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**ACCOUNTING INFORMATION SYSTEMS IN SMALL AND
MEDIUM-SIZED ENTERPRISES IN BAC NINH**

MAJOR: ACCOUNTING

MAJOR CODE: 9.34.03.01

SUMMARY OF THE DISSERTATION

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This research was conducted at: The Academy of Finance - Ministry of Finance

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Reviewer 1:

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Time: (hours), Date:Month:..... Year:

INTRODUCTION

1. Reasons for choosing the topic

In the context of the Fourth Industrial Revolution and the trend of DT AIS are no longer just performing accounting record-keeping functions but have become tools to support management and strategic decision-making in businesses. For SMEs in Bac Ninh – a locality with a high rate of industrialization and strong participation of FDI enterprises – the DT (DT) of AIS is an urgent requirement to improve management capacity, increase data connectivity, and meet the requirements of financial transparency in the global supply chain.

Although Bac Ninh has many favorable conditions for DT, most SMEs still face difficulties in modernizing their AIS due to limitations in financial resources, technological infrastructure, digital skills of personnel, and awareness of managers. AIS in many businesses remains fragmented, lacks integration, and primarily serves compliance goals. Therefore, studying the improvement of information and communication technology systems in the context of DT at SMEs in Bac Ninh has both theoretical and practical significance.

2. Overview of researches

Studies on AIS show that these systems have shifted from processing accounting data to providing information for management and decision-making. In the context of DT , modern AIS integrate real-time data, supporting internal control, forecasting, and strategic planning. However, in Vietnamese SMEs, AIS still primarily serve the goals of compliance and tax declaration. Studies also point out the difference between computerization and DT , where DT is a comprehensive restructuring of the system based on digital technologies such as ERP, cloud computing, AI, and big data. Factors influencing AIS in this context include internal factors (leadership awareness, financial resources, human resources, IT infrastructure) and external factors (legal, customers, partners, technology providers). In Bac Ninh, SMEs have many opportunities for development but are limited in management, resources, and digital capabilities.

3. Research gap

- Firstly, there are not many studies approaching the Information and Communication Technology (ICT) system as a whole in the context of digital transformation.

- Secondly, there is a lack of integrated studies on TOE, RBV, DOI, and IPT to explain ICT systems.

- Thirdly, studies are inconsistent regarding the factors influencing ICT systems.

- Fourthly, research on ICT systems in SMEs, especially in Vietnam, is limited.
- Fifthly, there is a lack of in-depth research on ICT systems in SMEs in Bac Ninh province in the context of digital transformation.
- Sixthly, research combining qualitative and quantitative methods is limited.

4. Research objectives and research questions

Research Objectives

This dissertation systematizes the theoretical basis, assesses the current situation, and analyzes the influencing factors. It proposes solutions to improve the economic information system in SMEs in Bac Ninh province in the context of DT.

Research question

The dissertation focuses on addressing four main issues: (1) clarifying the changes in AIS under the impact of DT; (2) evaluating the current state of AIS in SMEs in Bac Ninh Province; (3) identifying and measuring the factors influencing AIS; and (4) proposing solutions to improve AIS in order to meet management requirements in the digital economy.

5. Research Subject and Scope of the Study

Research Subject: AIS in the context of DT within SMEs in Bac Ninh Province.

Research Scope: The study focuses on the theoretical foundations, current practices, and solutions for improving AIS. The empirical investigation is conducted among SMEs located in Bac Ninh Province. Both secondary and primary data collected during the period from 2020 to 2025 are utilized for the analysis.

6. Research Methodology

Qualitative Research: In-depth interviews were conducted with experts, including Chief Executive Officers (CEOs), Chief Accountants, and Information Technology (IT) Managers from SMEs in Bac Ninh Province. Each interview lasted approximately 45–60 minutes.

Quantitative Research: A survey was conducted with 357 valid responses obtained from 400 distributed questionnaires. The collected data were analyzed using Cronbach's Alpha, Exploratory Factor Analysis (EFA), and Multiple Linear Regression techniques with the support of SPSS 26 software.

7. New Contributions of the Dissertation

The dissertation systematizes the theoretical foundations of AIS in the context of DT, clarifies the changes in the system's constituent elements, and develops a model of factors influencing AIS in SMEs.

The study also provides a basis for proposing solutions to improve AIS in SMEs in Bac Ninh Province, while contributing to policymaking, teaching, and further research in the fields of accounting and DT.

8. Structure of the Thesis

Besides the introduction, list of abbreviations, list of tables, diagrams, figures, list of references, and conclusion, the thesis is presented in 3 chapters, specifically:

Chapter 1: Theory of accounting information systems in SMEs.

Chapter 2: Current status of accounting information systems in SMEs in Bac Ninh.

