THE IMPACT OF DIGITAL TRANSFORMATION IN MANAGEMENT ACCOUNTING ON GOVERNANCE EFFICIENCY: THE INTERMEDIARY ROLE OF ACCOUNTING INFORMATION QUALITY

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Abstract

This study aims to evaluate the impact of digital transformation in management accounting on the management efficiency of enterprises, with the intermediary role of accounting information quality. The study is based on the theoretical model proposed by Hasan (2023) and Phornlaphatrachakorn and Na Kalasindhu (2020, 2021) regarding the influence of digital transformation in accounting. The research utilized a quantitative approach, employing the linear structural equation model (SEM) and survey data from 320 enterprises in Hanoi, Vietnam. The findings revealed the acceptance of four hypotheses, suggesting the following: the direct positive impact of digital transformation in accounting on the quality of accounting information and business ME; quality of accounting information has a direct positive impact on corporate governance efficiency; digital transformation in accounting has indirect implications on corporate governance efficiency with the mediating role of accounting information quality. This study contributes to empirical research on the application of digital transformation in various fields while enhancing confidence in digital technology.

Keywords: Digital Transformation, Management Accounting, Quality, Information, Management Efficiency, Impact, Vietnam

1. INTRODUCTION

In the face of constant economic fluctuations and changes caused by factors such as pandemics, wars, and energy crises, the choice to undergo digital transformation in business operations has become essential for enterprises. Accounting is one of the fields greatly influenced by the digital transformation trend (Lyford-Smith, 2019; Agostino et al., 2021; Hasan, 2023). Management accounting plays a crucial role in providing information for making optimal future decisions within organizations (Rom & Rohde, 2007). The digital transformation in management accounting helps managers enhance organizational efficiency by evaluating economic impacts clearly and making appropriate decisions (Phornlaphatrachakorn & Na Kalasindhu, 2020; Shan et al., 2021).

Digital transformation in enterprises refers to the process of applying digital technologies to the operations of a business, aiming to change the way it operates, and its business models, and to provide customers with new and improved products and services (Phornlaphatrachakorn & Na Kalasindhu, 2021). Digital transformation requires businesses to be innovative and constantly adapt their processes to quickly align with the trends of the era (Thetlek et al., 2024; Akpan & Ukwu, 2023). Digital accounting specifically refers to the creation and transfer of information in electronic data format instead of using paper documents. All accounting transactions are conducted in an electronic environment. Technological advancements have enhanced the ability of accounting to interpret and report data faster and more efficiently (Troshani et al., 2019; Ouda & Klischewski, 2019; Shaughnessy & Goulding, 2021). Therefore, digital transformation in management accounting involves the application of digital technologies to provide accounting information to business managers, enabling faster, more relevant, and more efficient information while optimizing human resources, time, and costs for the enterprise.

Digital transformation in the field of management accounting brings certain benefits, such as modernizing the working methods of accounting through accounting software and electronic tools, helping businesses reduce storage and preservation costs, and enhancing multidimensional management reporting and timely sending and receiving of reports (Chang & Ma, 2019; Ouda & Klischewski, 2019; Shaughnessy & Goulding, 2021).

According to the 2020 Vietnamese Enterprises White Book (Ministry of Planning and Investment, 2020), there were 758,610 active businesses nationwide, with Hanoi being the locality with a high concentration of businesses, with a total of 311,240 enterprises (accounting for nearly 38% of the total number of businesses in the country). Considering the digital transformation in the field of management accounting within businesses in Hanoi is a suitable choice given the economic, social, and information technology (IT) development. This research aims to contribute to both the field of management accounting and digital transformation by exploring phenomena and evaluating the impact of digital transformation in management accounting that directly supports the provision of management accounting information, management efficiency, and the indirect impact of digital transformation in management accounting on management efficiency through the quality of management accounting information in businesses in Hanoi, Vietnam. Vietnam has seen extensive research on digital transformation, covering various aspects such as the factors influencing successful digital transformation in Vietnamese enterprises (Quyet, 2021; Thuy & Nhan, 2022; Chi & Tiep, 2022), as well as digital transformation in the tourism sector (Huyen, 2021). Despite this, no prior research has been conducted on the application of digital transformation in the field of management accounting in Vietnam and its impact on management efficiency. This study provides an overview of the digital transformation status in an emerging country such as Vietnam and contributes to empirical research on the application of digital transformation in various fields while reinforcing confidence in digital technology.

The remainder of this paper is as follows. Section 2 will relate to the literature review and hypotheses development. Section 3 will describe the research methodology. Section 4 will present the results of the study and further discussion. Section 5 will give a conclusion of the study, and identify limitations and implications of this study.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Theoretical background

Digital transformation is an issue of great interest to scholars. Research on digital transformation focuses on many different aspects to clarify the current situation of digital transformation in businesses, and various industries, and the impact of digital transformation in various fields, especially management accounting values, and factors affecting digital transformation.

