = agree,

6.16-7.00 = strongly agree

A correlation coefficient was employed to determine the degree of association between perceived ease of use (PEU) and perceived usefulness (PU) across the domains of marketing, logistics, and finance. As presented in Table 5, the results reveal statistically significant relationships between PEU and PU. Specifically, PEU exhibited a moderate positive correlation with PU in marketing ($r(50) = .44$, $p < .05$) and logistics ($r(50) = .43$, $p < .05$). Notably, a strong positive correlation was observed between PEU and PU in the domain of finance ($r(50) = .75$, $p < .05$).

The findings of the correlational analysis suggest that the perceived ease of use of e-commerce platforms is strongly associated with improved financial outcomes. This further implies that the adoption of information and communications technology (ICT) has the potential to enhance the financial capabilities of micro and small enterprises (MSEs), while also contributing—albeit to a comparatively moderate extent—to their marketing and logistics functions. However, it is important to acknowledge that the generalizability of these findings is limited due to the geographically bounded nature of the sample. Moreover, the participating MSEs predominantly utilize social media platforms, particularly Facebook, as their primary e-commerce tool.

The respondents from Naga City likewise indicated that the use of e-commerce platforms is relatively effortless and free from complexity. In line with this, they perceived that such technologies contribute positively to both individual and organizational performance. These results underscore the notion that perceived ease of use significantly influences the perceived usefulness of e-commerce, thereby supporting enterprises in achieving their

organizational objectives. Consistent with the findings of Bacik et al. (2018), modern technologies directly affect the frequency of e-commerce usage, with digitalization enhancing competitive advantage and, consequently, increasing sales and revenue.

Furthermore, the data imply that respondents demonstrate a high level of confidence in engaging with digital technologies, particularly when these are localized and contextualized to better align with the needs of their target markets. As articulated by a key informant, *“Mas magayun kuta kun uyon sa paggamit ming mga saradit na negosyante para sa mga taga Naga, or igdi sa Bicol”* (“It would be more effective if the technology aligns with the nature and requirements of small businesses in Naga or the Bicol region”). Supporting this, Ritz et al. (2019) found that small business owners engaged in digital marketing activities often experience a sense of control, enjoyment, excitement, and self-improvement—factors that increase their likelihood of embracing and continuously using technological systems.

4.4. Proposed intervention or innovation to deal with the opportunities and challenges along the e-commerce experience of micro and small enterprises in Naga City.

To further strengthen the capabilities of micro and small enterprises (MSEs) in Naga City, the following interventions are proposed:

- i. A feature-rich business technology application may be developed to enhance user experience, taking into account the contextual realities of business owners and technology users, particularly MSEs in Naga City and other prospective adopters. The proposed application should integrate key functionalities, including online storefronts, inventory management systems, embedded payment gateways such as GCash and Maya, sales analytics, and customer relationship management (CRM) tools.
- ii. A pilot implementation program may be initiated to evaluate the effectiveness of the application among a selected group of MSEs across various sectors in Naga City. This initiative may also promote community collaboration through peer-to-peer learning networks and support the development of a unified local marketplace under a collective brand identity such as “Proudly Naga,” thereby expanding the market reach of local enterprises. Complementary strategies, including targeted social media campaigns and community-based events, can further contribute to the development of a robust e-commerce ecosystem within the locality. Collectively, these measures aim to foster a more inclusive, sustainable, and empowering digital transformation for MSEs in the region.
- iii. Strengthening collaboration with industry stakeholders is likewise essential, particularly in aligning digital capability-building programs with the needs of MSEs. This includes the development of customized training modules designed to enhance digital literacy and e-commerce competencies. Such training initiatives, delivered in Filipino or Bikol dialects, may focus on practical areas such as establishing online stores, effectively utilizing digital marketing tools, and analyzing business performance through data analytics. Strategic partnerships with organizations such as Go Negosyo and academic institutions like Bicol State College of Applied Sciences and Technology can help ensure that these programs remain accessible, contextually relevant, and responsive to the needs of local enterprises.

5. Conclusion

The findings of the study indicate that social media platforms have a significant influence on the business operations of micro and small enterprises (MSEs) in Naga City, evolving into a comprehensive business model and an alternative entrepreneurial ecosystem, particularly in the aftermath of the COVID-19 pandemic. These digital technologies have demonstrated substantial utility in marketing functions by enabling enterprises to more effectively reach their target markets, enhance brand visibility, and expand their promotional strategies.

Moreover, the adoption of such platforms contributes to improved confidence in inventory and storage management systems, facilitates the expansion of distribution networks, and supports the reduction of logistics-related costs. In addition, digitally adept users are able to monitor and evaluate business performance in real time through available analytics tools. Consequently, the integration of these technologies serves as a critical enabler of enhanced organizational performance and provides clearer performance indicators across marketing, logistics, and financial domains.

In light of these findings, it is recommended that MSEs in Naga City adopt e-commerce technologies in a more proactive and strategic manner to optimize their operational processes. The development of customized e-commerce websites—guided by information technology professionals—can support enterprises in effectively understanding and implementing digital tools that are aligned with their specific business needs and operational contexts. Such initiatives are expected to promote greater efficiency and unlock broader opportunities for sustainable business growth.

Ethics Approval and Consent to Participate

This research was conducted in strict accordance with the ethical standards of Bicol State College of Applied Sciences and Technology Research Ethics Committee.

The participants including the supervising government agencies of MSE's, the micro and small enterprises in Naga City – were provided with a clear and comprehensive Informed Consent Form in both hard copy and digital formats. This document detailed the study's objectives, the voluntary nature of participation, and the right to withdraw at any stage without penalty. The data gathering procedure was performed in compliance with the Philippine Data Privacy Act of 2012 (RA 10173).

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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