Chapter 3: Solutions for improving accounting information systems in SMEs in Bac Ninh.

CHAPTER 1: THEORETICAL FOUNDATIONS OF AIS IN SMEs

1.1. Overview of AIS and the DT of AIS in SMEs

1.1.1. Overview of Small and SMEs

Definition of SMEs

SMEs are businesses that operate on a small or medium scale within the economy. According to the Law on Support for SMEs and Government Decree No. 80/2021/ND-CP, SMEs are classified based on criteria such as the average annual number of employees participating in social insurance, annual revenue, and total capital. SMEs comprise micro enterprises, small enterprises, and medium-sized enterprises.

Role of SMEs

SMEs play a vital role in socio-economic development. They account for approximately 98% of all enterprises in Vietnam and make significant contributions to gross domestic product (GDP) and state budget revenues. In addition, SMEs generate more than 50% of total employment in the economy, thereby promoting local economic development, reducing unemployment, and enhancing the flexibility and resilience of the economy.

Characteristics of SMEs

Small scale of business operations and limited financial capacity.

Diverse organizational forms, industries, and business sectors.

Limited business strategies, scientific and technological capabilities, and competitive capacity.

A high degree of dependence on changes in the business environment.

Lean and flexible management structures, although managerial capabilities are often relatively limited.

Classification of SMEs

1.1.2. Accounting Information Systems in SMEs

Definition of AIS

Table 1.1. Definitions of AIS from Different Perspectives

Author(s)	Definition
<i>Approach from the Perspective of Information Users and Information Provision Objectives</i>	
Bodnar and Hopwood (2013)	An AIS is a system that collects, processes, and communicates financial information to support managers in planning, controlling, and decision-making activities, while also meeting the reporting requirements of external stakeholders such as investors, tax authorities, and banks.
O'Brien and	An AIS is a subsystem of a management information

Marakas (2005)	system that provides useful financial and non-financial information to both internal and external users of an enterprise, in order to support management and control of business operations.
<i>Approach from the perspective of system components</i>	
American Institute of Certified Public Accountants–AICPA	An AIS is a system consisting of multiple components, including people, hardware and software systems, communication networks, and operating procedures. These components are integrated to perform functions of collecting, processing, storing data, and providing information in order to support the objectives of an organization.
Romney and Steinbart (2021)	An AIS is an information system designed to collect, record, and process data in order to generate useful information for decision-making. An AIS consists of six key components: (1) people; (2) data collection and processing procedures; (3) organizational data; (4) software for data processing; (5) information technology infrastructure; and (6) internal control and security mechanisms to protect data.
Gelinas et al (2018)	An AIS is a subsystem of the overall information system that is responsible for collecting, processing, and reporting the financial aspects of business operations. The AIS comprises ten fundamental components: (1) technology; (2) databases; (3) reporting; (4) control; (5) business operations of the enterprise; (6) transaction processing procedures; (7) managerial decision-making; (8) system development and operation; (9) communication; and (10) accounting and auditing principles.
<i>Approach from the perspective of IT</i>	
Gelinas, Dull and Wheeler (2012),	An AIS is considered a subsystem of an organization's management information system. Its purpose is to collect, process, and provide information related to the financial aspects of economic events.
Saira et al (2010),	An AIS is defined as a system that processes and analyzes data with the purpose of providing information to users for planning and controlling business operations within an enterprise.
James A.Hall (2011)	An AIS is a system that collects, processes, and provides financial information to support operational activities, the preparation of financial statements, and managerial decision-making. The system consists of three main subsystems: the Transaction Processing System (TPS), the General Ledger and Financial Reporting System

	(GLS/FRS), and the Management Reporting System (MRS), serving both internal and external users of the enterprise.
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The role of AIS in SMEs

First, AIS helps SMEs improve product and service quality while reducing operating costs.

Second, AIS enhances the decision-making process of SME managers.

Third, AIS contributes to improving the operational efficiency of SMEs.

Fourth, AIS strengthens the effectiveness of internal control systems in SMEs.

Fifth, AIS supports information and knowledge sharing within SMEs.

Sixth, AIS contributes to improving the efficiency and effectiveness of SME value chains.

Classification of AIS

Table 1.2. Classification of AIS by criteria

<i>Classification by Purpose of Use and Information Users</i>		
Financial AIS		Management AIS
<i>Classification by Functional Subsystem Structure (System Perspective)</i>		
Transaction Processing System - TPS	General Ledger/Financial Reporting System - GL/FRS	Management Reporting System - MRS
<i>Classification by Level of Technology Adoption and Digital Maturity</i>		
Level 1: Manual and Semi-Manual AIS (Spreadsheet-based Applications)	Level 2: Standalone AIS (Standalone Accounting Software)	Level 3: Integrated and Intelligent AIS (ERP & Cloud-based Systems)

1.1.3. DT of Accounting Information Systems in SMEs

Concept of DT in Accounting Activities

AIS in the Context of DT

Synchronous Transformation of the Components of AIS

Table 1.3. Synchronous Transformation of AIS Components in the Context of DT

Components of AIS	Characteristics in the traditional environment	Changes in the context of DT	Implications of the changes
Human factor	Accountants mainly perform bookkeeping, data entry, and financial statement preparation.	The role of accountants shifts toward consulting, data analysis, decision support, and system management.	Requires enhanced technological capabilities, analytical thinking, and digital skills.