Research on the impact of digital transformation on business performance has been conducted by multiple authors. Dong et al. (2023) demonstrated that organizations are investing more in digital technology to enhance overall customer experience or improve their operational efficiency. Tang (2023) also showed that investment in digital technology or a focus on digital transformation can help companies operating in service-oriented industries gain a competitive advantage over their competitors. Based on cross-industry data, time series, and tabular data over 26 years to analyze the effectiveness of companies when implementing digital transformation, Aljahdaly and Balubaid (2020) focused on digital transformation in business: a study that evaluated the current digital operating model of Saudi Arabian airlines to understand the impact of digital transformation. This framework encompasses ten factors for a successful digital transformation journey. Finally, the interpretive structural modeling (ISM) framework was utilized to prioritize the factors of the framework and determine the interdependence of these factors (Benitez et al., 2018). They aimed to demonstrate the role of digital transformation in fostering innovation and creativity within a sample of 100 small companies in the USA under the regulation of social communication capabilities. The empirical analysis revealed that the IT infrastructure enables companies to explore new knowledge and exploit existing/new knowledge for better and increased innovation, thereby enhancing operational efficiency. The impact of digital transformation not only

improves management efficiency but also enhances the quality of financial reporting, as demonstrated by Friyani and Hernando's (2021) study conducted on 98 small and medium-sized enterprises (SMEs). The results indicated that most entrepreneurs in SMEs require the assistance of computer systems to record transactions and generate high-quality financial reports. The findings also revealed that some companies have utilized technology to enhance the quality of financial reporting, with IT being part of the digital transformation process. A significant contribution by Bambang et al. (2021) is the indication that companies focusing more on digitizing their functions will also support business behavior to a greater extent, leading to increased digitization and driving decision-making within the business.

Digital transformation impacts various fields, particularly MA. In Vietnam, Huyen's (2021) research on the current state of digital transformation in the tourism sector includes e-commerce and digital platforms, Big Data, artificial intelligence (AI), and the Internet of Things (IoT). The research indicates that with the rapid changes in technological advancements, the tourism industry is facing significant transformations. The article also highlights the importance of digital transformation in tourism, the influencing factors, as well as the negative impacts of digital transformation on the tourism industry. In addition to the tourism sector, the banking industry is another area that receives significant attention in the process of digital transformation. The success of Rashwan and Kassem (2021) confirms the role of digital transformation in enhancing the operational efficiency of banks and attracting investments. On the other hand, Voskresenskaya et al. (2019) focus on studying digital transformation in the social domain, which is crucial for a country's development and security. Digital issues affect the compatibility of the economy under current conditions.

The issue of digital transformation has been extensively studied in the fields of finance, accounting, and auditing: Phornlaphatrachakorn and Na Kalasindhu (2021) examined the impact of digital transformation in accounting on the quality of financial reporting, the usefulness of accounting information, and the effectiveness of strategic decision-making of 313 listed companies in Thailand through digital transformation as a moderating variable. The research results showed that digital transformation in accounting significantly affects the quality of financial reporting, the usefulness of accounting information, and the effectiveness of strategic decision-making. The quality of financial reporting and the usefulness of accounting information both serve as mediators for the relationship between the effectiveness of strategic decision-making and digital transformation in accounting. Digital transformation in accounting plays an important role in identifying and explaining the achievement of business objectives. Managers are encouraged to learn, invest, and utilize digital accounting systems within the organization to ensure the achievement of goals and enhance organizational sustainability. Meraghni et al. (2021) also conducted research to demonstrate the impact of digital transformation on the accounting information system, focusing on digital transformation requirements such as digital strategy, human knowledge, and limitations in the digitization of accounting information systems in Algerian companies. The research was conducted with a sample of 237 individuals from 120 companies through a questionnaire. The study revealed a lack of awareness about the importance of digital transformation as a weakness in developing accounting information systems and being incompatible with digitalization trends. Supporting this framework, Hasan (2023) further investigated the impact of digital transformation on the quality of financial reporting and accounting information. With 102 valid responses for statistical analysis, simple linear regression analysis showed a correlation between digital transformation and the quality of financial reporting. Digital transformation leads to the completeness and reliability of accounting information, thereby benefiting users. In the field of auditing, El-Haddad (2022) studied the impact of digital transformation in auditing in Egypt. This research aimed to examine the extent of the influence of digital transformation in auditing on the quality of the auditing process and address the digital transformation mechanisms used (AI, Big Data, robots, cloud computing). Surveys were conducted with auditors and accountants in auditing agencies, and the data were analyzed using statistical software (Statistical Package for the Social Sciences — SPSS). The results showed statistically significant differences in the impact of using digital transformation techniques on operational efficiency and the quality of auditing.

From another perspective, when considering the role of management accounting in preparing and implementing the digital transformation process of a company, Agostino et al. (2021) studied the features and requirements of management accounting in the digital economy, demonstrating proposals for significant changes in the organizational structure of management accounting during a company's digital transformation. Tang (2023) focused on assessing the trends in the formation of management accounting systems and analysis in the digital economy. The author identified key components including organizational and procedural techniques for management accounting and internal control. The main objective was to examine the changes in resources as the foundation for the digital production transformation process.

