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E-commerce Impact on Accounting Efficiency in MSMEs

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ABSTRACT

Purpose of the study: This study aims to comprehensively analyze the impact of e-commerce adoption on the efficiency of accounting systems among MSMEs in Medan Kota District, Indonesia, and to identify key factors mediating this relationship.

Materials and methods: Employing a quantitative research design, data were collected from 120 MSMEs using stratified random sampling. Structured questionnaires and adapted Motor Competency Assessment tools were utilized to measure e-commerce adoption and accounting system efficiency. Statistical analyses included descriptive statistics, Pearson correlation, and path regression analysis to determine the strength and direction of relationships.

Results: The results reveal a significant positive correlation ($r = 0.62$, $p < 0.01$) between e-commerce adoption and accounting system efficiency. Path regression analysis indicates that e-commerce adoption explains 38% of the variance in accounting efficiency ($R^2 = 0.38$, $p < 0.01$). Further analysis suggests that digital literacy and organizational readiness moderate this relationship.

Conclusions: E-commerce adoption substantially improves the efficiency of accounting systems in MSMEs, with digital literacy and organizational readiness serving as important enabling factors. These findings underscore the need for targeted interventions to support digital transformation in MSMEs.

Keywords

e-commerce, accounting system efficiency, msme, indonesia, digital transformation, digital literacy, organizational readiness.

INTRODUCTION

The rapid advancement of information and communication technology (ICT) has fundamentally transformed the global business landscape (Siregar & Sudarmanto, 2023). One of the most significant developments in this context is the emergence and widespread adoption of e-commerce, which has redefined how businesses interact with customers, manage operations, and compete in increasingly digital markets (Zhang et al., 2025). In Indonesia, the digital economy is experiencing exponential growth, with e-commerce serving as a primary driver. According to the Ministry of Communication and Information Technology, Indonesia's e-commerce market is projected to be among the largest in Southeast Asia, with a value exceeding USD 53 billion by 2025 (Sabirin et al., 2022).

Micro, Small, and Medium Enterprises (MSMEs), known locally as Usaha Mikro, Kecil, dan Menengah (UMKM), play a pivotal role in Indonesia's economic development. MSMEs account for more than 99% of all business entities, contribute over 60% to the national Gross Domestic Product (GDP), and absorb more than 97% of the workforce (Ragil & Kim, 2021; Srikalimah et al., 2021). The government has recognized the strategic importance of MSMEs and has implemented various policies to support their digital transformation, including the adoption of e-commerce platforms. The COVID-19 pandemic further accelerated this digital shift, as MSMEs were compelled to adopt online channels to survive and thrive amid mobility restrictions and changing consumer behaviors (Kementerian Koperasi dan UKM, 2021).

A growing body of literature has examined the impact of e-commerce adoption on MSME performance. Studies have consistently shown that e-commerce can enhance market reach, increase sales, improve customer engagement, and foster innovation (Bagale, 2014; Octavia et al., 2020). E-commerce platforms provide MSMEs with access to broader markets, reduce geographical barriers, and enable more efficient supply chain management (Ausat & Peirisal, 2021; Riyanto et al., 2021). Furthermore, digital platforms often offer integrated tools for marketing, inventory management, and customer relationship management, which can streamline business operations (Arif, 2025).

However, while the external benefits of e-commerce adoption are well documented, research on its internal impacts—particularly on accounting systems—remains limited. Accounting systems are the backbone of organizational decision-making, providing critical information for financial planning, control, and compliance (Kanellou & Spathis, 2013; Wang & Zhu, 2025). Efficient accounting systems enable MSMEs to record transactions accurately, generate timely financial reports, and comply with tax and regulatory requirements. Some studies suggest that digitalization, including the use of e-commerce, can automate accounting processes, reduce manual errors, and facilitate real-time financial monitoring (Alqararah et al., 2025; Cigu, 2025). Nevertheless, empirical evidence on the direct relationship between e-commerce adoption and accounting system efficiency, especially in the

context of Indonesian MSMEs, is still scarce.