Processes and Procedures	Processes are manual, fragmented across departments, and batch-processed.	Processes are digitalized, automated, and fully integrated across enterprise functions.	Increases processing speed, reduces errors, and improves management efficiency.
Data	Data is mainly structured financial data with limited data sources.	Data becomes multi-source and multidimensional, including both financial and non-financial data, as well as structured and unstructured data.	Enhances analytical and forecasting capabilities, and strengthens decision-support functions.
Software	Accounting software operates independently with single, isolated functions.	Accounting systems evolve into core modules within ERP systems, integrated with cloud computing, artificial intelligence (AI), and business intelligence (BI).	Improves connectivity, data sharing, and intelligent data processing capabilities.
IT infrastructure	The system relies on local physical servers and internal network infrastructure.	Systems shift toward cloud-based platforms, mobile devices, and IoT-enabled sensors.	Increases flexibility, scalability, and real-time accessibility.
Internal control and information security	Controls are manual, heavily dependent on paper-based documents and direct approvals.	Advanced controls are applied, including access authorization, electronic approvals, audit trails, data encryption, blockchain technology, and multi-factor authentication.	Enhances transparency, security, and risk control capabilities in the digital environment.

Source: Compiled by the author based on the dissertation.

1.2. Components of AIS in SMEs in the Context of DT

(1) Human factor

DT changes the role of people from performing manual bookkeeping and data entry tasks to managing, analyzing, and exploiting data. Accountants are no longer limited to preparing financial reports but also participate in process design, data control, and management consulting. Managers shift from using periodic reports to

leveraging real-time information for decision-making. At the same time, the requirements for digital skills, data analytical capabilities, and technological competence for both accounting and managerial staff are increasingly higher.

(2) Processes and Procedures

DT shifts accounting processes from manual processing to digitalized and automated workflows. Data is captured at the source, transferred electronically, and processed in real time instead of through multiple intermediary steps. Procedures for approval, reconciliation, verification, and storage are performed on digital platforms, thereby reducing processing time, increasing transparency, and enhancing control effectiveness.

(3) Data

Data in AIS is expanded in terms of scale, speed, and scope. In addition to traditional accounting data, the system also exploits data from electronic invoices, digital banking, e-commerce, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and other digital platforms. Data has become a strategic asset of the enterprise, requiring standardization, governance, and security to ensure the accuracy, completeness, and timeliness of information.

(4) Software

Traditional accounting software has evolved into integrated systems capable of connecting multiple modules such as sales, inventory, human resources, banking, and electronic invoicing. Modern software supports process automation, real-time data processing, multidimensional analysis, and management reporting. As a result, accounting software no longer serves only bookkeeping purposes but also supports management and decision-making processes.

(5) Information technology infrastructure

DT shifts IT infrastructure from a local, on-premise model to a connected digital environment based on cloud computing, high-speed internet, and remote access platforms. The infrastructure not only ensures data processing and storage capabilities but also supports real-time information sharing, thereby enhancing flexibility and scalability of AIS at an appropriate cost for SMEs.

(6) Internal control and information security

DT expands the scope of control from source documents and accounting records to data, systems, and the digital environment. Modern control mechanisms such as access authorization, system logs, multi-factor authentication, data backup, and cybersecurity monitoring are implemented to protect accounting information. As a result, AIS not only ensure the accuracy and reliability of information but also help mitigate risks of fraud, data loss, and cybersecurity threats.

1.3. Theoretical Foundations

- Technology–Organization–Environment (TOE) Framework: This framework provides a comprehensive analytical structure for examining technology adoption decisions through three core dimensions: Technology (infrastructure characteristics), Organization (managerial awareness and financial resources), and Environment (supply chain and external competitive pressures).

- Institutional Theory (INT): Argues that organizational behavior and structure are determined not only by rational considerations of economic efficiency, but also by institutional pressures to achieve legitimacy within the institutional environment in which the organization operates.

- Information Processing Theory (IPT): This theory argues that firms are open systems that need to process information in order to reduce environmental uncertainty. The DT of AIS enhances the organization's internal information processing capabilities, enabling firms to respond more effectively to market pressures.