Research on factors influencing digital transformation to help businesses identify strengths and weaknesses to find ways to overcome them. Wiliandri (2020) identified internal and external factors influencing the digital transformation process of micro, small, and medium enterprises during the COVID-19 pandemic. The digital transformation model through the establishment of a business center can encourage enterprises to transition to digital technology. The objective of Ab Wahid and Zulkifli (2021) was to investigate the factors influencing the adoption of digital transformation (competitive pressure, technological advancement, cost reduction, and environmental impact) among SMEs in Malaysia. Ab Wahid and Zulkifli (2021) also provided knowledge to deepen understanding of digital transformation and serve as a guide for all entrepreneurs and others. The study conducted in Vietnam by Quyet (2021) identified factors influencing successful digital transformation. With a sample size of 200, the study found that there are seven factors influencing the successful digital transformation process of businesses in Vietnam, including the digital transformation strategy of businesses. In a different context, Thuy

and Nhan (2022) conducted research on factors influencing digital transformation in SMEs in Dong Nai province. The study used a quantitative research method to measure and evaluate the factors influencing digital transformation in 220 SMEs in Dong Nai province. The research results showed that there are six factors influencing digital transformation in SMEs in Dong Nai province, which are business strategy, digitalization process, human resources, benefits of digital transformation, competitive pressure, and government policies, with government policies having the strongest impact on the digital transformation of these businesses. For Ho Chi Minh City, the research conducted by Chi and Tiep (2022) was based on the analysis of primary data collected through surveys of individuals and employees currently working in businesses throughout Ho Chi Minh City. The results showed that process digitization, safety and security, data and technology availability, compatibility, business strategy, management, organizational structure, business processes, government assistance policies, and the impact of the COVID-19 pandemic are factors influencing the digital transformation process of businesses in Ho Chi Minh City.

It can be seen that research on digital transformation has been conducted with various research directions. Research on digital transformation in financial and accounting activities in general, and in the field of accounting in particular, has received significant attention from scholars recently, especially the impact of the COVID-19 pandemic and the strong development of the Fourth Industrial Revolution (Industry 4.0). Studies have reflected many aspects such as the current situation of digital transformation, the benefits and challenges of digital transformation, and the factors influencing digital transformation and its impact on information quality and operational efficiency. In-depth research on digital transformation in the context of Vietnamese businesses is still lacking. This is a gap for future research to address.

2.2. Hypotheses development

2.2.1. Digital transformation in management accounting

"Digital transformation" is a term that, although it appeared in the mid-20th century worldwide, only became popular with the emergence of Industry 4.0. Digital transformation is a process of changing existing methods and models by using the latest IT to generate real-time information for quick decision-making (Zeltser et al., 2019). Digital transformation is also understood as the process of applying digital technologies to operational areas of businesses to change their operational methods and bring about higher efficiency and new values. Therefore, digital transformation in management accounting is the application of digital technologies to the operations of management accounting, influencing and changing the methods, functions, and processes of management accounting in businesses, with the ultimate goal of serving managers in decision-making to: accelerate market speed, enhance competitive position, promote revenue growth, increase labor productivity, expand the ability to attract and retain customers.

Digital transformation has become a necessary reality that businesses must engage in to develop and avoid falling behind. This can be seen through the increasing number of businesses implementing digital transformation, especially in activities that involve data and information within organizations. For management accounting, the importance and role of digital transformation are key drivers for the development of organizations, given the undeniable benefits that this process brings, such as improving efficiency and reducing operating costs, enhancing the ability to provide and analyze detailed information from data, facilitating information linkage between departments within organizations, and strengthening competitive position.

2.2.2. The impact of digital transformation in management accounting on the quality of accounting information and management efficiency

Digital transformation impacts the quality of management accounting information

Hasan (2023) and Phornlaphatrachakorn and Na Kalasindhu (2021) demonstrate that digital transformation impacts the quality of financial reporting and the usefulness of accounting information. According to Hasan (2023), financial reporting quality focuses on two characteristics: appropriateness and truthfulness in presenting information on financial reports. However, in this study, the approach is from the perspective of management accounting. Therefore, the measurement variables are constructed based on the quality information features of management accounting, which extend to include: enhanced accuracy of forecasts, timeliness, relevance, objectivity, ease of comprehension, comparability, and critical for decision evaluation. These characteristics draw from the guidelines set by the American Institute of Certified Public Accountants and the International Accounting Standards Board. They also align with the research conducted by Phornlaphatrachakorn and Na Kalasindhu (2021).

The relationship between accounting and technology has become increasingly crucial. Accountants must redefine boundaries, redesign the delegation of authority and responsibilities within companies, and alter the nature of decision-making information. Traditional direct accounting processes are gradually being replaced by online models for economic transactions (Knudsen, 2020). Digital technology affects accounting across various aspects, from accounting practices to financial reporting and management reporting. It enhances the quality of accounting information by enabling faster, timely processing, easy tracking of invoices and payments, better integration and synchronization, and streamlining tax compliance and bank reconciliation (Hasan, 2023). This argument serves as the foundation for proposing the first hypothesis as follows:

H1: Digital transformation in management accounting has a positive impact on the quality of management accounting information.

