ANALYSIS OF THE IMPACT OF DIGITAL ACCOUNTING TRANSFORMATION ON THE FINANCIAL EFFICIENCY OF SMALL, MICRO, AND MEDIUM ENTERPRISES (MSMES) IN INDONESIA WITH TECHNOLOGICAL INTELLIGENCE AS A MODERATING VARIABLE

Jamilatul Uyun[1*], Nailah Aka Kusuma, Kholishotur Rohmaniyah[2], Lutfiyah Lutfiyah[3]

Affiliation:

[1,2,3]Accounting Study Program, Faculty of Economics, University of Islam Madura

Article Process:
Received 12-05, 2025
Revised 02-28, 2026
Accepted 02-28, 2026

*** Correspondence:**
jamilatuluyun@uim.ac.id

DOI : 10.30813/jab.v19i1.9341

Abstrak

Background: Major changes in digital accounting have had a significant impact on various business sectors, especially on Micro, Small, and Medium Enterprises (MSMEs).

Objective: This study aims to analyze of the impact digital transformation in accounting can enhance financial efficiency in the Micro, Small, and Medium Enterprises (MSMEs) sector.

Research Methods: This research is a quantitative study. The research data were obtained through questionnaires distributed to 602 MSME respondents. Data analysis and hypothesis testing were conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Research Results: The results of this study indicate that the adoption of digital accounting, FinTech innovation, and technological competition has a direct impact on enhancing financial efficiency. All pathways leading to improved financial efficiency proved significant in hypothetical tests, especially the adoption of FinTech innovations, which was highly encouraging in improving financial efficiency. Additionally, technological intelligence can moderate or strengthen relationship between implementation of digital in accounting and technological competition in enhancing financial efficiency.

Originality/Novelty of Research: This in-depth research examines the concrete effect of digital transformation on accounting associated with financial Efficiency at the MSME scale, which often lags in technology application. It also develops an integrated model regarding the impact indicators of digitalization on the financial efficiency of MSMEs. For practitioners, the results of this study can provide meaningful insights for policymakers and organizations seeking to adopt digital technology to improve financial efficiency.

Keywords: Digital, Transformation, Accounting, FinTech, Financial, MSMEs

Introduction

The current global economic landscape has undergone significant changes, particularly in the realm of digital transformation (M. Al-Okaily, Alghazzawi, Alkhwaldi, & Al-Okaily, 2023 ; Zhang, Shi, Shi, & Chen, 2022). Digital transformation involves a combination of physical and digital processes that are

integrated into a distributed system, bringing significant changes to business and social activities. The current global economic landscape has undergone significant changes, particularly in the realm of digital transformation (Kraus et al., 2021 ; Schwertner, 2017). This demonstrates that digital transformation is crucial so that organizations can compete effectively and remain relevant in today's digital age (Adamik & Nowicki, 2018 ; Agustian, Mubarok, Zen, Wiwin, & Malik, 2023). The development of digital technology has brought significant transformations in various sectors, including accounting. Digital transformation in accounting has not only changed the way financial records and reporting are maintained, but also has an impact on the efficiency and effectiveness of financial management, improving efficiency, accuracy, and transparency, specifically for the MSME sector. Efficiency in financial aspects is the main factor in determining business success and sustainability, especially for MSMEs that have limited resources (Sumanjeet Singh et al., 2024). Remembering that MSMEs are becoming a significant factor in economic growth, contributing around 60% of GDP and absorbing 97% of the workforce (Dasaraju, Somalaraju, & Kota, 2020).

Digital transformation offers a solution to address this problem by providing tools that can automate accounting processes, reduce human error, and provide financial data in real-time (Gonçalves, da Silva, & Ferreira, 2022 ; Trigo, Belfo, & Estébanez, 2014). This not only helps MSMEs manage their finances better but also enhances their ability to make more informed and integrated business decisions. Therefore, the implementation of digital technology in accounting is expected to improve financial efficiency, reduce administrative burden, and support more accurate business decision-making.

Based on a study conducted by (Guan et al, 2021 ; Tiron-Tudor et al, 2022), Organizations that adopt business intelligence technology have the potential to optimize revenue and cost management, provided that it is used carefully, allowing them to recognize future opportunities. The proficient use of technology is determined by the skills of employees or individuals, especially accountants with the right expertise in the technological aspect, so that they can design for the future (Kruskopf et al., 2020). The technological skills possessed by individuals are supported by the accounting system updates used by the organization. One of the most commonly used in accounting digitalization is blockchain, as research conducted by (M. Al-Okaily, Al-Majali, Al-Okaily, & Majali, 2023), financial reporting data can be enhanced with blockchain, thereby increasing investor confidence in global scale. So that it will improve the efficiency of the organization's digital finances (Wang, Yang, Chiu, & Lin, 2020). In addition to improving financial efficiency, organizations that adopt digital innovation in accounting systems can also enhance decision-making quality and improve business performance by adopting digital accounting,

FinTech, and leveraging technology competition in the banking industry. The goal of digital transformation in accounting is to create good corporate governance. The practical and successful implementation of digital accounting systems in pharmaceutical companies can encourage increased corporate governance (Al-Hattami, Almaqtari, Abdullah, & Al-Adwan, 2024). Although many businesses are attempting to digitize their operational activities, a growing number of businesses today are incorporating digital systems into their operations. However, the Majority of industrial and market sector players usually do not take full advantage of the potential of digitalization (Agostino, Saliterer, & Steccolini, 2022 ; Ayman A Alsmadi, Shuhaiber, Alhawamdeh, Alghazzawi, & Al-Okaily, 2022 ; Peng & Tao, 2022).

A considerable amount of research has been conducted on digitalization, but it still has some weaknesses. The weakness of the previous research was that it focused on the evolution of digital transformation in accounting, conducted in an advanced sector. It is necessary to apply digitalization in accounting to every operational activity, such as in the banking sector. (M. Al-Okaily et al., 2024), basic hook TI (M. Al-Okaily, Al-Majali, et al., 2023), Service Company (Guan et al., 2021), Pharmaceutical companies (Al-Hattami et al., 2024), and public sector organizations (Agostino et al., 2022). However, there has been no previous research that provides an in-depth analysis of the impact of digital transformation evolution on accounting in MSMEs. In fact, MSMEs are the pillars of the national economy, forming the foundation of Indonesia's sustainable economic growth with the support of the right technology and policies. The evolution of digital transformation in accounting for MSMEs is a fascinating subject for discussing changes in digital transformation across every sector of the business industry, particularly in the small and emerging business sector.

In accordance with the previous description, the purpose of this study is to develop an integrated model for empirically analyzing the impact of digital transformation accounting, as measured by implementation of digital tools on accounting, utilization of FinTech innovations, and technology competition on financial efficiency. This study also examines how technological skills act as a moderating variable of transformation digital in accounting, the implementation of FinTech innovations, and the challenges of technological competition and financial efficiency. This study analyzes in a complex manner the variables that have an impact on digital transformation, not only focusing on the concept of digital accountability, but also measuring digital transformation is measured in several fields, namely finance and technology, in financial sector, digital technology-based changes is measured by adoption for FinTech innovations, and in the technology field it is measured by technological competition. The dependent variable used is also included in the field of measurement, namely, financial efficiency. In addition, this

study employs an integrated research model, as it incorporates a moderation variable to measure the strength or weakness for the relationship between the independent and dependent variables, namely technological intelligence. The contribution of this research is beneficial for practitioners, governments, and researchers, providing additional information and insights into the impact of digital transformation on accounting, which can improve financial efficiency in business operations and inform government regulations for policy-making. In addition, the usefulness of this research lies in providing an additional reference for further study on the impact of Digital changes in accounting.