- The Diffusion of Innovation (DOI) theory argues that the diffusion rate of a strategic innovation, such as the DT of information and communication technology, depends closely on five perceived characteristics: relative superiority, compatibility, complexity, tryability, and observability of results.

- Resource-Based View (RBV): This theory posits that high-quality digitalized AIS and technologically competent accounting personnel represent unique strategic resources that help firms build and sustain competitive advantage.

1.4. factors influencing and proposed research model of factors affecting AIS in SMES in the context of dt

1.4.1. Factors influencing AIS in SMES in the context of DT

Internal Factors

Managerial Awareness and Commitment: From an ownership mindset to a digital leadership mindset.

Human Resource Quality: Digital skills and organizational adaptability.

Financial Resources: The investment paradox and cost optimization challenges.

Information Technology Infrastructure: Conditions for information technology adoption and application.

External Factors

Pressure from State Regulatory Authorities: Coercive drivers and the legal framework.

Pressure from Partners and Customers: Spillover effects within the supply chain.

1.4.2. Research model of factors affecting AIS in SMEs in the context of DT

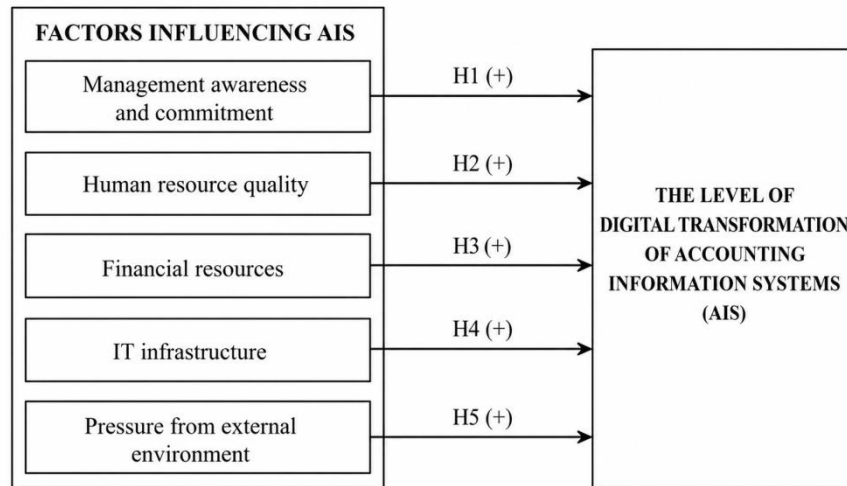


Figure 1.1. Research model of factors affecting IT systems in SMEs in the context of DT.

CHAPTER 2: CURRENT STATE OF ACCOUNTING INFORMATION SYSTEMS IN SMEs IN BAC NINH PROVINCE

2.1. Overview of SMEs in Bac Ninh Province

2.2.1. Current status of AIS in SMEs in Bac Ninh in the context of DT according to structural components

Current status of the Human factor

Table 2.1. Current status of the human factor in the AIS in SMEs in Bac Ninh

Evaluation Criteria	Results	Assessment
Accounting staff are well-versed in accounting standards, accounting regimes, and bookkeeping/accounting entries.	Strongly disagree: 57 DN (16,0%); Disagree: 78 DN (21,8%); Neutral: 86 DN (24,1%); Agree: 80 DN (22,4%); Strongly Agree: 56 DN (15,7%)	The professional competence of accounting staff is at an average level; the proportion of positive assessments is not significantly higher than that of non-positive evaluations, indicating that the capacity for direct operation of the AIS remains uneven.
Business owners, board of directors, and managers regularly exploit information from the AIS for decision-making.	Yes: 202 DN (56,6%); No: 155 DN (43,4%)	Management groups have shown a tendency to use accounting information for decision-making; however, the extent of information utilization is not yet widespread across all SMEs.
The enterprise has personnel or units supporting accounting software and information technology.	Yes: 183 DN (51,3%); No: 174 DN (48,7%)	The capacity for system design, development, and implementation remains at a moderate level; nearly half of the enterprises still lack stable technical support resources.
The enterprise has personnel responsible for operating, maintaining, and managing the information system.	Yes: 180 DN (50,4%); No: 177 DN (49,6%)	System operation, maintenance, and management activities are not yet truly sustainable; many enterprises still lack regular personnel or external support units.
The enterprise has a department or staff performing internal control and internal audit	Yes: 194 DN (54,3%); No: 163 DN (45,7%)	Evaluation and control functions have received attention, but have not yet become common practice;

functions.		risks related to data control and information security remain noteworthy.
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Current status of the Process and Procedures factor

Table 2.2. Current status of the process and procedures factor in the AIS in SMEs in Bac Ninh