Digital transformation impacts business management efficiency

This perspective is examined in the research by Phornlaphatrachakorn and Na Kalasindhu (2020), which demonstrates the impact of strategic

management accounting on management efficiency and operational effectiveness within businesses. The study highlights that effective management is crucial for business survival and growth in an environment characterized by fierce competition and continuous technological transformation. Management efficiency reflects the outcomes of a company's operations and significantly influences its overall effectiveness. Furthermore, Phornlaphatrachakorn and Na Kalasindhu (2021) supplement this by exploring the impact of digital transformation on accounting information quality and the effectiveness of strategic decision-making.

Digital transformation diversifies and tailors Management accounting information for decision-making. As digitalization continues to advance, IT and accounting become the most effective tools for business managers and accountants, serving roles in control and decision support. These functions encompass prediction, identification, prevention, detection, response, and recovery. In the short term, networked accounting will enhance the international compatibility of current operations and indices. It will make statistical analysis systems more flexible and responsive to new information from groundbreaking applications like cloud computing, edge computing, and 5G technology in accounting. Digitalization will enable the global economy to achieve sustained transformation by designing a new, cross-industry foundational mechanism that is resilient against cyberattacks and interconnected through partnerships among all relevant parties, bolstered by the robust support of researchers like Hasan (2023), Phornlaphatrachakorn and Na Kalasindhu (2021). The second hypothesis is:

H2: Digital Transformation in Management Accounting has a positive impact on Business Management efficiency.

The quality of management accounting information impacts business management efficiency

Diversifying data used for decision-making is an additional aspect of organizations' digital transformation. Non-financial data related to user web behavior, page views for specific posts or advertisements, or product rankings on social platforms significantly influence management decisions. These new types of data can be managed by experts from various fields (accounting, marketing, IT), leading to a "hybridization" of specialized accounting roles. Digital transformation ensures that all accounting transactions take place in an electronic environment, simplifying accounting tasks. From creating or collecting electronic documents to processing, analyzing, and storing information in digital systems, the ease of accessing accounting information is enhanced. Real-time access to accounting data empowers management decision-making. This argument supports *H2*.

The role of high-quality accounting information provides useful insights for management decision-making. The quality of accounting information lies in its ability to be timely and relevant for economic decision-making by businesses (Ouda & Klischewski, 2019). Key characteristics of high-quality management accounting information include appropriateness, materiality, comprehensibility, comparability, consistency, reliability, neutrality, timeliness, and objectivity, making it valuable for management decision-making. Improved accounting information quality enhances transparency, reduces inappropriate

or uncertain information, and ultimately enhances the optimal decision-making capabilities of managers. The quality of accounting information significantly impacts the effectiveness of strategic decisions by management (Phornlaphatrachakorn & Na Kalasindhu, 2021; Shaughnessy & Goulding, 2021). The third hypothesis is:

H3: Quality of management accounting information has a positive impact on business management efficiency.

### The intermediary role of quality information in managerial accounting

Phornlaphatrachakorn and Na Kalasindhu (2020, 2021) have highlighted that the quality of financial reporting and the utility of accounting information both serve as intermediaries for the effectiveness of strategic decision-making in the context of digital transformation in accounting. Digital transformation in accounting plays a crucial role in identifying and explaining the achievement of business objectives.

The quality of management accounting information will positively affect managers in making resource allocation decisions as well as business and investment decisions (Phornlaphatrachakorn & Na Kalasindhu 2021; Shaughnessy & Goulding, 2021). If the provision of accounting information quality with the characteristics mentioned above, administrators can utilize and explain information to make the right decisions, increasing business performance through financial indicators (revenue, costs, profits) or non-financial indicators (product and service quality, customer satisfaction, market share, etc.). Digital transformation helps transactions perform faster and save time so businesses can focus on other areas (Shan et al., 2021). Successful businesses actively implement digital transformation in accounting to be able to have timely, appropriate, and honest information for businesses to make important decisions, upgrade their accounting systems, and expand their scale of operations. Businesses need to take full advantage of changes and opportunities from digital technologies to have strategies and priorities for achieving positive change in the future (Garzoni et al., 2020). Digital transformation is important for businesses to develop and maintain industry competitiveness (Vial, 2021; Joni et al., 2020). Combining the arguments of hypotheses *H1* and *H3*, the quality of management accounting information will have a positive impact on the management efficiency of enterprises with the mediating role of promoting the quality of management accounting information.

Therefore, the fourth hypothesis is:

H4: Digital transformation in management accounting has a positive impact on enterprise management efficiency with the mediating role of management accounting information quality.

Based on the analyses above, the selected research model includes the following components: 1) direct impact of digital transformation on the quality of management accounting information; 2) direct impact of digital transformation on business management efficiency; 3) direct impact of the quality of management accounting information on management efficiency; 4) the role of quality information as an intermediate factor in the relationship between digital transformation in management accounting and business management efficiency. This proposed research model is illustrated in Figure 1.