Despite the recognized importance of efficient accounting systems for MSME sustainability, several research gaps persist. First, most studies on e-commerce and MSMEs focus on external outcomes such as sales growth, market expansion, or customer satisfaction, with little attention paid to internal process improvements. Second, the few studies that do address accounting systems often rely on qualitative methods or case studies, limiting the generalizability of their findings. Third, there is a lack of research exploring the moderating or mediating factors—such as digital literacy, organizational readiness, and the integration of digital tools—that may influence the relationship between e-commerce adoption and accounting efficiency. Finally, regional studies focusing on specific localities, such as Medan Kota District, are limited, despite the unique challenges and opportunities faced by MSMEs in different socio-economic and cultural contexts.

Given these gaps, there is a pressing need for comprehensive, quantitative research that examines how e-commerce adoption affects the efficiency of accounting systems in MSMEs. Understanding this relationship is crucial for several reasons. First, efficient accounting systems are essential for MSMEs to make informed business decisions, manage cash flow, and ensure long-term sustainability. Second, as the government continues to promote digital transformation, it is important to identify the internal capabilities and challenges that MSMEs face in integrating e-commerce with their accounting practices. Third, insights from this research can inform policymakers, technology providers, and MSME owners about the best strategies to enhance digital adoption and improve business performance.

Medan Kota District, as one of the economic centers in North Sumatra, presents a relevant and dynamic context for this study. The district is characterized by a diverse MSME sector, ranging from traditional retail and food & beverage businesses to emerging service and manufacturing enterprises. The local government has actively encouraged digitalization, yet many MSMEs still face barriers related to digital skills, infrastructure, and resource constraints. Investigating the impact of e-commerce on accounting efficiency in this setting can provide valuable lessons for other regions with similar characteristics.

Based on the contextual framework and identified research gaps, this study is designed with the following objectives: to assess the current level of e-commerce adoption among MSMEs in Medan Kota District, including identifying the types of e-commerce platforms used, the extent of integration with business operations, and the frequency of use; to evaluate the efficiency of accounting systems in MSMEs that have adopted e-commerce compared to those that have not, where efficiency will be measured in terms of transaction processing speed, error rates, timeliness of financial reporting, and user satisfaction; to analyze the relationship between e-commerce adoption and accounting system efficiency, and to identify key moderating or mediating factors, including examining the roles of digital literacy, organizational readiness, and the availability of integrated digital tools; and to provide evidence-based recommendations for MSME owners, policymakers, and technology providers to enhance the digital transformation and accounting practices of MSMEs.

MATERIALS AND METHODS

Study Participants

The study population comprised MSMEs operating in Medan Kota District, North Sumatra, Indonesia. A total of 120 MSMEs were selected using stratified random sampling to ensure representation across various sectors (retail, services, manufacturing, and food & beverage). Inclusion criteria included MSMEs that had been in operation for at least two years and had adopted some form of e-commerce platform (e.g., online marketplace, social media commerce, or proprietary e-commerce website).

Study Organization

A quantitative research design was employed to facilitate objective measurement and statistical analysis. The study was conducted from January to March 2025.