Evaluation Criteria	Results	Assessment
Method of preparing accounting documents	Manual: 33 DN (9,2%); Combined: 115 DN (32,2%); Software-based accounting: 209 DN (58,5%)	The use of software for preparing accounting documents has become dominant; however, 41.4% of enterprises still apply manual or combined methods, indicating an uneven level of digitalization in document processing.
The enterprise has issued accounting process procedures	No: 63 DN (17,6%); Not good: 88 DN (24,6%); Moderate: 88 DN (24,6%); Good: 58 DN (16,2%); Very good:: 60 DN (16,8%)	The issuance of accounting procedures is at a relatively low-to-moderate level; the proportion of “not available” and “poor” assessments is higher than that of “good” and “very good” evaluations.
The sales – inventory – accounting processes are integrated	No: 58 DN (16,2%); Not good: 104 DN (29,1%); Moderate: 65 DN (18,2%); Good: 67 DN (18,8%); Very good:: 63 DN (17,6%)	The integration between sales, inventory, and accounting functions is unstable; many enterprises still handle processes in a fragmented manner across departments.
Level of automated or semi-automated accounts receivable reconciliation in the system	No: 68 DN (19,0%); Not good: 90 DN (25,2%); Moderate: 81 DN (22,7%); Good: 68 DN (19,0%); Very good:: 50 DN (14,0%)	Automatic or semi-automatic accounts reconciliation remains limited; this is a weakness in controlling accounts receivable and payable.
Written guidelines for electronic data processing are available	No: 59 DN (16,5%); Not good: 78 DN (21,8%); Moderate: 91 DN (25,5%); Good: 81 DN (22,7%); Very good:: 48 DN (13,4%)	The issuance of guidelines for electronic data processing has received attention but is still incomplete; many enterprises have not

		standardized them into formal regulations.
Accounting data is electronically transferred between departments without repeated data entry	Strongly disagree: 66 DN (18,5%); Disagree: 92 DN (25,8%); Neutral: 73 DN (20,4%); Agree: 76 DN (21,3%); Strongly Agree: 50 DN (14,0%)	Electronic data transfer between departments is not smooth; data re-entry across departments remains common.
Accounting processes are standardized and documented in written form or process flow diagrams	Strongly disagree: 63 DN (17,6%); Disagree: 87 DN (24,4%); Neutral: 78 DN (21,8%); Agree: 62 DN (17,4%); Strongly Agree: 67 DN (18,8%)	The level of process standardization is still low; documenting processes in written form or flowcharts has not yet become a common practice.
Financial statements are automatically generated from the system	Strongly disagree: 66 DN (18,5%); Disagree: 96 DN (26,9%); Neutral: 77 DN (21,6%); Agree: 61 DN (17,1%); Strongly Agree: 57 DN (16,0%)	The automatic generation of financial statements remains limited; many enterprises still require additional manual adjustments outside the system.
Management reports are directly extracted from the system	Strongly disagree: 63 DN (17,6%); Disagree: 80 DN (22,4%); Neutral: 90 DN (25,2%); Agree: 67 DN (18,8%); Strongly Agree: 57 DN (16,0%)	Management reports are initially extracted from the system, but the level of responsiveness still does not fully meet decision-making requirements.
Ability to access reports remotely via the Internet	Strongly disagree: 65 DN (18,2%); Disagree: 96 DN (26,9%); Neutral: 78 DN (21,8%); Agree: 68 DN (19,0%); Strongly Agree: 50 DN (14,0%)	Remote access to reports remains weak; systems have not yet fully supported flexible management in the digital environment.
The system provides dashboards or data visualization reports	Strongly disagree: 58 DN (16,2%); Disagree: 85 DN (23,8%); Neutral: 86 DN (24,1%); Agree: 77 DN (21,6%); Strongly Agree: 51 DN (14,3%)	Data visualization tools have been introduced in some enterprises, but they are not yet widely and regularly implemented.

Current status of the data factor

Table 2.3. Current status of the data factor in the AIS in SMEs in Bac Ninh

Evaluation Criteria	Results		Assessment
Standardized and centrally managed data catalog	35,01	40,90	The chart of accounts, customer, supplier, and inventory master data are not yet fully standardized.
Inventory data updated automatically or in near real time	34,17	43,70	Inventory data does not promptly reflect all changes in receipts, issues, and stock levels.
Accounts receivable/payable data supports aging analysis	35,29	43,70	The capability of accounts receivable/payable analysis remains limited.
Cost data is linked to orders/projects/products	35,57	42,86	Cost data is not sufficiently detailed to support managerial purposes.
Rules for data naming, storage, and backup are in place	33,89	42,86	Data management policies are not consistently documented across the enterprise.
Data is integrated and shared across departments	34,45	43,42	Data remains fragmented across departments.
Data is utilized for analysis and decision-making	35,29	40,34	Accounting data has not been effectively transformed into managerial information.