Figure 1. Proposed research model
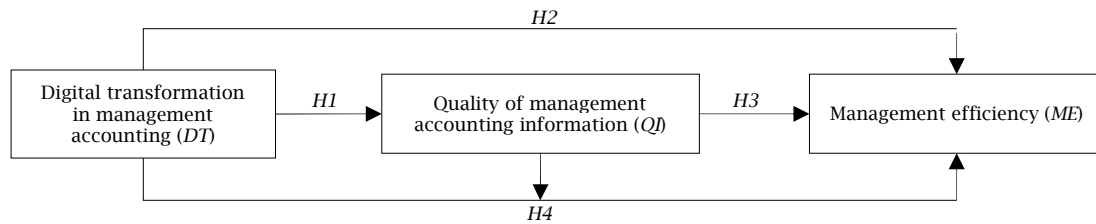
Source: Authors' elaboration.

3. RESEARCH METHODOLOGY

3.1. Data collection and analytical procedure

The stages of implementation from data collection and processing to data analysis are as follows in Figure 2.

Step 1: Based on the set of indicators to evaluate the general level of digital transformation of Vietnamese enterprises and inheriting the measurement scales of previous studies on digital transformation in accounting, along with the theoretical model of Hasan (2023), Phornlaphatrachakorn and Na Kalasindhu (2020, 2021), we designed a questionnaire on Google Forms.

We held discussions with experts, including two directors and chief accountants from International Telecommunication Investment and Development Joint Stock Company and AFT Consulting LLC, as well as two scientists who are lecturers at the University of Labor and Social Affairs. The purpose of the discussion is to clarify any questions. Based on the results of the discussion, we have adjusted the measurement scale to conduct an official survey. The official questionnaire was sent to accountants and business managers in Hanoi City via email using a convenient sampling method from friends, relatives, and partners.

Step 2: 320 responses were collected. After encoding and cleaning the data, all these responses are valid for analysis.

Step 3: Analyze data on SPSS v. 22 software using the following tools: 1) descriptive statistical analysis; 2) test the reliability of the scale using Cronbach's alpha; 3) exploratory factor analysis (EFA); 4) correlation analysis; 5) confirmatory factor analysis (CFA); and 6) regression analysis and structural equation modeling (SEM).

Step 4: Analyze and discuss the research results.

Step 5: Conclusion and recommendations.

Figure 2. Research process
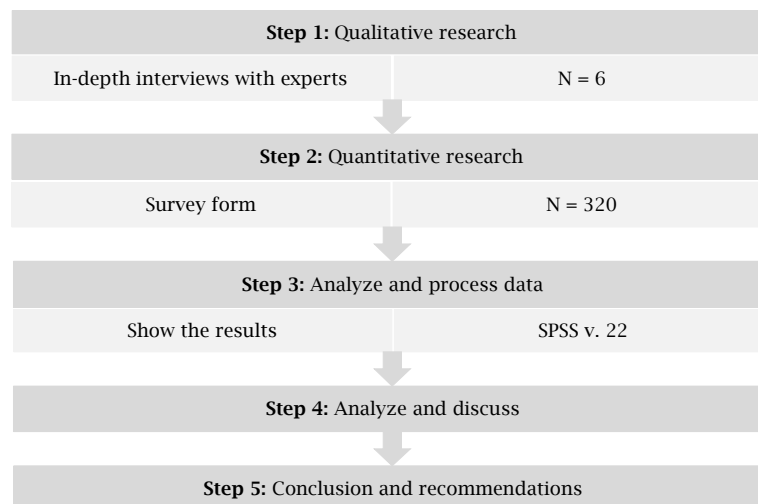
Source: Authors' elaboration.

3.2. Research scale

The questionnaire is designed into five parts, specifically:

Part 1. "Digital transformation in management account of enterprises": This part is designed to evaluate digital transformation based on the set of indicators to evaluate the general level of digital transformation of enterprises. Enterprise according to Decision No. 1970/QD-BTTTT dated December 13, 2021, of the Minister of Information and Communications of Vietnam. To have a more specific basis for evaluation in the field of management accounting, we consider and selectively inherit the four scales of Nasiri et al. (2020). Additionally, Nwankpa and Roumani (2016) adapted a scale based on three items from Aral and Weill (2007). The research of Shehadeh et al. (2023) study adapted both sets of scales above and presented a revised scale for digital transformation based on seven items because previous scales were insufficient to explore the wide-ranged concept of digital transformation. In this study, we synthesize the scales inherited from Shehadeh et al. (2023) and add the scales from the studies of Hasan (2023), Phornlaphatrachakorn and Na Kalasindhu (2021),

and Feghali et al. (2022). The scales of "digital transformation in management account" aim to measure digital transformation factors in the management accounting of enterprises.

Part 2. "Quality of management accounting information" includes the scales inherited from (Friyani & Hernando, 2021; Meraghni et al., 2021; Hasan, 2023).

Part 3. "Management efficiency" inherits the scale from (Chang & Ma, 2019; Phornlaphatrachakorn & Na Kalasindhu, 2020; Rashwan & Kassem, 2021).