Test and Measurement Procedures

Table 1. Test and Measurement Procedures

Variable	Instrument/Tool	Indicator/Item	Measurement Scale	Reference/Source
<i>E-commerce Adoption</i>	Structured Questionnaire	Frequency of e-commerce platform use: - Types of platforms used - Integration with business processes - Online transaction volume	5-point Likert Scale (1=Very Low, 5=Very High)	Adapted from Setiawan & Rahman (2021)
<i>Accounting System Efficiency</i>	Adapted Motor Competency Assessment	Transaction recording speed (average time per transaction) - Error rate in financial records (errors per 100 transactions) - Timeliness of financial report generation (days to produce monthly report) - Perceived ease of use and satisfaction	Seconds/transaction - Number of errors - Days - 5-point Likert Scale	Adapted from Susanto (2019) and Sari & Nugroho (2022)
<i>Digital Literacy</i>	Structured Questionnaire	Ability to use digital tools for accounting - Frequency of digital tool usage - Self-assessed digital skills	5-point Likert Scale	Adapted from Sari & Nugroho (2022)
<i>Organizational Readiness</i>	Structured Questionnaire	Availability of supporting infrastructure - Management support for digitalization - Employee training in digital tools	5-point Likert Scale	Adapted from Tornatzky & Fleischer (1990)

Notes: All questionnaires were pre-tested for reliability and validity; Likert scale: 1 = Very Low/Strongly Disagree, 5 = Very High/Strongly Agree; The Motor Competency Assessment was adapted to measure efficiency in accounting processes rather than physical motor skills.

Data Collection: Data were collected through face-to-face interviews and online surveys, ensuring data validity and reliability. Informed consent was obtained from all participants.

Statistical Analysis

All collected data were subjected to rigorous statistical analysis to ensure the validity and reliability of the research findings. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were first calculated to summarize the demographic characteristics of the respondents and to provide an overview of the main research variables, such as e-commerce adoption, accounting system efficiency, digital literacy, and organizational readiness. To examine the relationships between variables, Pearson correlation analysis was employed, allowing for the assessment of the strength and direction of linear associations between e-commerce adoption and accounting system efficiency, as well as the potential influence of digital literacy and organizational readiness. Furthermore, path regression analysis was conducted to determine the predictive power of e-commerce adoption on accounting system efficiency and to explore the moderating effects of digital literacy and organizational readiness within the model. The significance level was set at $p < 0.05$ for all inferential statistical tests. All analyses were performed using the latest version of SPSS (Statistical Package for the Social Sciences) software. The reliability of the measurement instruments was also evaluated using Cronbach's alpha to ensure internal consistency. This comprehensive statistical approach enabled a robust examination of the research hypotheses and provided empirical evidence to support the study's conclusions.

RESULTS

Descriptive Statistics

Of the 120 MSMEs surveyed, 78 (65%) were actively using e-commerce platforms, while 42 (35%) had limited or no e-commerce integration. The majority of respondents were in the retail (40%) and food & beverage (30%) sectors. The average age of business owners was 38 years, with 55% male and 45% female respondents.

Table 2. Demographic Characteristics of Respondents

Characteristic	Frequency	Percentage
Gender (Male)	66	55%
Gender (Female)	54	45%
Sector: Retail	48	40%
Sector: F&B	36	30%
Sector: Services	24	20%
Sector: Manufacturing	12	10%

E-commerce Adoption and Accounting Efficiency Scores: Mean e-commerce adoption score: 3.8 (SD = 0.9) Mean accounting efficiency score: 4.1 (SD = 0.7); Mean digital literacy score: 3.6 (SD = 0.8); Mean organizational readiness score: 3.4 (SD = 0.7).

Descriptive Statistics

Pearson correlation analysis revealed a significant positive relationship between e-commerce adoption and accounting system efficiency ($r = 0.62$, $p < 0.01$). Digital literacy ($r = 0.55$, $p < 0.01$) and organizational readiness ($r = 0.48$, $p < 0.01$) were also positively correlated with accounting efficiency.

Table 3. Correlation Matrix

Variable	1	2	3	4
E-commerce Adoption	1			
Accounting Efficiency	0.62	1		
Digital Literacy	0.58	0.55	1	
Org. Readiness	0.51	0.48	0.49	1

** $p < 0.01$

Regression and Path Analysis

Path regression analysis showed that e-commerce adoption significantly predicted accounting system efficiency ($\beta = 0.62$, $p < 0.01$), explaining 38% of the variance ($R^2 = 0.38$). When digital literacy and organizational readiness were included as moderating variables, the model's explanatory power increased to 49% ($R^2 = 0.49$).