Literature Review

The implementation of digital transformation in the accounting field has a substantial impact on financial efficiency through various mechanisms. The implementation of digital transformation in commercial banks contributes to cost efficiency by expanding business diversification, reducing information gaps, maximizing fund utilization, and minimizing risks (Shen, Wu, Li, & Chen, 2025) The findings indicate that digital transformation in the banking industry can enhance the effectiveness of profit generation by optimizing revenue and reducing costs (Ren, Song, Zhu, & Yang, 2024). Additionally, the use of digital technology in accounting can enhance the quality of financial reports and positively impact the efficiency of corporate governance (Oanh, Ngoc, Dung, Trang, & Anh, 2025). Accurate and timely accounting information has an important role in driving quality improvement resolution and the efficiency for financial management. In the public sector, current accounting utilization software and digital devices significantly improve operational efficiency, reduce financial reporting errors by 60-70%, increase budget estimates by 30%, and optimize workflows by 40% (Hoxha, Angjeli, & Bombaj, 2025). Although some studies have not found a direct link between reduced processing time and financial benefits, the efficiency of data management and financial reporting has continued to improve thanks to digital transformation (Feijoó González, Gutiérrez Jaramillo, Medina Castillo, & Jaramillo Simbaña, 2024). However, challenges such as high implementation costs, resistance to change, and cybersecurity risks must be addressed so that the full potential of digital transformation in accounting can be realized (Feijoó González et al., 2024 ; Hoxha et al., 2025). This opens up new opportunities for measuring financial efficiency and digitalization within an organization, ensuring information integrity, stakeholder engagement, optimization of decision-making processes, as well as addressing the Company's social responsibility, accountability, and accounting transparency (Lombardi & Secundo, 2021). The following research concept map is presented in Figure 1:

EMKM's Financial Accounting Standards (SAK) are adopted and utilized by MSMEs to improve their professionalism, competition, as well as readiness to face the global market on the correct and appropriate regulations, such as the existence of these SAKs. SAK EMKM covers various aspects, including management, production, marketing, finance, and legality. For MSME actors, starting with simple standards such as neat bookkeeping and fundamental legality is essential. Then, MSMEs need to gradually increase their standards to move towards a larger and more sustainable MSME business. In the context of accounting and auditing, ERP is considered a technology that has a significant role (Abdulrasool & Turnbull, 2020 ; Strong et al., 2006 ; Sutton, 2004). Thus, The hypotheses in this study it is explained as follows:

H1: The implementation of digital accounting has a positive relationship with increased financial efficiency of MSMEs.

Although there are many benefits to be gained from the adoption of FinTech, there are also obstacles to its implementation. The most significant risk is the sustainability of business ventures, which tends to be hampered. Concerns over differences in skill levels, safety, social engagement, and environmental factors drive this (Bhat, Khan, Alkhwaldi, & Abdulmuhsin, 2024). MSMEs in advising FinTech pay attention to the perception of benefits and risks arising from the adoption of FinTech. The sustainability of FinTech utilization is highly dependent on the trust factor (Nugraha, Setiawan, Nathan, & Fekete-Farkas, 2022 ; Saadah & Setiawan, 2024). The adoption of financial technology has a significant impact on the MSME sector, as evidenced by transformations in various aspects, including digital payments, insurance services, and asset management. FinTech refers to the utilization of innovative technology to provide products and services to consumers (Dwivedi, Alabdooli, & Dwivedi, 2021). The implementation of FinTech in MSMEs, in line with technological developments, has shifted the way transactions are carried out from time to time, thus supporting the creation of more innovative and efficient services while strengthening environmental welfare (Ferdianto et al., 2024 ; Yan, Siddik, Akter, & Dong, 2023). A significant link exists between strategic alignment and technological innovation in the pursuit of a sustainable competitive advantage. Furthermore, strategic alignment is a crucial factor in maintaining that competitive advantage (A. Al-Okaily, Abd Rahman, Al-Okaily, Ismail, & Ali, 2020 ; M. Al-Okaily, Alqudah, Al-Qudah, Al-Qadi, et al., 2022 ; M. Al-Okaily, Alqudah, Al-Qudah, & Alkhwaldi, 2022 ; Natour, Shishan, Al-Dmour, Alghazzawi, & Alsharairi, 2021 ; Severo, Guimarães, Dellarmelin, & Ribeiro, 2019). Therefore, the following hypotheses can be proposed in this study:

H2: Adoption of FinTech innovations is positively associated with increased financial efficiency of MSMEs.

MSMEs that develop the adoption of technology in their business processes will be able to increase productivity and production, which will affect the financial efficiency of MSMEs (Prasanna et al., 2019). MSMEs need to enhance their sales, promotion, and marketing efforts through e-commerce, supported by information technology. Promotion or marketing is the spearhead of MSMEs in surviving in the midst of market changes (Jatmiko, Udin, Raharti, Laras, & Ardhi, 2021). Marketing quality reflects the importance of companies prioritizing customer satisfaction, attending to their needs, and maintaining good relationships with wholesalers, retailers, and consumers, thereby increasing the organization's profitability (M. Al-Okaily, Al-Fraihat, Al-Debei, & Al-Okaily, 2022 ; Ayman A Alsmadi et al., 2022 ; Bany Mohammad, Al-Okaily, Al-Majali, & Masa'deh, 2022 ; Tan & Sousa, 2015). According to (Lagat & Frankwick, 2017), Marketing capabilities play a crucial role in developing essential capabilities, such as collecting market data and creating a new strategy that focuses on meeting the needs of the target business segment, including aspects of Goods/services, pricing, distribution channels, and promotional activities. Based on research (Jatmiko et al., 2021) Marketing or promotional capabilities can be effectively carried out using a SWOT analysis, which is measured across several key aspects. Therefore, the following hypothesis is designed as follows:

H3: Technological competition is positively correlated with the financial efficiency of MSMEs.

Technological intelligence is not only defined as practical mastery, but also as the ability to adapt to the latest modern evolution and best methods in the digital transformation world (Basbeth, Sedyowidodo, & Sumanto, 2019). In recent years, Artificial Intelligence (AI) has evolved into a transformative capability that is revolutionizing the way businesses operate and compete in the global marketplace. (Rahman, Terano, Rahman, Salamzadeh, & Rahaman, 2023 ; Shiyyab, Alzoubi, Obidat, & Alshurafat, 2023) Researching the effect of AI implementation on financial performance. Organizations that utilize business intelligence can enhance the operational efficiency of their business, which in turn leads to increased business profitability. Similarly, (Yoshikuni, Dwivedi, Dultra-de-Lima, Parisi, & Oyadomari, 2023) This focuses on the impact of moderating technological skills, especially in the context of implementing technology-based systems to support accounting. Not only limited to the use of technology (Chen et al., 2020) Analyzing technology function skills plays a moderating role in the relationship between the influence of digital capabilities and innovation performance. Therefore, the results of this study offer important additional insights into how digital accounting, FinTech innovation, and technological competition contribute to financial efficiency, with technological literacy as a moderating factor. Thus, this study provides the following hypothesis:

H4: Technological intelligence strengthens or weakens the relationship between digital accounting adoption and the financial efficiency of MSMEs.

H5: Technological intelligence strengthens or weakens relationship between implementation of FinTech innovation and the financial efficiency of MSMEs.

H6: Technological intelligence strengthens or weakens the link between technological competition and the financial efficiency of MSMEs.

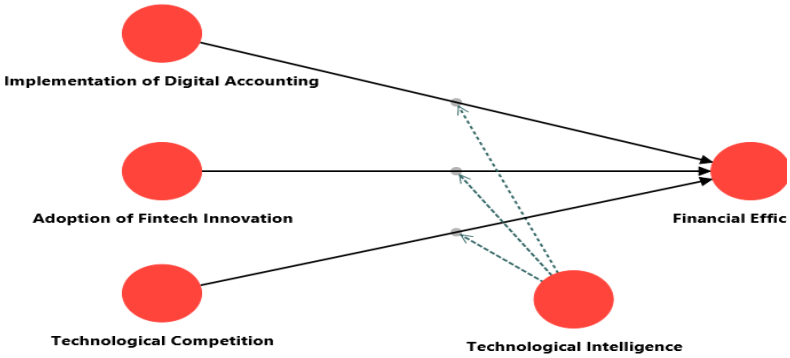

Figure 1: Research Hypothesis Model

Research Methods

Research design

This research method uses a descriptive quantitative method. It was used to examine the hypotheses that had been previously formulated. The research procedure begins with 1). Determination of samples/respondents with the identification of MSMEs that meet the criteria, 2). Data Collection, namely the distribution of survey questionnaires through the distribution of questionnaires directly to MSME business actors and digital platforms, or direct email communication, 3). Data analysis serves as a validity and realism test, as well as a multiple linear regression analysis, to measure the contribution of digital change in the context of accounting to increasing the financial efficiency of MSMEs 4. Interpretation of the results of data analysis and discussion, 5). Conclusion (M. Al-Okaily et al., 2024). Fully presented in Figure 2.