Current status of the Data factor

Table 2.4. Current status of the data processing software factor in the AIS in SMEs in Bac Ninh

Evaluation Criteria	Results	Assessment
Accounting software	195 DN (54,62%)	Computerized accounting platforms are relatively common; however, standalone software has not yet ensured full data integration.
Accounting on Excel	87 DN (24,37%)	This reflects a continued dependence on manual operations and fragmented data files.
Integrated ERP software	55 DN (15,41%)	Although this group shows a higher level of integration, the proportion of such enterprises remains low.

Manual accounting	20 DN (5,60%)	This indicates that some enterprises have not yet met basic digitalization requirements.
Integration of software with other modules	Agree/ Strongly agree: 35,29%	The ability to integrate software with sales, inventory, human resources, and banking systems remains limited.
Connection between e-invoicing systems and accounting software	Agree/ Strongly agree: 35,57%	Integration with e-invoicing systems has not been implemented uniformly across enterprises.
Integration with digital banking and automated reconciliation systems	Agree/ Strongly agree: 35,29%	Automated bank reconciliation has not yet become a common practice.

Current Status of Information Technology Infrastructure

Table 2.5. Current status of IT infrastructure in the Economic Information System at SMEs in Bac Ninh

Evaluation Criteria	Results	Assessment
Internet and intranet meet operational requirements	Mean = 2,92; Agree/ Strongly agree = 33,61%	The connectivity infrastructure partially meets basic needs but does not guarantee the continuous operation of the integrated system.
IT equipment meets usage requirements	Mean = 2,83; Agree/ Strongly agree = 33,33%	Equipment in some businesses is not sufficiently compatible with modern software.
Stable and continuous infrastructure	Mean = 3,02; Agree/ Strongly agree = 38,94%	Stability levels vary between businesses with significant investment and small-scale businesses.
Utilization of cloud computing	Mean = 2,94; Agree/ Strongly agree = 36,69%	The shift to cloud platforms has begun but is not yet widespread.
Remote access to IT systems	Mean = 2,88; Agree/ Strongly agree = 33,33%	The ability to work remotely and access data flexibly remains limited.

Current status of internal control and information security

Table 2.6. Current status of internal control and information security in the AIS in SMEs in Bac Ninh

Evaluation Criteria	Results		Assessment
Job-based access control	35,57	42,86	Authorization has received attention but is not yet synchronized with process design.
Periodic access control review	34,45	40,62	Permission review has not become a regular mechanism.
Access and data modification tracking	35,85	39,78	Data traceability needs to be enhanced.
Password, digital signature, and account regulations	36,41	42,30	Account security regulations have not been fully documented.
Regular data backup and recovery	35,01	43,42	Backup and recovery remain weaknesses in many businesses.
Incident response plan	34,17	42,30	Incident response scenarios have not been standardized.
Information security training	36,41	40,06	Information security training is not conducted regularly.

2.2.2. Current status of factors affecting the DT of information and communication technology systems in SMEs in Bac Ninh.

Research Model and Methods for Investigating Factors Affecting the DT of Information and Communication Technology (ICT) Systems in SMEs in Bac Ninh Province.

Research Hypotheses and Proposed Model

Table 2.7. Construction of the Measurement Scale for Research Variables

Factor	Coding	Theoretical Source	Impact
Managerial awareness	NT	Davis (1989); Thong (1999); Kane et al. (2015)	(+)
Quality of human resources	NL	Al-Okaily et al. (2021); Zhang et al. (2022)	(+)

Factor	Coding	Theoretical Source	Impact
Financial	TC	Ghobakhloo (2018); Iacovou et al.	(+)
IT infrastructure	HT	Zhu & Kraemer (2005); Kucherenko et al. (2021)	(+)
External environmental	MT	DiMaggio & Powell (1983); Budiarto & Prabowo (2015)	(+)

Data Collection Methods and Sample Size

The study uses a mixed methodology, combining qualitative and quantitative methods. The qualitative phase involved interviewing experts at SMEs in Bac Ninh to refine the research model. The quantitative phase involved surveying business owners, accountants, and IT personnel, yielding 357 valid responses, meeting the requirements for EFA and multiple regression analysis.

Analysis of research results on factors influencing AIS in SMEs in Bac Ninh in the context of DT.