This information is intended to evaluate the factors to clarify the corresponding hypotheses according to the proposed model.

Part 4. "Business information" and *Part 5.* "Respondent information". This information is collected to evaluate the suitability and reliability of the survey subjects, as a basis for necessary comparisons according to demographic characteristics or characteristics of the surveyed enterprises.

Details of the scale are shown in Table 1.

Table 1. Scale description

No.	Factor	Encode	Observed variables
1	Digital transformation in enterprise management accounting	*DT*	13
2	Quality of management accounting information	*QI*	11
3	Management efficiency	*ME*	6

Source: Authors' elaboration.

In this study, we designed a questionnaire with 30 scales, of which, the number of observed variables of *DT* is 13, the *QI* is 11, and the *ME* is 6 (see Table 1). These questions apply the Likert scale of 5 points: 1 — strongly disagree; 2 — disagree, 3 — neutral, 4 — agree, 5 — strongly agree.

3.3. Description of the research sample

Regarding the size of the surveyed enterprises in this study, we categorize enterprises based on the number of employees with three levels: small (less than 100 people), medium (from 100 to 200 people), and large (over 200 people). Of the total 320 enterprises, there are 170 SMEs with less than 100 employees (accounting for 53.1%), 85 medium enterprises with the number of employees from 100–200 people (accounting for 26.6%), and 65 large enterprises with the number of employees over 200 people (accounting for 20.3%).

Regarding the number of operating years, enterprises from 5–10 years accounted for the largest proportion (139 enterprises; 43.4%), followed by those over 10 years (101 enterprises; 31.6%), and enterprises under five years accounted for 25%. In terms of ownership, 256 enterprises are private enterprises (accounting for 80%), 28 enterprises are state-owned enterprises (accounting for 8.8%), 23 enterprises are foreign-invested enterprises (accounting for 7.2%), and other enterprises account for the smallest proportion (4.1%). In terms of business sectors, 172 enterprises operate in the field of trade and services (accounting for 53.8%), 53 enterprises operate in the field of manufacturing (accounting for 16.6%), 35 enterprises operating in the field of construction (accounting for 10.9%), 18 enterprises operating in the field of IT (accounting for 5.6%), and 42 enterprises operating in other fields such as healthcare, education (13.1%).

4. RESEARCH RESULTS

4.1. Reliability assessment of scales

The reliability of the scales was assessed using Cronbach's alpha coefficient to indicate the extent of tight correlation among the observed variables within each factor. All factors ensured a Cronbach's alpha reliability coefficient of 0.6 or above (Hair & Alamer, 2022). Hence, the observations within each scale are deemed appropriate for conducting EFA.

Table 2. Reliability assessment of scales (Part 1)

Encoding	Average scale score if variable deleted	Scale variance if variable deleted	Total variable correlation coefficient	Cronbach's alpha if the variable deleted
Digitization in management accounting (Cronbach's alpha = 0.972)				
DT01	47.85	95.646	0.859	0.969
DT02	47.75	96.709	0.831	0.970
DT03	47.71	95.703	0.842	0.970
DT04	47.81	94.870	0.825	0.970
DT05	47.64	96.487	0.835	0.970
DT06	47.74	95.297	0.845	0.970
DT07	47.74	96.545	0.827	0.970
DT08	47.85	95.295	0.874	0.969
DT09	47.87	95.823	0.837	0.970
DT10	48.09	95.364	0.791	0.971
DT11	47.97	93.903	0.840	0.970
DT12	47.87	95.319	0.867	0.969
DT13	47.87	95.012	0.871	0.969
Quality of management accounting information (Cronbach's alpha = 0.977)				
QI01	40.86	64.409	0.858	0.975
QI02	40.84	63.734	0.888	0.974
QI03	40.77	65.325	0.851	0.975
QI04	40.78	64.919	0.868	0.975
QI05	40.88	63.783	0.871	0.975
QI06	40.81	64.019	0.905	0.974
QI07	40.83	64.317	0.874	0.975
QI08	40.82	64.628	0.885	0.974
QI09	40.85	64.171	0.891	0.974
QI10	40.84	64.210	0.883	0.974
QI11	40.78	64.132	0.894	0.974

Table 2. Reliability assessment of scales (Part 2)

Encoding	Average scale score if variable deleted	Scale variance if variable deleted	Total variable correlation coefficient	Cronbach's alpha if the variable deleted
Management efficiency (Cronbach's alpha = 0.958)				
ME01	20.15	15.952	0.873	0.950
ME02	20.06	15.739	0.869	0.950
ME03	20.07	16.053	0.860	0.951
ME04	20.07	16.085	0.850	0.952
ME05	20.10	15.790	0.877	0.949
ME06	20.09	15.818	0.877	0.949

Source: Authors' elaboration.

4.2. Exploratory factor analysis

The EFA was conducted to assess the convergence and differentiation of factor groups and reaffirm the structure of the scales. The results of the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test showed sig. = 0.000 < 0.05; a high KMO coefficient (0.967 > 0.5).