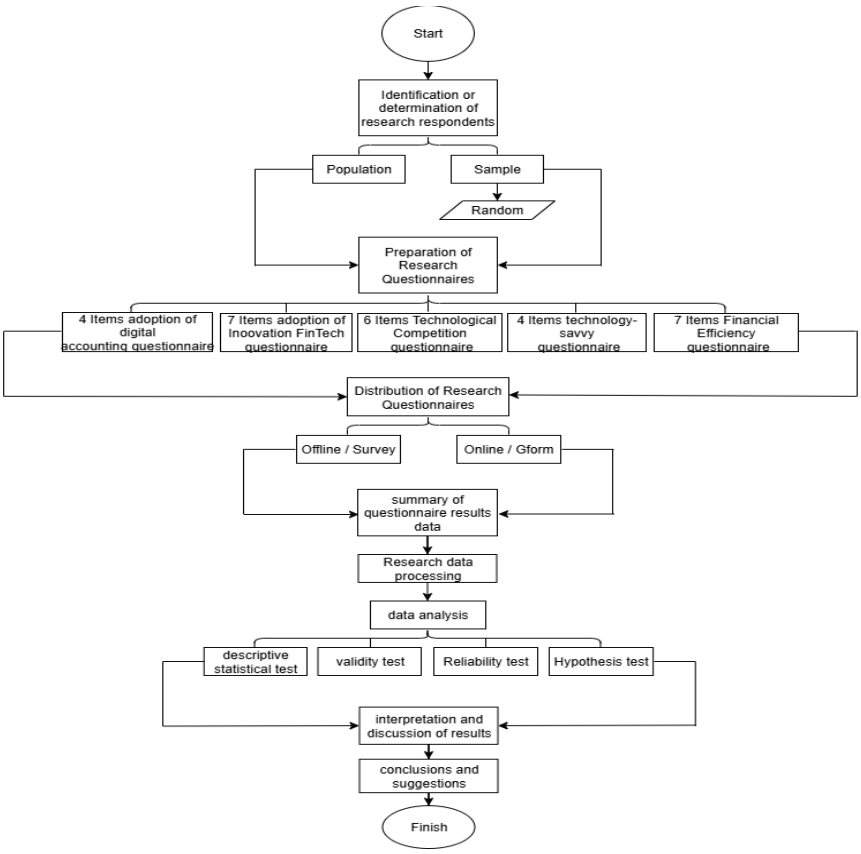

Figure 2: Research Flow

Instrument Development and Measurement

The techniques used to collect data involve surveying or distributing questionnaires in a structured manner to test the hypotheses proposed in this study. The questionnaire consists of three parts: a cover letter, demographic information, and measurement scale instruments assessing five constructs (M. Al-Okaily et al., 2024). The measurement instrument in the questionnaire was developed by adapting items from previous studies to align with the research purpose and maintain validity and reliability. In detail, the Measurement of the implementation of digital accounting was conducted using four items adapted from previous research (M. Al-Okaily et al., 2024 ; Rajan & Baral, 2015), Adoption of FinTech innovations was measured using seven items adapted from previous research. Technological intelligence is assessed through four indicators adapted from previous research (Guan et al., 2021 ; Lichtenthaler, 2007). The construct of technological competition was measured using six items adapted from the research (Zainun Tuanmat & Smith, 2011), Meanwhile, financial efficiency is measured through seven adapted indicators from the

research (Le, Chuc, & Taghizadeh-Hesary, 2019 ; Wang et al., 2020). The questionnaire measurement was conducted using a 5-point Likert scale, ranging from "strongly disagree (1)" to "strongly agree (5)". The research author maintains the confidentiality of respondents' identities, which are protected through a cover letter accompanying the questionnaire. Next, the researcher will review the questionnaire data collected using Excel software.

Data and sample

The data used in this study are primary data collected through questionnaires distributed online and offline. This research involves Batik MSME actors in Indonesia who utilize digital tools in their operational activities and sell and market their products on marketplaces and social media. This is a consideration for research to determine the impact on MSME actors of using digital tools, particularly in accounting and finance. The number of populations in this study is unlimited, and the sample used is limited to batik MSME actors in Indonesia. The determination of the sample uses nonprobability sampling with the purposive sampling technique with the determination of samples based on criteria, namely batik MSMEs in Indonesia and those who use digitalization in their operational activities, especially in financial recording and selling or marketing their products on marketplaces and social media, and are willing to fill out questionnaires (Tajik, Golzar, & Noor, 2024). Before the final trial, a preliminary trial was carried out to ensure the validity and reliability of the questionnaire data. A preliminary trial was conducted with 50 respondents who had experience with digitization (Saadah & Setiawan, 2024). As a result, 602 samples were obtained from questionnaires distributed both online and offline. Based on the ten-fold rule, at least 30 questionnaires are considered sufficient as the basis for PLS-SEM analysis, to avoid errors in concluding, a sample size of 200 may be needed (M. Al-Okaily, Alqudah, Al-Qudah, & Alkhwaldi, 2022).

Data analysis techniques

Data analysis was carried out using statistical software such as PLS-SEM, which produced descriptive statistics to summarize the variables of the impact of digital transformation, namely implementation of Digital Accounting, Implementation of FinTech Innovation, Technological Competiion and financial efficiency, as well as technological intelligence variables that are the moderating variables in the relationship between implementation of Digital Accounting, Implementation of FinTech Innovation, Technological Competition against financial efficiency and inferential statistics to assess the implications of Digital Transformation. The validity of the content is ensured by consulting experts in digital accounting and MSME financial management to verify the relevance of the questionnaire to the research purpose, in

addition to testing the validity of the data collected through the questionnaires. The questionnaire was tested for reliability using Cronbach's Alpha, with a coefficient value above 0.70 to ensure consistency of answers between similar items. The multiple regression method was applied to analyze the relationship between the implementation of Digital Accounting, Implementation of FinTech Innovation, Technological Competition (independent variable), and financial efficiency (dependent variable), while controlling for technological intelligence as a moderation variable. With a significance level of < 0.5. Findings from data analysis were interpreted to determine the implications of digital transformation in the financial efficiency on MSMEs in various contexts. These implications were further discussed in relation to relevant theories and previous research. Furthermore, based on the results and discussions, conclusions can be drawn in accordance with the research's purpose.

Respondent demographic data is presented in Table I. The results of this research indicate that the majority of respondents were male, aged between 30 and 40 years, and had a high school educational background. These findings reveal that the majority of respondents ran their businesses for a period of five to ten years. Based on the observations made, the majority of respondents selected were acting as both craftsmen and batik sellers in MSME business actors.

Table 1 : Demographic information from the Respondent

Information	Category	Frequency
Gender	Man	329
	Woman	273
Long Term of Effort	Less than 1 year	20
	1-5 Years	127
	5-10 Years	320
	More than 10 years	135
Education	SMA	402
	Bachelor (S1)	200
Age	Less than 30 Years	100
	30 - 40 years old	252
	41-50 Years	225
	More than 50 Years	25

Source: Data Processed by researchers

Results and Discussion

Measurement model assessment

The measurement assessment is according to research conducted by the (Ayman Abdalmajeed Alsmadi & Al-Omoush, 2025). The data analysis employed in this study utilizes SEMPLS to test the data and hypotheses. In the context of this research, PLS is considered appropriate because it supports predictive analysis that includes moderating variables, namely technological intelligence, and has a large sample size. The results of the outer loading model in this study are shown in Figure 3. Furthermore, the results of the measurement model presented in Table 3 show that the Cronbach's Alpha Coefficient ranges from 0.748 to 0.954. In contrast, The Composite Reliability value ranges from 0.942 to 0.963, indicating that the research data have adequate internal consistency.

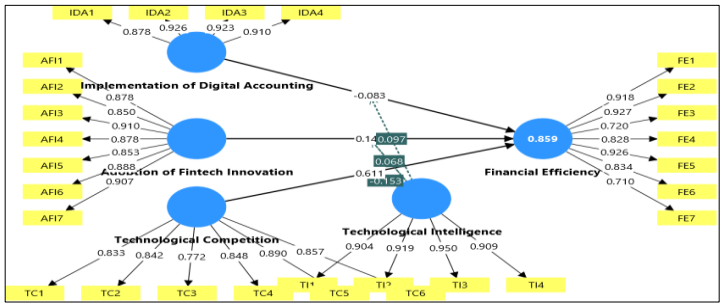

Figure 3: Outer Loadiang Models

The optimal average value of extraction variance (AVE) shows results higher than 0.50. Table 3 shows that Cronbach's Alpha value exceeds 0.70, the composite reliability value is above 0.70, and the AVE result is greater than 0.50, indicating that this result is acceptable and conforms to the recommended criteria.