Results from the questionnaire (Quantitative analysis)

Reliability testing of the scale using Cronbach's Alpha coefficient

Table 2.8. Cronbach's Alpha coefficient of observed variables

Scale	N of Items	Valid N	Cronbach's Alpha
CDS	6	357	0,950
NT	6	357	0,940
NL	6	357	0,947
TC	5	357	0,941
HT	5	357	0,932
MT	6	357	0,951

Exploratory Factor Analysis (EFA)

Table 2.9. KMO and Bartlett's Test results for independent variables

KMO and Bartlett's Test		
Trị số KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy)		0,937
TEST Bartlett (Bartlett's Test of Sphericity)	Approx. Chi-Square	8922,370
	df	378
	Sig.	< 0,001

Table 2.10. Total variance extracted for independent variables

Comp onent	Initial Eigen values Total	Initial % of Variance	Initial Cumulative %	Extraction Sums Total	Extraction % of Variance	Extraction Cumulative %	Rotation Sums Total	Rotation % of Variance	Rotation Cumulative %
1	9,743	34,80	34,80	9,743	34,70	34,70	4,874	17,41	17,41
2	3,599	12,85	47,65	3,599	12,82	47,51	4,633	16,55	33,95
3	3,354	11,98	59,63	3,354	11,95	59,46	4,760	17,00	50,95
4	2,966	10,59	70,22	2,966	10,56	70,02	4,086	14,59	65,55
5	2,626	9,38	79,60	2,626	9,35	79,38	3,935	14,05	79,60
6	0,398	1,42	81,02						
7	0,373	1,33	82,35						
8	0,330	1,18	83,53						

Extraction Method: Principal Component Analysis.

Regression Analysis

The results of the multiple linear regression analysis to assess the impact of the independent variables including: Awareness (NT), Human Resources (NL), Technology/Infrastructure (HT), Environment (MT), and Finance (TC) on the dependent variable "Level of DT " (MD) are shown in Table 2.11.

Table 2.11. Results of multiple linear regression analysis

Regression coefficients

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.	Lower Bound	Upper Bound	VIF	Conclusion
Constant	-0,295	0,172		-1,715	0,087	-0,633	0,043		
NT	0,280	0,041	0,272	6,806	< 0,001	0,199	0,361	8,877	Có ý nghĩa
NL	0,195	0,041	0,193	4,766	< 0,001	0,115	0,276	9,190	Có ý nghĩa
TC	0,199	0,039	0,206	5,043	< 0,001	0,121	0,276	8,809	Có ý nghĩa
HT	0,172	0,041	0,173	4,167	< 0,001	0,091	0,253	9,650	Có ý nghĩa
MT	0,255	0,040	0,256	6,356	< 0,001	0,176	0,335	8,983	Có ý nghĩa

a. Dependent Variable: MD

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0,729	0,531	0,525	0,790	2,059

a. Predictors: (Constant), TC, HT, NL, NT, MT

b. Dependent Variable: MD

ANOVA TEST

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	248,501	5	49,700	79,564	< 0,001
Residual	219,255	351	0,625		
Total	467,756	356			

Standardized regression equation:

$$CDS = 0,272 \text{ NT} + 0,256 \text{ MT} + 0,206 \text{ TC} + 0,193 \text{ NL} + 0,173 \text{ HT}.$$

The research results show that Managerial Awareness has the strongest impact on the DT of Information and Communication Technology (ICT) ($\beta = 0.272$), followed by Environmental Pressure ($\beta = 0.256$) and Financial Resources ($\beta = 0.206$), followed by Human Resources ($\beta = 0.193$) and ICT Infrastructure ($\beta = 0.173$) which have a lower impact but are still important conditions for promoting and maintaining the DT process.

Hypothesis Testing

Table 2.12. Summary of results of hypothesis testing in the study

Predictor	B	Sig.	Conclusion at 5%
NT	0,280	< 0,001	Ủng hộ
NL	0,195	< 0,001	Ủng hộ
TC	0,199	< 0,001	Ủng hộ
HT	0,172	< 0,001	Ủng hộ
MT	0,255	< 0,001	Ủng hộ

2.3. Assessment of the current state of AIS in SMEs in Bac Ninh in the context of DT

2.3.1. Achievements in AIS in SMEs in Bac Ninh

First: Fundamental transformation in leadership awareness and strategic thinking.

Second: Breakthrough in technological infrastructure and the level of digitalization diffusion.

Third: Integration capability and synergy with the FDI supply chain.

Fourth: Adaptability and DT capacity of accounting personnel.

2.3.2. Limitations of AIS in SMEs in Bac Ninh

Limitations in human factor

Limitations in processes and procedures factor

Limitations in data factor

Limitations in software factor

Limitations in IT infrastructure factor

Limitations in internal control and information security factor

2.3.3. Causes of limitations:

Subjective causes from enterprises

Objective causes from the environment and policies

CHAPTER 3: IMPROVING THE ACCOUNTING INFORMATION SYSTEM IN SMALL AND MEDIUM-SIZED ENTERPRISES IN BAC NINH

3.1. Development orientation of SMEs in Bac Ninh toward 2030

3.2. Basis, requirements, and principles for improving the accounting AIS in SMEs in Bac Ninh

3.2.1. Basis for proposing solutions

First, the theoretical framework presented in Chapter 1 clarifies the role and structural components of the AIS in the context of DT .