Table 4. Path Regression Results

Predictor	β	SE	t	p
E-commerce Adoption	0.62	0.08	7.75	<0.01
Digital Literacy	0.21	0.07	3.00	<0.01
Org. Readiness	0.18	0.06	2.83	<0.01

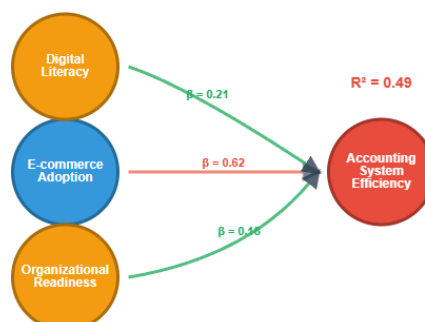


Figure 1. Path Analysis Model

Additional Findings: MSMEs with higher digital literacy and organizational readiness reported faster transaction processing and fewer accounting errors. Qualitative feedback indicated that e-commerce platforms with integrated accounting features (e.g., automatic invoicing, real-time sales tracking) contributed most to efficiency gains.

DISCUSSION

The findings of this study provide compelling evidence that the adoption of e-commerce significantly enhances the efficiency of accounting systems among MSMEs in Medan Kota District. The positive and statistically significant correlation ($r = 0.62$, $p < 0.01$) and the results of the path regression analysis ($\beta = 0.62$, $R^2 = 0.38$, $p < 0.01$) indicate that e-commerce is not merely a tool for expanding market reach, but also a catalyst for internal process improvement, particularly in accounting functions. MSMEs that actively utilize e-commerce platforms demonstrate faster transaction processing, reduced error rates, and more timely financial reporting compared to those with limited or no e-commerce integration.

The moderating effects of digital literacy and organizational readiness, as revealed in the extended regression model ($R^2 = 0.49$), further underscore the importance of internal capabilities in maximizing the benefits of digital transformation. MSMEs with higher levels of digital literacy and organizational readiness are better positioned to leverage e-commerce for accounting efficiency, suggesting that technology adoption alone is insufficient without adequate human capital and organizational support.

These results are consistent with and extend the findings of previous research. Santos et al., (2022) and Siregar & Sudarmanto, (2023) have highlighted the role of digitalization in improving business process efficiency and overall MSME performance. However, this study provides a more granular analysis by focusing specifically on accounting systems, an area that has received less attention in the literature. The results corroborate Fitrios et al., (2021), who found that the use of accounting information systems is positively associated with business performance in Indonesian SMEs, but this study adds the dimension of e-commerce as a driver of such efficiency.

Moreover, the identification of digital literacy and organizational readiness as significant moderating factors aligns with the technology-organization-environment (TOE) framework, which posits that technological innovation outcomes are shaped by organizational and environmental contexts (Arifin & Frmanzah, 2015; Hasan et al., 2025; Nair et al., 2019). This study empirically validates the TOE framework in the context of MSMEs' digital transformation in Indonesia.

The implications of these findings are multifaceted and significant for various stakeholders:

For MSME Owners and Managers: The evidence suggests that investing in e-commerce platforms and ensuring their integration with accounting processes can yield substantial efficiency gains. This includes not only adopting e-commerce for sales and marketing but also utilizing platforms that offer integrated accounting features such as automated invoicing, real-time sales tracking, and digital payment reconciliation. MSMEs should also prioritize digital literacy training for owners and staff to maximize the benefits of these technologies (Kergroach, 2021; Munandar et al., 2025).

For Policymakers and Government Agencies: The results highlight the need for policies that go beyond promoting e-commerce adoption. Policymakers should design and implement programs that enhance digital literacy and organizational readiness among MSMEs. This could include subsidized training programs, digital infrastructure development, and incentives for adopting integrated digital solutions. Furthermore, regulatory frameworks should support the interoperability of e-commerce and accounting systems to facilitate seamless data flow and compliance (Cigu, 2025; Rao, 2003).