Table 3 shows the results of Square Root of AVE and correlation matrix of coefficients. In each variable, the square root of AVE is indicated by a bold letter on the diagonal. The findings in Table 3 show that each variable has an AVE value that exceeds the required limit, as indicated by the correlation coefficient in the correlation coefficient matrix of the Likert scale. To prove discrimination on these scales.

Table 2: Results of validity and reliability tests

Variabel	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (Ave)
Implementation of Digital Accounting		0,933	0,950	0,827
IDA 1	0,878			
IDA 2	0,926			
IDA 3	0,923			
IDA 4	0,910			
Adoption of Fintech innovation		0.952	0.960	0.776
AFI1	0.878			
AFI2	0.850			
AFI3	0.910			
AFI4	0.878			
AFI5	0.853			
AFI6	0.888			
AIF7	0.907			
Technology Competition		0.917	0.935	0.707
TC1	0.833			
TC2	0.842			
TC3	0.772			
TC4	0.848			
TC5	0.890			
TC6	0.857			
Technological Intelligence		0.940	0.957	0.847
TI1	0.904			
TI2	0.919			
TI3	0.950			
TI4	0.909			
Financial Efficiency		0.930	0.944	0.709
FE1	0.918			
FE2	0.927			
FE3	0.720			
FE4	0.828			
FE5	0.926			
FE6	0.834			
FE7	0.710			

Source: Data Processed by Researchers

Table 3: Results Of Ave Square Root Structure And Correlation Coefficient

VARIABLES	1	2	3	4	5
Implementation of digital in accounting	0.909				
implementation of FinTech innovation	0.776	0.881			
Technological Competition	0.632	0.821	0.915		
Technological Intelligence	0.755	0.719	0.818	0.841	
Financial efficiency	0.814	0.814	0.865	0.830	0.842
Source: Data processed by the researcher					

Source: Data Processed by Researchers

After analyzing the data by estimating a reliable and accurate measurement model, the next stage of research involves testing the PLS path model to explore the influence of independent variables on improving financial efficiency, where the intelligence of technological understanding moderates the effect of these independent variables. Structural models use path coefficients to assess the statistical significance of the flow of coefficients. Additionally, this study examines how the impact of technological intelligence strengthens or weakens the correlation between independent and dependent variables.

Common method bias (CMB) test

The results of the study indicate that the samples used meet the criteria required for PLS-SEM analysis. Furthermore, single-factor analysis was conducted to identify the influence of CMB on the data research (Podsakoff et al., 2003). This analysis was conducted to address the CMB issue in the research data. CMB analysis by looking at VIF values for all models in the study (Kock, 2017). The test results showed that the VIF value of the outer model ranged from 2.006 to 3.372, still below the threshold of 3, which means that there was no multicollinearity in the research question item.

Table 4 presents the VIF values of the inner model used to assess multicollinearity among the independent variables. These values indicate how much the variable affects other variables in the model. All values less than 3.3 indicate that no multicollinearity would negatively impact accuracy and estimation. The value of VIF ranges from 2.351 to 3.033. This reflects a moderate interaction between variables, indicating a stable model suitable for unbiased path analysis.

Table 4: VIF Construct

Construct	Financial Efficiency
Implementation of Digital Accounting	3,033
Implementation of FinTech Innovation	2,586
Technological Competition	2,587
Technological Intelligence	2,888
TI x IDA	2,961
TI x AFI	2,351
TI x TC	2,643

Source: Data Processed by Researchers

R-Square (R^2) Test

R-squared (R^2) is used as a measure of the structural model to build dependent and independent variables. Table 5 presents the R-squared value (R^2) for the financial efficiency variable, which is 0.859. This means that the implementation of digital accounting influences 85.9% of financial efficiency, the adoption of fintech innovations, and technological competition. Meanwhile, 14.1% were influenced by other factors or variables that affect financial efficiency.

Table 5 : R-SQUARE (R2)

	R-square
Financial Efficiency	0.859

Source: Data processed by researchers

Hypothesis test

Table 6 shows that the implementation of digital technology in accounting proven to have a positive impact on financial efficiency ($\beta = 0.045$ and p-value = 0.018). Value ρ-values less than a significance value of 0,05. This indicates that H1 is accepted. The value of FinTech innovation adoption shows $\beta = 0.074$ and ρ-values = 0.002, which is less than the significance value of 0.05. This means that the use of FinTech innovation has a positive effect on financial efficiency. Therefore, H2 is also supported. Competition in the technology sector has an impact on financial efficiency, with a value of $\beta = 0.089$ and ρ-values of 0.006, which indicates that ρ-value is less than 0,05. Therefore, it can be inferred that technological competition have a significant impact on financial efficiency. So, it can be concluded that H3 is accepted. All hypotheses that directly lead to financial efficiency are found to have significant results on the proposed hypotheses. So H1, H2, and H3 are accepted. Based on these results, it is evident that the adoption of FinTech innovation has the most significant influence compared to the other two variables,

which directly lead to financial efficiency. In addition, the results of the moderation variable test also show that technological intelligence indirectly moderates or strengthens the relationship between technological competition and improving financial efficiency. But. Technological intelligence cannot moderate or weaken the interaction between the adoption of FinTech innovations and the increase in financial efficiency of Batik MSMEs in Indonesia. Therefore, it is not accepted and is not supported.

Table 6: Results of hypothesis testing

#	Path	β	t - value	ρ - values	Findings
H1	implementation of digital accounting → Financial efficiency	0,049	3,065	0,001	Accepted
H2	implementation of fintech innovation → Financial efficiency	0,030	2,748	0,003	Accepted
H3	technological competition → Financial efficiency	0,041	3,701	0,000	Accepted
H4	$technological\ intelligence \times implementation\ of\ digital\ in\ accounting \rightarrow Financial\ Efficiency$	0.051	1,901	0029	Accepted
H5	$technological\ intelligence \times adoption\ of\ FINTECH\ innovation \rightarrow Financial\ Efficiency$	0.057	1,196	0.116	Not Accepted
H6	$technological\ intelligence \times technological\ competition \rightarrow Financial\ Efficiency$	0.037	4,112	0.000	Accepted

Source: Data processed by researchers

Discussion

Digital transformation in the context of accounting and finance for MSMEs in Indonesia is a significant development, considering the numerous MSME actors in Indonesia and the sectors that significantly impact Indonesia's economic development. The issue and research results indicate that the digitalization rate of Indonesian MSMEs is still in the initial stage, ranking 13th in the Asia Pacific, with approximately 39.7% of MSMEs connected in the digital ecosystem (Nugroho & Wang, 2023). Therefore, this study aims to analyze the influence of digital accounting transformation, as measured by the implementation of digital-based accounting and fintech innovation, and the challenges of technology competition on increasing financial efficiency in MSMEs in Indonesia. Furthermore, this study employs an integrated model, and Table 6 examines the moderation of the results related to how technological intelligence influences the relationship between the independent and dependent variables. Statistical tests prove that the use of digital accounting significantly contributes to increasing financial efficiency. This

means that MSMEs that implement digital accounting for collecting financial transactions can improve their financial efficiency. This research is consistent with the findings of previous studies, such as (LOHAPAN, 2021) This study demonstrates that the implementation of a digital accounting system significantly contributes to improved audit results. The same thing is also shown by the results of previous research from (M. Al-Okaily et al., 2024 ; M. Al-Okaily, Al-Fraihat, et al., 2022). The findings show that implementation of digital accounting has an important and significant role in improve business performance and the quality of decision making in the banking sector. Research results of (M. Al-Okaily, 2024) Shows that the ease of use of technology can affect the desire to utilize Analytical Accounting Technology (AAT). The application of technology in accounting can be demonstrated by the use of specific systems or applications to streamline the organization's accounting process. One of the commonly used accounting systems is blockchain and the cloud (M. Al-Okaily, Al-Majali, et al., 2023 ; Nguyen Phu, Hoang Thi, & Tran Nguyen Bich, 2025).