These results indicate that the observed variables in the overall dataset are correlated with each other, and EFA is highly appropriate. Eigenvalues exceeded one, with three factors, and the explained variance was 78.032% (greater than 50%), meeting the requirement (Hair & Alamer, 2022).

Table 3. Results of factor rotation matrix[a] (EFA)

Items	Component	
	DT	QI
DT08	0.810	
DT13	0.804	
DT11	0.802	
DT09	0.794	
DT12	0.786	
DT04	0.784	
DT10	0.782	
DT06	0.772	
DT01	0.760	
DT07	0.758	
DT02	0.745	
DT05	0.745	
DT03	0.743	
QI06		0.833
QI07		0.829
QI02		0.827
QI08		0.827
QI11		0.813
QI09		0.810
QI01		0.801
QI04		0.797
QI05		0.796
QI03		0.792
QI10		0.785

Note: Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalization. [a] Rotation converged in 3 iterations.
Source: Authors' elaboration.

The results of the EFA (see Table 3) indicate that the observed variables form two factors, with the observed variables fitting the initial model appropriately.

4.3. Confirmatory factor analysis

Confirmatory factor analysis aims to explain the parameters and evaluate the factor model, typically used after confirming the basic structure of EFA analysis. The evaluation of the scales was conducted again using composite reliability (CR) coefficients, and CFA was performed based on the data from the formal study with a sample size of $n = 320$. From the results of EFA, three-factor groups were utilized in the research model, namely digital transformation, quality of management accounting information, and the dependent variable *ME*.

The KMO and Bartlett's test showed sig. = 0.000 < 0.05, with a high KMO coefficient (0.966 > 0.5). This result indicates that the observed variables in the overall dataset are correlated with each other and are suitable for CFA (Hair & Alamer, 2022).

The results of the CFA analysis show that after considering the correlation between the errors of observed variables, the model has 395 degrees of freedom (df), Chi-square is 1124.470 (p = 0.000); goodness-of-fit index (GFI) = 0.801 (GFI > 0.8); Tucker-Lewis index (TLI) = 0.928; comparative fit index (CFI) = 0.934 (TLI, CFI > 0.9); Chi-square/df = 2.847; root mean square error of approximation (RMSEA) = 0.077 (Chi-square / df < 3, RMSEA < 0.08), all indices meet the requirements. Therefore, the model fits the data well (Hair & Alamer, 2022).

In addition to Cronbach's alpha coefficient, the CR and extracted variance are also used to assess the reliability of the scales. The CR should be greater than 0.7, and the average variance extracted (AVE) should be greater than 0.5 for the scales to meet the requirements (Hair & Alamer, 2022). Since Cronbach's alpha coefficient is greater than 0.5, and the p-value < 0.05, the correlation coefficient of each pair of different concepts is significantly different from 1 at a 90% confidence level. Therefore, the scales are both distinct and reliable. After conducting the CFA, the scales fully meet the conditions for conducting SEM analysis.

4.4. Structural equation modeling testing

The proposed research model consists of three mentioned concepts: digital transformation, quality of management accounting information, and management efficiency. The results of the SEM model analysis are depicted in Figure 3.

The results of the SEM structural model analysis (see Figure 3) show that the model has 395 df with a statistical Chi-square value of 1124.470; p = 0.000. When adjusted by dividing the Chi-square value by the df, this criterion achieves an acceptable level (2.847 < 3). Other evaluation indices also meet the requirements: GFI = 0.801 (>= 0.8); TLI = 0.928 (> 0.9), CFI = 0.934 (> 0.9), RMSEA = 0.077 (< 0.08). Thus, the research model is deemed appropriate for the collected data.

Figure 3. Results of the SEM model
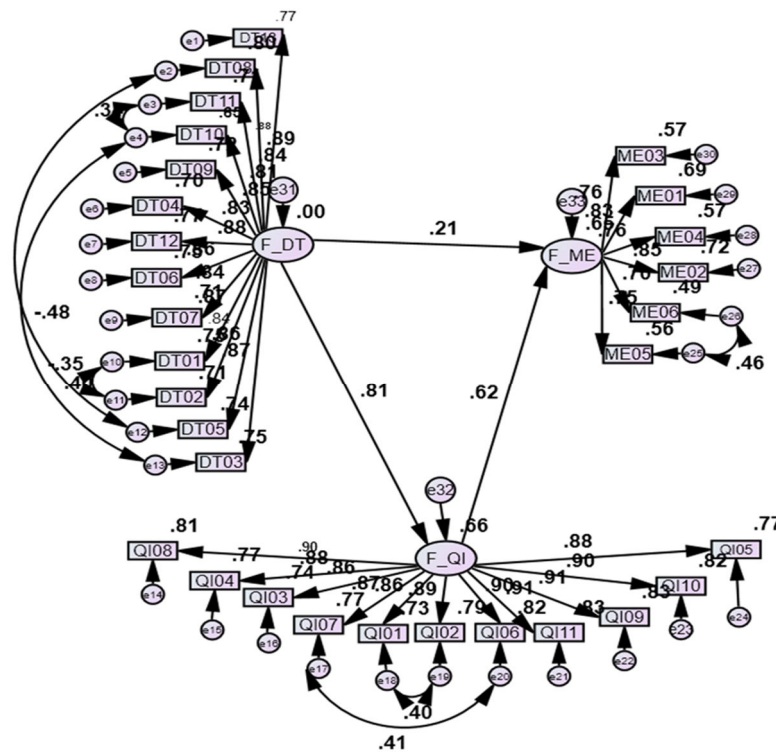
Note: Chi-square = 1124.470, df = 395, Chi-square / df = 2.847, GFI = 0.801, TLI = 0.928, CFI = 0.934, RMSEA = 0.077.
Source: Authors' elaboration using Amos software.