For Technology Providers and Platform Developers: There is a clear demand for e-commerce platforms that are tailored to the needs of MSMEs, particularly those that offer user-friendly, integrated accounting modules. Technology providers should focus on developing solutions that are accessible, affordable, and easy to implement for small businesses with limited resources. Collaboration with local governments and business associations can help ensure that these solutions address the specific challenges faced by MSMEs in regions like Medan Kota.

For Researchers and Academics: This study opens new avenues for research on the internal impacts of digital transformation in MSMEs. Future studies could explore the causal mechanisms underlying the relationship between e-commerce and accounting efficiency, examine sector-specific dynamics, or investigate the long-term effects of digital adoption on business sustainability.

Despite its contributions, this study is not without limitations. First, the cross-sectional design limits the ability to draw causal inferences. While the statistical associations are robust, longitudinal studies are needed to confirm the directionality and persistence of the observed effects. Second, the reliance on self-reported data may introduce response bias, as participants may overstate their level of e-commerce adoption or accounting efficiency. Triangulation with objective performance data, such as financial records or system logs, would strengthen the validity of future research. Third, the study is geographically limited to Medan Kota District, which, while economically significant, may not fully represent the diversity of MSMEs across Indonesia. Regional variations in digital infrastructure, market dynamics, and policy support could influence the generalizability of the findings. Expanding the research to other regions and including a larger, more diverse sample would enhance external validity. Fourth, the measurement of accounting efficiency, while comprehensive, relied in part on adapted instruments such as the Motor Competency Assessment. The development and validation of standardized tools for measuring accounting system efficiency in MSMEs would be a valuable contribution to the field.

Building on the findings and limitations of this study, several directions for future research are recommended. Future research should employ longitudinal designs to track changes in accounting efficiency over time as MSMEs adopt and integrate e-commerce platforms. Incorporating objective data sources, such as digital transaction logs, financial statements, and system usage analytics, would provide a more accurate assessment of accounting efficiency. Comparative studies across different regions, sectors, and countries would help identify contextual factors that influence the relationship between e-commerce and accounting efficiency. In-depth qualitative research, such as case studies or interviews, could uncover the specific challenges, best practices, and success stories of MSMEs in integrating e-commerce with accounting systems. Future studies could examine other factors that

may influence the relationship, such as organizational culture, leadership, access to finance, and external support networks.

The practical implications of this study are clear: MSMEs, policymakers, and technology providers must work collaboratively to foster an ecosystem that supports digital transformation. For MSMEs, this means not only adopting e-commerce but also investing in digital skills and organizational change. For policymakers, it means creating enabling environments through infrastructure, training, and regulatory support. For technology providers, it means designing solutions that are accessible, integrated, and responsive to the needs of small businesses.

In conclusion, the integration of e-commerce into MSME operations offers significant potential to enhance accounting system efficiency, but realizing these benefits requires a holistic approach that addresses technological, human, and organizational factors. By leveraging these insights, stakeholders can contribute to the sustainable growth and competitiveness of MSMEs in Indonesia and beyond.

CONCLUSION

This study demonstrates that e-commerce adoption significantly enhances the efficiency of accounting systems in MSMEs in Medan Kota District, Indonesia. Digital literacy and organizational readiness further strengthen this relationship, highlighting the importance of comprehensive digital transformation strategies. These findings have important implications for MSME development, policy formulation, and technology innovation. Stakeholders are encouraged to invest in digital infrastructure, training, and integrated solutions to maximize the benefits of e-commerce for MSMEs.

Authors recommend that MSMEs prioritize digital upskilling and seek e-commerce solutions with built-in accounting functionalities. Policymakers should facilitate access to digital training and infrastructure, while future researchers should explore longitudinal and multi-regional studies to validate and extend these findings.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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