Research from (Agostino et al., 2022) In accordance with the findings of this study, which shows that the change in accounting to digital form also experiences a shift in the form of government accountability from vertical, one-way, and government-focused accountability to a horizontal and decentralized form of accountability that will have the potential to increase empowerment to the community, including the voices of remote communities to provide easier access to services and information. Additionally, Digital accounting plays a role in enhancing effective and sustainable organization in the public sector (Pramono, Amyar, & Friska, 2023). (Klymenko, Halse, & Jæger, 2021) The findings show that manufacturing companies consistently utilize digital technologies to support automation and robotization, thereby generating digital data for their operations. However, digitalization is not yet implemented in environmental and social accounting.

The results of subsequent studies are consistent with the established hypothesis that the adoption of Fintech innovation has been proven to influence financial efficiency in the context of MSMEs. Thus, H2 is accepted. This enables Indonesian MSMEs to innovate by adopting fintech solutions to enhance financial efficiency. This finding supports the results of research conducted by (Dhiaf, Khakan, Atayah, Marashdeh, & El Khoury, 2024) This shows that Companies that implement FinTech can improve the efficiency of their market performance. Research from (M. Al-Okaily et al., 2024) Support the results of this study, which show that the adoption of FinTech innovations affects the performance of the banking business, in addition to, (Bazarbash, Griffin, Una, & Verma, 2023) Found that FinTech adoption can provide several benefits for organizations, namely to strengthen fiscal transparency, improve macro-fiscal forecasting, improve

budget planning and execution, and improve cash management. Extensive research from (Wang et al., 2020) Revealed that the impact of FinTech on financial efficiency in the agricultural sector in various provinces varies wildly, depending on the region.

Innovation, digital adoption, and Fintech have integration and interaction (Rizvi, Rahat, Naqvi, & Umar, 2024). This affects the intention to use FinTech. In line with research (Shubhangi Singh, Sahni, & Kovid, 2020) The perception of the usefulness and ease of FinTech services can influence FinTech adoption. However, age affects the perception of Fintech service security. This will impact aspects of the benefits and risks associated with the use of FinTech. MSMEs that use FinTech services pay proportional attention to the benefits and risks (Saadah & Setiawan, 2024). Financial technology helps reduce the financing gap by providing more inclusive access to financial services for the public and MSMEs, which ultimately increases business growth and company revenue (Omowole, Urefe, Mokogwu, & Ewim, 2024). The development of functional and attractive FinTech applications for MSMEs is an important factor in accelerating the adoption of financial technology in Indonesia, accompanied by regular security updates to protect consumer privacy and data (Nugraha et al., 2022).

The following study found a significant influence of technological competition on financial efficiency. This proves that H3 is accepted. This indicates that Indonesian MSMEs must compete globally in technology, encompassing marketing, sales, and operations, to enhance the financial efficiency of MSMEs. The results of this study are in accordance with the research conducted by (M. Al-Okaily et al., 2024) This indicates that technological competition has a substantial impact on the performance of the banking industry. (Rastogi, Kanoujiya, Bhimavarapu, & Gautam, 2022) This study also proves that competitive advantage contributes positively, both partially and significantly, to improving company performance. (Zhao et al., 2021) Affirms that market competition and bank capital effectiveness have a positive influence on banking performance. Meanwhile, MSMEs require support from various institutions, one of which is financial institutions (banks), to cover innovation costs independently and develop technological innovations for business sustainability, thereby enabling them to survive and excel in the midst of technological innovation competition. Research from (Prasanna et al., 2019) It was also revealed that for MSEs to survive in the technology competition, it is essential to identify six key aspects, namely social capital, cooperation with multinational and transnational companies in terms of sharing innovation and access to information technology networks, and the adoption of technology to support increased productivity.

Technological intelligence is a moderating variable in this study. The findings of the hypothesis analysis carried out show that technological intelligence has an indirect influence on the correlation between the implementation of digital accounting, technological competition, and financial efficiency. Therefore, H4 & H6 are accepted and in accordance with the findings of the previous hypothesis. Meanwhile, technological intelligence cannot mitigate the correlation between FinTech innovation and financial efficiency. This means that H5 is rejected or not supported.

These findings align with existing research (Zahra, 1996) this reveals that technological proficiency affects the Company's performance to survive in technological competition. Research (Ding, 2022) It was also revealed that the understanding of technology affects the intention to use technology to achieve the Company's technological competitiveness. As well as research from (Almashhadani & Almashhadani, 2023) It also revealed that technological and financial capabilities have a profound impact on technological competitiveness and business performance. This result contradicts research conducted (M. Al-Okaily et al., 2024) The findings suggest that technological savvy serves as an indirect moderating variable in relation to the implementation of digital accounting and the use of fintech innovations, influencing the performance results of the banking sector. The research findings indicate that technological savvy does not serve as an intermediary variable that moderates the relationship between technological rivalry and banking business performance outcomes. Other dimensions are also shown by (Guan et al., 2021) This study demonstrates that organizations can effectively implement Business Intelligence (BI) to support companies in optimizing revenue and expenses.

Technological innovation and digital adoption of accounting complement each other (Rizvi et al., 2024). Research (Abbas & Khan, 2024 ; Anwarul Islam & Khan, 2024 ; Mohammed Shebeen, Shanthi, & Mathiyarasan, 2024) Revealed that individuals who have high financial literacy and technological intelligence have a positive effect on user engagement with FinTech services, so that they will form sustainable digital behavior, and entrepreneurial success directly affects the competitiveness and growth of MSMEs. This proves that digital transformation in every aspect of measurement, such as digital accounting, Fintech, technological competition, and technological intelligence, is crucial for MSMEs in Indonesia to survive, synergize, and compete in all aspects of their business activities, especially in terms of financial efficiency.

Digital transformation in accounting is a rapidly growing topic. However, its application at the MSME scale, particularly in relation to financial efficiency, remains relatively new and has not been extensively researched. Most previous studies have emphasized digitalization in large companies or

discussed digitalization in general without highlighting its impact on the financial efficiency of MSMEs. This research presents a novel approach, focusing on MSMEs that are often overlooked in the adoption of digital accounting technology. This can impact financial efficiency in terms of reporting speed, cost savings, increased data accuracy, and informed decision-making. This study employs an impact analysis approach to examine the correlation between digital transformation and the financial performance of MSMEs by developing a new model or framework that incorporates indicators of impact digitalization to the financial efficiency on MSMEs. In addition, this research was conducted on batik MSMEs in Indonesia, where the majority of artisans' digitization efforts are still low.

Table 7: Current Research Differences

Object	Method	Result	Reference
Micro, Small and Medium Enterprises (MSMEs)	Quantitative	The implementation of digital accounting, FinTech innovation, and technological competition have a significant impact on financial efficiency. Likewise, technological intelligence has an indirect influence on technological competition and financial efficiency.	Current research (present study)
Banking (Jordan)	Quantitative	The study's findings confirm that implementation of digitalization in accounting, the implementation of fintech innovations, and technology competition play a significant role in business performance. Meanwhile, technological proficiency serves as an indirect factor influencing the adoption of digital accounting, FinTech utilization, and financial effectiveness.	(M. Al-Okaily et al., 2024)
Public Accounting Firm	Quantitative	The implementation of digital accounting have a significant impact on audit results.	Lohapan (2021)
Public Sector Accounting	Quantitative	The change in accounting to digital form also undergoes a shift in the form of government accountability from vertical, one-way, and government-focused accountability to a horizontal and decentralized form of accountability that will have the potential to increase empowerment to the community, including the voices of remote communities, to provide easier access to services and information. In addition, the implementation of digital accounting also improves organizational achievement and sustainability from the point of view of public sector accounting.	(Agostino et al., 2022)

Manufacturing Company	Quantitative	Manufacturing business organizations are increasingly utilizing digital technology to automate and robotize operations, generating digital data for their processes. However, digitalization has not yet been applied to environmental and social accounting.	(Klymenko, Lillebrygfjeld Halse, & Jæger, 2021)

Source: Data Processed by Researcherssion and conclusion

The implications of this research are very significant to practitioners, government, and researchers. For practitioners, the results can serve as a valuable reference regarding the impact of digital transformation on accounting, as examined in terms of the adoption of digital accounting systems, the use of financial technology (FinTech), and technology-based competition to drive financial efficiency for MSMEs in Indonesia. This knowledge can serve as a reference for MSMEs seeking to adopt and operate this technology to enhance financial efficiency. The findings of this study provide effective development strategies for the utilization and application of technology, helping MSMEs in Indonesia overcome challenges in adopting the technology. The results of this study also contribute by providing literature on conducting examinations and offering price insights for businesses on how FinTech and the digitalization of MSMEs in developing countries can be leveraged.