Table 4. Summary of research findings

Impact	Direct effects		Indirect effects	
	S.ES.	p-value	S.ES.	p-value
F_QI ← F_DT	0.814	***		
F_ME ← F_DT	0.209	0.004	0.508	0.002
F_ME ← F_QI	0.624	***		

*Note: S.ES. — standard estimates, *** p-value < 0.001.*
Source: Authors' elaboration.

The results of testing the relationships between concepts in the model (see Table 4) show that all relationships are statistically significant at a 95% confidence level. The following hypotheses have been accepted: *H1, H2, H3, H4.*

Thus, Table 4 shows that the direct effects of *DT* on the *QI* and *ME* are accepted with standardized regression coefficients of 0.814 and 0.209, respectively. The study also demonstrates that the *QI* directly impacts *ME* with a standardized regression coefficient of 0.624. *DT* indirectly influences the *ME* of the enterprise through the *QI*.

The research points out that *DT* positively influences the *QI*. This finding is consistent with the studies by Knudsen (2020) and Hasan (2023), suggesting that digital technology affects accounting by facilitating fast and timely accounting tasks, easy invoice tracking and payment, better integration and synchronization, tax reporting, and bank reconciliation.

DT positively influences business *ME*. Managers can access information anytime and anywhere, so digitization has a positive impact on *ME*. Previous studies such as Phornlaphatrachakorn and Na Kalasindhu (2020), Hasan (2023), and Rashwan and Kassem (2021) have also found similar results.

The *QI* positively affects business *ME*. This result is consistent with many previous studies such as Phornlaphatrachakorn and Na Kalasindhu (2021), Shaughnessy and Goulding (2021), and Ouda and Klischewski (2019).

DT positively influences business *ME*. Managers can obtain appropriate and timely information for decision-making, leading to correct decision-making.

This research result has also been demonstrated in previous studies such as Phornlaphatrachakorn and Na Kalasindhu (2021), and Shaughnessy and Goulding (2021).

5. CONCLUSION

In this study, digital transformation in management accounting, quality of management accounting information, and management efficiency are placed within the same research model. All research relationships are accepted, including both direct and indirect effects.

Firstly, the research results have demonstrated the positive impact of digital transformation on the quality of management accounting information. This result encourages enterprises to enhance digital transformation in general and in management accounting specifically.

Secondly, the study also shows that digital transformation positively influences the management efficiency of the enterprise. With digitization, accounting transactions are executed more efficiently, thus providing timely information for managerial decision-making.

Thirdly, the quality of management accounting information positively affects the management efficiency of the enterprise through regression analysis. Digitization helps accounting information to be provided quickly, completely, and timely, thereby enhancing the quality of management accounting information.

Finally, the research findings provide evidence that digital transformation positively influences the management efficiency of the enterprise through the mediating role of the quality of management accounting information.

Although the topic has completed the proposed research objectives, there are still some limitations as follows. Firstly, in terms of content, the research focuses on the digital transformation in management accounting but has not expanded to the entire field of accounting or control. Digital transformation in Vietnamese businesses is mostly in the initial stages, so research on the scope of management accounting has not yet considered many contents. Therefore, future research needs to frame the digital transformation aspects of accounting within the context of financial accounting or control. Additionally, future research may need to reconceptualize the regulatory role of digital transformation to further its benefits and advantages in empirical research. According to the research results, in the future, studies can consider digital transformation as an independent variable because it clearly determines the results and has the value of the research.

Secondly, in terms of scope, the research was conducted in the context of businesses in Hanoi City, where there is strong development of digital transformation throughout the country. Future studies can expand the scope of research to other major cities in Vietnam or conduct surveys in many localities to make comparisons by location, thereby providing an overall picture of transformation in the international economy of Vietnamese enterprises.

Thirdly, in terms of research method, this study focuses on quantitative methods, using in-depth interviews to adjust the scale. Next research needs to supplement qualitative research methods and discuss in more detail with a number of leading businesses in digital transformation to have more of a picture of the current situation of digital transformation in pioneering businesses, and at the same time have factors affecting this content can be added. Future research may need to collect additional data or a larger sample group to potentially enhance and encourage research and data collection from different samples to build the generalizability of this study.

Fourthly, research should make comparisons between businesses of different sizes, business fields, age characteristics, etc., with differences in digital transformation in the international economy and the impact of these factors model factors to operational efficiency.

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