Furthermore, this research is particularly relevant to explaining business operations in light of current technological developments. Especially in the context of Batik MSMEs, it can serve as a reference for the government's policy on utilizing the right technology for MSMEs in Indonesia. Thus, this study aims to fill the gap in the literature by comprehensively examining the impact of digital transformation on the field of accounting, specifically in improving the financial efficiency of batik MSMEs in Indonesia.
This research focuses on financial efficiency, with a particular emphasis on the scope of batik MSMEs in Indonesia. These findings limit the extent to which the research results can be generalized. Therefore, Further studies on MSMEs should be conducted to strengthen the findings across different and fairly broad industrial sectors, as well as other sectors that may be present in various contexts. Furthermore, future research should examine the expand research by using other variables as moderators or additional variables, such as those related to the perception of religiosity, in order to understand better the Implications of implementing digital accounting transformation on increasing financial efficiency. Furthermore, long-term research explores changes in the relationships between variables over time. The following study recommends conducting a comparative analysis of the application of digital accounting and the adoption of FinTech innovations to enhance financial efficiency in the Multi-sector of the Region, and reviewing

their impact on specific aspects of MSME finances, such as company profitability, cost efficiency, and customer satisfaction. Further research should also develop frameworks and tools to assist MSMEs in adopting and utilizing technology-based financial innovations and digital-based accounting technologies. Further research can deepen these results by examining the impact of digital accounting, FinTech, technological intelligence, and MSME success through the analysis of relevant variables. Finally, Future studies need to examine how MSMEs can leverage digital technologies to improve financial efficiency in various contexts.

Conclusion

The rapid development of digital technology in this modern era has a significant impact on all business activities across every sector, including MSMEs, which are also affected by digital transformation. Based on data from 602 Batik MSMEs in Indonesia. This study employs a quantitative analysis approach to assess the influence of digital transformation in accounting, measured through variables of digitalization accounting, fintech-based innovation, and technology competition on MSME financial efficiency, as well as the moderating role of tech-intelligent individuals. This study found that the direct Factors, such as the implementation of digitalization accounting, fintech innovation, and technology competition, have been proven to make a real contribution to driving financial efficiency. However, technological intelligence did not succeed in moderating the relationship between implementation of FinTech innovations and improved financial efficiency. However, technological intelligence has an indirect influence and can serve as a moderating factor in the relationship between the implementation of digital accounting and technology competition, thereby increasing financial efficiency. Therefore, this result is recommended for future research for include other variabels as moderators related to the effect without mediation between independent variables and dependent variables. This research focuses on financial efficiency, with a particular emphasis on the scope of batik MSMEs. These findings limit the extent to which the research results can be generalized. Therefore, Further studies on MSMEs should be conducted to strengthen the findings across different and fairly broad industrial sectors, as well as other sectors that may be present in various contexts.

Appendix

Appendix A. Research Questionnaire

Index	Questionnaire
Implementation of Digital Accounting (IDA)	
IDA1	I intend to use a digital system to record my finances as often as necessary.
IDA2	I have used a digital financial system to record my business finances.
IDA3	By using a digital financial recording system, financial recording is faster.
IDA4	I use a digital financial recording system for various reasons.
Adoption of FinTech Innovation (AFI)	
AFI1	Financial Technology creates new opportunities for MSMEs
AFI2	Financial Technology for MSMEs is inevitable
AFI3	Financial Technology helps innovate financial products and services for MSMEs
AFI4	The process of using Financial Technology is smooth for use by MSMEs
AFI5	The use of Financial Technology is supported by all MSME employees
AFI6	The use of Financial Technology creates new networks in business activities
AFI7	The use of Financial Technology requires a strategic approach in technology management.
Technological Competition	
TC1	My competitors' actions in using digital financial records influenced me to also use digital financial records.
TC2	I compete with other batik sellers through digital marketing
TC3	The use of digital financial records affects the price that I set compared to other MSMEs.
TC4	By using digital financial records, MSMEs are able to compete nationally.
TC5	Today's technological sophistication is able to develop new and diverse products for MSMEs
TC6	Selling MSME products online and offline by following current technological developments
Technological Intelligence (TI)	
TI1	Current technology systems can meet the business needs of MSMEs
TI2	The financial technology system that I use has good quality
TI3	The financial technology system that I use is very useful
TI4	The features of the financial technology system that I use are very good
Financial Efficiency (FE)	
FE1	My turnover increased when I used technology in my financial records.
FE2	My profits increased when I used technology in my financial records.
FE3	I am taxed on MSMEs business
FE4	My assets increased when I started using technology in my financial records
FE5	My capital increased when I started using technology in my financial records.
FE6	The costs I incur are reduced when using current technological developments.
FE7	Debt increased when I started using current technological developments in my batik business

References

Abbas, N., & Khan, H. G. M. (2024). The Role of Financial Literacy and Technology savviness on Fintech Adoption in Traditional Banking, the Mediating Role of Trust in Technology. *Pakistan Journal of Humanities and Social Sciences*, *12*(04), 3183-3191. https://doi.org/10.52131/pjhss.2024.v12i4.2577

Abdulrasool, F. E., & Turnbull, S. J. (2020). Exploring security, risk, and compliance driven IT governance model for universities: applied research based on the COBIT framework. *International Journal of Electronic Banking*, *2*(3), 237-265.

Adamik, A., & Nowicki, M. (2018). Preparedness of companies for digital transformation and creating a competitive advantage in the age of Industry 4.0. Dans *Proceedings of the International Conference on Business Excellence* (Vol. 12, pp. 10-24). Sciendo Warszawa, Poland.

Agostino, D., Saliterer, I., & Steccolini, I. (2022). Digitalization, accounting and accountability: A literature review and reflections on future research in public services. *Financial Accountability and Management*, *38*(2), 152-176. https://doi.org/10.1111/faam.12301

Agustian, K., Mubarok, E. S., Zen, A., Wiwin, W., & Malik, A. J. (2023). The impact of digital transformation on business models and competitive advantage. *Technology and Society Perspectives (TACIT)*, *1*(2), 79-93.

Al-Hattami, H. M., Almaqtari, F. A., Abdullah, A. A. H., & Al-Adwan, A. S. (2024). Digital accounting system and its effect on corporate governance: An empirical investigation. *Strategic Change*, *33*(3), 151-167. https://doi.org/10.1002/jsc.2571

Almashhadani, M., & Almashhadani, H. A. (2023). the Influence of Technological Capacity and Financial Capacity on Promoting Firm Competitiveness and Firm Performance. *Journal of Humanities Social Sciences and Business (Jhssb)*, *3*(1), 125-141. https://doi.org/10.55047/jhssb.v3i1.847

Al-Okaily, A., Abd Rahman, M. S., Al-Okaily, M., Ismail, W., & Ali, A. (2020). Measuring success of accounting information system: applying the DeLone and McLean model at the organizational level. *J. Theor. Appl. Inf. Technol*, *98*(14), 2697-2706.

Al-Okaily, M. (2024). Toward an integrated model for the antecedents and consequences of AIS usage at the organizational level. *EuroMed Journal of Business*, *19*(3), 645-666.

Al-Okaily, M., Al-Fraihat, D., Al-Debei, M. M., & Al-Okaily, A. (2022). Factors influencing the decision to utilize eTax systems during the COVID-19 pandemic: the moderating role of anxiety of COVID-19 infection. *International Journal of Electronic Government Research (IJEGR)*, *18*(1), 1-24.

Al-Okaily, M., Alghazzawi, R., Alkhwaldi, A. F., & Al-Okaily, A. (2023). The effect of digital accounting systems on the decision-making quality in the banking industry sector: a mediated-moderated model. *Global Knowledge, Memory and Communication*, *72*(8-9), 882-901. https://doi.org/10.1108/GKMC-01-2022-0015

Al-Okaily, M., Al-Majali, D., Al-Okaily, A., & Majali, T. (2023). Blockchain technology and its applications in digital accounting systems: insights from Jordanian context. *Journal of Financial Reporting and Accounting*. https://doi.org/10.1108/JFRA-05-2023-0277

Al-Okaily, M., Alqudah, H., Al-Qudah, A. A., Al-Qadi, N. S., Elrehail, H., & Al-Okaily, A. (2022). Does financial awareness increase the acceptance rate for financial inclusion? An empirical examination in the era of digital transformation. *Kybernetes*, *52*(11), 4876-4896.

Al-Okaily, M., Alqudah, H. M., Al-Qudah, A. A., & Alkhwaldi, A. F. (2022). Examining the critical factors of computer-assisted audit tools and techniques adoption in the post-COVID-19 period: internal auditors perspective. *VINE Journal of Information and Knowledge Management Systems*, *54*(5), 1062-1091.

Al-Okaily, M., Alsmadi, A. A., Alrawashdeh, N., Al-Okaily, A., Oroud, Y., & Al-Gasaymeh, A. S. (2024). The role of digital accounting transformation in the banking industry sector: an integrated model. *Journal of Financial Reporting and Accounting*, *22*(2), 308-326. https://doi.org/10.1108/JFRA-04-2023-0214

Alsmadi, Ayman A, Shuhaiber, A., Alhawamdeh, L. N., Alghazzawi, R., & Al-Okaily, M. (2022). Twenty years of mobile banking services development and sustainability: a bibliometric analysis overview (2000–2020). *Sustainability*, *14*(17), 10630.

Alsmadi, Ayman Abdalmajeed, & Al-Omoush, K. S. (2025). Transforming Financial Landscapes: Exploring the Nexus Between Digitalization in Accounting and Islamic Fintech Adoption. *Human Behavior and Emerging Technologies*, *2025*(1). https://doi.org/10.1155/hbe2/2854513

Anwarul Islam, K. M., & Khan, M. S. (2024). The role of financial literacy, digital literacy, and financial self-efficacy in FinTech adoption. *Investment Management and Financial Innovations*, *21*(2), 370-380. https://doi.org/10.21511/imfi.21(2).2024.30

Bany Mohammad, A., Al-Okaily, M., Al-Majali, M., & Masa'deh, R. (2022). Business intelligence and analytics (BIA) usage in the banking industry sector: an application of the TOE framework. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(4), 189.

Basbeth, F., Sedyowidodo, U., & Sumanto, A. (2019). Mobile application and smart city orientation: the moderating role of tech savvy population. Dans *2019 International Conference on ICT for Smart Society (ICISS)* (Vol. 7, pp. 1-4). IEEE.

Bazarbash, M., Griffin, N. N., Una, G., & Verma, A. (2023). Emerging ideas for fintech applications in public finance. Dans *Research Handbook on Public Financial Management* (pp. 31-56). (S.l.) : Edward Elgar Publishing.

Bhat, M. A., Khan, S. T., Alkhwaldi, A. F., & Abdulmuhsin, A. A. (2024). Investigating the critical drivers of Fintech adoption to promote business sustainability of SMEs. *Global Knowledge, Memory and Communication.*

Chen, L., Wang, Y.-F., Liu, L., Bielowka, A., Ahmed, R., Zhang, H., … Cunninghame Graham, D. S. (2020). Genome-wide assessment of genetic risk for systemic lupus erythematosus and disease severity. *Human molecular genetics*, *29*(10), 1745-1756.

Dasaraju, H., Somalaraju, K., & Kota, S. M. (2020). MSMEs in Developing Economies and Their Role in Achieving Sustainable Development Goals in the Context of Covid19: A Theoretical Exposition. *International Journal of Small and Medium Enterprises and Business Sustainability*, *5*(1), 94-121.

Dhiaf, M. M., Khakan, N., Atayah, O. F., Marashdeh, H., & El Khoury, R. (2024). The role of FinTech for manufacturing efficiency and financial performance: in the era of industry 4.0. *Journal of Decision Systems*, *33*(2), 220-241.

Ding, X. (2022). Are tech-savvy users more likely to use technology? An examination of market entry and customer experience. *Research Handbook on Services Management*, (2009), 194-210. https://doi.org/10.4337/9781800375659.00023

Dwivedi, P., Alabdooli, J. I., & Dwivedi, R. (2021). Role of FinTech Adoption for Competitiveness and Performance of the Bank: A Study of Banking Industry in UAE. *International Journal of Global Business and Competitiveness*, *16*(2), 130-138. https://doi.org/10.1007/s42943-021-00033-9

Feijoó González, E. M., Gutiérrez Jaramillo, N. D., Medina Castillo, W. T., & Jaramillo Simbaña, R. M. (2024). Digital transformation in accounting for small and medium-sized enterprises in the province of El Oro, Ecuador. *Revista Venezolana de Gerencia*, *29*(12), 1580-1598. https://doi.org/10.52080/rvgluz.29.e12.44

Ferdianto, J. R., Sevtiyuni, P. E., Putra, P., Prihatiningrum, R. R. Y., Kamal, M. A., Masitoh, G., … Syahputra, A. (2024). Kewirausahaan Umkm. Aikomedia Press.

Gonçalves, M. J. A., da Silva, A. C. F., & Ferreira, C. G. (2022). The future of accounting: how will digital transformation impact the sector? Dans *Informatics* (Vol. 9, p. 19). MDPI.

Guan, X., Xie, L., Shen, W. G., & Huan, T. C. (2021). Are you a tech-savvy person? Exploring factors influencing customers using self-service technology. *Technology in Society*, *65*(March), 101564. https://doi.org/10.1016/j.techsoc.2021.101564

Hoxha, E., Angjeli, A., & Bombaj, F. (2025). Implementation of modern information systems for automating accounting processes in the public sector: The experience of Albania. *Scientific Bulletin of Mukachevo State University. Series Economics*, *12*(1), 61-74. https://doi.org/10.52566/msu-econ1.2025.61

Jatmiko, B., Udin, U., Raharti, R., Laras, T., & Ardhi, K. F. (2021). Strategies for MSMEs to achieve sustainable competitive advantage: The SWOT analysis method. *The Journal of Asian Finance, Economics and Business*, *8*(3), 505-515.

Klymenko, O., Halse, L. L., & Jæger, B. (2021). The enabling role of digital technologies in sustainability accounting: Findings from norwegian manufacturing companies. *Systems*, *9*(2). https://doi.org/10.3390/systems9020033

Klymenko, O., Lillebrygfjeld Halse, L., & Jæger, B. (2021). The enabling role of digital technologies in sustainability accounting: Findings from Norwegian manufacturing companies. *Systems*, *9*(2), 33.

Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital transformation: An overview of the current state of the art of research. *Sage Open*, *11*(3), 21582440211047576.

Kruskopf, S., Lobbas, C., Meinander, H., Söderling, K., Martikainen, M., & Lehner, O. (2020). Digital accounting and the human factor: Theory and practice. *ACRN Journal of Finance and Risk Perspectives*, *9*(1), 78-89. https://doi.org/10.35944/JOFRP.2020.9.1.006

Lagat, C., & Frankwick, G. L. (2017). Marketing capability, marketing strategy implementation and performance in small firms. *Journal for Global Business Advancement*, *10*(3), 327-345.

Le, T. H., Chuc, A. T., & Taghizadeh-Hesary, F. (2019). Financial inclusion and its impact on financial efficiency and sustainability: Empirical evidence from Asia. *Borsa Istanbul Review*, *19*(4), 310-322. https://doi.org/10.1016/j.bir.2019.07.002

Lichtenthaler, E. (2007). Managing technology intelligence processes in situations of radical technological change. *Technological Forecasting and Social Change*, *74*(8), 1109-1136.

LOHAPAN, N. (2021). Digital accounting implementation and audit performance: An empirical research of tax auditors in Thailand. *The Journal of Asian Finance, Economics and Business*, *8*(11), 121-131.

Lombardi, R., & Secundo, G. (2021). The digital transformation of corporate reporting–a systematic literature review and avenues for future research. *Meditari accountancy research*, *29*(5), 1179-1208.

Mohammed Shebeen, T., Shanthi, R., & Mathiyarasan, M. (2024). Navigating Industry 4.0: Skill Development Strategies for Empowering MSMEs in the Digital Age. Dans *Anticipating Future Business Trends: Navigating Artificial Intelligence Innovations: Volume 2* (pp. 453-462). (S.l.) : Springer.

Natour, A. R. A., Shishan, F., Al-Dmour, A., Alghazzawi, R., & Alsharairi, M. (2021). Sustainable FinTech innovation orientation: a moderated model. *Sustainability*, *13*(24), 1-12.

Nguyen Phu, G., Hoang Thi, T., & Tran Nguyen Bich, H. (2025). The impact of cloud computing technology on cloud accounting adoption and financial management of businesses. *Humanities and Social Sciences Communications*, *12*(1), 1-14. https://doi.org/10.1057/s41599-025-05190-3

Nugraha, D. P., Setiawan, B., Nathan, R. J., & Fekete-Farkas, M. (2022). FinTech adoption drivers for innovation for SMEs in Indonesia. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(4), 208.

Nugroho, A., & Wang, W.-T. (2023). Consumer switching behavior to an augmented reality (AR) beauty product application: Push-pull mooring theory framework. *Computers in Human Behavior*, *142*, 107646.

Oanh, L. T. T., Ngoc, B. T., Dung, N. T., Trang, N. T., & Anh, V. T. K. (2025). The Impact Of Digital Transformation In Management Accounting On Governance Efficiency: The Intermediary Role Of Accounting Information Quality. *Journal of Governance and Regulation*, *14*(1 Special issue), 295-306. https://doi.org/10.22495/jgrv14i1siart6

Omowole, B. M., Urefe, O., Mokogwu, C., & Ewim, S. E. (2024). Integrating fintech and innovation in microfinance: Transforming credit accessibility for small businesses. *International Journal of Frontline Research and Reviews*, *3*(1), 90-100.

Peng, Y., & Tao, C. (2022). Can digital transformation promote enterprise performance?—From the perspective of public policy and innovation. *Journal of Innovation & Knowledge*, *7*(3), 100198.

Pramono, A. J., Amyar, F., & Friska, R. (2023). Exploring technology acceptance in management accounting tools' adoption in public sector accounting: a sustainability perspective for organizations. *Sustainability*, *15*(21), 15334.

Prasanna, R., Jayasundara, J., Naradda Gamage, S. K., Ekanayake, E. M. S., Rajapakshe, P. S. K., & Abeyrathne, G. (2019). Sustainability of SMEs in the competition: A systemic review on technological challenges and SME performance. *Journal of Open Innovation: Technology, Market, and Complexity*, *5*(4), 100.

Rahman, M. M., Terano, H. J., Rahman, M. N., Salamzadeh, A., & Rahaman, M. S. (2023). ChatGPT and academic research: A review and recommendations based on practical examples. *Rahman, M., Terano, HJR, Rahman, N., Salamzadeh, A., Rahaman, S.(2023). ChatGPT and Academic Research: A Review and Recommendations Based on Practical Examples. Journal of Education, Management and Development Studies*, *3*(1), 1-12.

Rajan, C. A., & Baral, R. (2015). Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user. *IIMB Management Review*, *27*(2), 105-117. https://doi.org/10.1016/j.iimb.2015.04.008

Rastogi, S., Kanoujiya, J., Bhimavarapu, V. M., & Gautam, R. S. (2022). The impact of competition on the profitability and Risk-Taking of commercial banks in India. *The Journal of Asian Finance, Economics and Business*, *9*(5), 377-388.

Ren, X., Song, K., Zhu, K., & Yang, X. (2024). Does digital transformation increase bank profit efficiency? Evidence from China. *Pacific Basin Finance Journal*, *86*. https://doi.org/10.1016/j.pacfin.2024.102388

Rizvi, S. K. A., Rahat, B., Naqvi, B., & Umar, M. (2024). Revolutionizing finance: The synergy of fintech, digital adoption, and innovation. *Technological Forecasting and Social Change*, *200*(January), 123112. https://doi.org/10.1016/j.techfore.2023.123112

Saadah, K., & Setiawan, D. (2024). Determinants of fintech adoption: evidence from SMEs in Indonesia. *LBS Journal of Management & Research*, *22*(1), 55-65.

Schwertner, K. (2017). Digital transformation of business. *Trakia Journal of Sciences*, *15*(1), 388-393.

Severo, E. A., Guimarães, J. C. F. de, Dellarmelin, M. L., & Ribeiro, R. P. (2019). The influence of social networks on environmental awareness and the social responsibility of generations. *BBR. Brazilian Business Review*, *16*(5), 500-518.

Shen, C., Wu, J., Li, Y., & Chen, Q. (2025). Does digital transformation improve the cost efficiency of commercial banks? Evidence from China. *Finance Research Letters*, *73*. https://doi.org/10.1016/j.frl.2024.106619

Shiyyab, F. S., Alzoubi, A. B., Obidat, Q. M., & Alshurafat, H. (2023). The impact of artificial intelligence disclosure on financial performance. *International Journal of Financial Studies*, *11*(3), 115.

Singh, Shubhangi, Sahni, M. M., & Kovid, R. K. (2020). What drives FinTech adoption? A multi-method evaluation using an adapted technology acceptance model. *Management Decision*, *58*(8), 1675-1697.

Singh, Sumanjeet, Raj, R., Dash, B. M., Kumar, V., Paliwal, M., & Chauhan, S. (2024). Access to finance and its impact on operational efficiency of MSMEs: mediating role of entrepreneurial personality and self-efficacy. *Journal of Small Business and Enterprise Development*.

Strong, M., Sawaya, M. R., Wang, S., Phillips, M., Cascio, D., & Eisenberg, D. (2006). Toward the structural genomics of complexes: crystal structure of a PE/PPE protein complex from Mycobacterium tuberculosis. *Proceedings of the National Academy of Sciences*, *103*(21), 8060-8065.

Sutton, P. (2004). A perspective on environmental sustainability. *Paper on the Victorian Commissioner for Environmental Sustainability*, *1*, 32.

Tajik, O., Golzar, J., & Noor, S. (2024). Purposive sampling. *International Journal of Education and Learning Studies*, *2*(2).

Tan, Q., & Sousa, C. M. P. (2015). Leveraging marketing capabilities into competitive advantage and export performance. *International marketing review*, *32*(1), 78-102.

Tiron-Tudor, A., Donțu, A. N., & Bresfelean, V. P. (2022). Emerging Technologies' Contribution to the Digital Transformation in Accountancy Firms. *Electronics (Switzerland)*, *11*(22), 1-19. https://doi.org/10.3390/electronics11223818

Trigo, A., Belfo, F., & Estébanez, R. P. (2014). Accounting information systems: The challenge of the real-time reporting. *Procedia Technology*, *16*, 118-127.

Wang, Q., Yang, J., Chiu, Y. ho, & Lin, T. Y. (2020). The impact of digital finance on financial efficiency. *Managerial and Decision Economics*, *41*(7), 1225-1236. https://doi.org/10.1002/mde.3168

Yan, C., Siddik, A. B., Akter, N., & Dong, Q. (2023). Factors influencing the adoption intention of using mobile financial service during the COVID-19 pandemic: the role of FinTech. *Environmental Science and Pollution Research*, *30*(22), 61271-61289.

Yoshikuni, A. C., Dwivedi, R., Dultra-de-Lima, R. G., Parisi, C., & Oyadomari, J. C. T. (2023). Role of emerging technologies in accounting information systems for achieving strategic flexibility through decision-making performance: an exploratory study based on North American and South American firms. *Global Journal of Flexible Systems Management*, *24*(2), 199-218.

Zahra, S. A. (1996). Technology strategy and financial performance: Examining the moderating role of the firm's competitive environment. *Journal of Business Venturing*, *11*(3), 189-219. https://doi.org/10.1016/0883-9026(96)00001-8

Zainun Tuanmat, T., & Smith, M. (2011). The effects of changes in competition, technology and strategy on organizational performance in small and medium manufacturing companies. *Asian Review of Accounting*, *19*(3), 208-220.

Zhang, T., Shi, Z.-Z., Shi, Y.-R., & Chen, N.-J. (2022). Enterprise digital transformation and production efficiency: Mechanism analysis and empirical research. *Economic research-Ekonomska istraživanja*, *35*(1), 2781-2792.

Zhao, Y., Chupradit, S., Hassan, M., Soudagar, S., Shoukry, A. M., & Khader, J. (2021). The role of technical efficiency, market competition and risk in the banking performance in G20 countries. *Business Process Management Journal*, *27*(7), 2144-2160.