Second, the quantitative research results in Chapter 2 reflect the current status of the AIS in the context of DT and the influencing factors in SMEs.

Third, the results of in-depth interviews and case studies reveal the practical needs, capabilities, and barriers faced by enterprises.

Fourth, the proposed solutions are aligned with the development objectives of SMEs and the DT strategy of Bac Ninh province.

3.2.2. Requirements for improving the AIS in SMEs in Bac Ninh

First, the fundamental requirement of a modern AIS is data integration and synchronization. Accounting information should be consistently connected across functional departments to ensure a unified and reliable data source for the entire enterprise.

Second, closely related to integration, timeliness and the ability to provide real-time or online information are essential core requirements. The AIS must be capable of delivering up-to-date information to support timely decision-making in a dynamic business environment.

Third, data security and integrity in the digital environment emerge as a critical and indispensable requirement. Enterprises must ensure that accounting data is protected against unauthorized access, loss, or alteration, thereby maintaining reliability and trustworthiness of information.

Fourth, compliance and flexible adaptation to the legal framework are also important requirements. The AIS must be designed to comply with current accounting standards and regulations while remaining flexible enough to adapt to future changes in the legal and regulatory environment.

3.2.3. Principles for improving the AIS in SMEs in Bac Ninh

The solutions should be developed on the basis of synchronizing the six components of the AIS, ensuring the interconnection between technology, human resources, processes, data, and internal control.

The DT of the AIS must originate from the information needs of managers in order to effectively support the decision-making process.

SMEs should implement DT following an appropriate roadmap, prioritizing the digitalization of core accounting operations before expanding to more advanced functions.

The solutions must ensure cost-effectiveness and be suitable for the scale, resources, and maintenance capacity of each enterprise.

Responsibility for data quality should be clearly assigned to relevant departments to ensure the completeness, accuracy, and timeliness of accounting information.

3.3. Solutions for improving the AIS in SMEs in Bac Ninh in the context of DT

3.3.1. Improving the Human factor.

First, enhance managers' awareness of the role of the AIS in enterprise management and DT .

Second, improve the digital competencies of accounting staff.

Third, strengthen coordination capacity among departments in data creation and management.

Fourth, increase IT and DT support resources.

Fifth, enhance capabilities in information evaluation, control, and security.

Sixth, develop a data-driven culture within the enterprise.

3.3.2. Improving process and procedure factor.

First, standardize and document accounting processes.

Second, redesign processes toward digitalization and data integration.

Third, promote the use of electronic documents and electronic approval workflows.

Fourth, improve data reconciliation and verification processes.

Fifth, strengthen the integration of accounting processes with management processes.

Sixth, establish a mechanism for periodic process review and improvement.

3.3.3. Improving data factor.

First, standardize the accounting data catalog system.

Second, improve data quality from the stages of data collection and data entry.

Third, strengthen data integration and sharing among departments within the enterprise.

Fourth, expand the scope of data used for management accounting.

Fifth, enhance data utilization for analysis and forecasting.

Sixth, improve accounting data storage, protection, and governance.

Seventh, develop a data governance culture within the enterprise.

3.3.4. Improving software factor.

First, select accounting software appropriate to the enterprise's size, operational characteristics, and development orientation.

Second, strengthen the integration of accounting software with other functional modules.

Third, promote connectivity with external digital platforms.

Fourth, expand functionalities to support management accounting and decision-making.

Fifth, enhance the level of automation in accounting data processing.

Sixth, ensure the scalability and adaptability of the software during enterprise development.

Seventh, improve the effectiveness of software management and utilization after implementation.

3.3.5. Improving IT infrastructure factor.

First, continue investing in and modernizing IT infrastructure to support the AIS.

Second, prioritize the use of cloud computing platforms for accounting data storage and processing.

Third, enhance data connectivity and sharing within the enterprise.

Fourth, develop an effective data backup and recovery system.

Fifth, improve remote working capabilities and real-time data processing.

Sixth, develop an IT infrastructure investment plan aligned with the enterprise's DT roadmap.

Seventh, strengthen cooperation with technology solution providers and DT support organizations.

3.3.6. Improving internal control and information security factor.

First, improve the internal control system in line with the characteristics of SMEs.

Second, strengthen authorization and access control within the system.

Third, implement the principle of segregation of duties in the digital environment.

Fourth, enhance the security of accounting data and enterprise information.

Fifth, strengthen data backup and recovery practices.

Sixth, establish mechanisms for system monitoring and activity logging.

Seventh, improve information security awareness and competencies among system users.

Eighth, develop response procedures for information security incidents and technological risks.

3.4. Conditions for organizing implementation and evaluating the results of improving the AIS in SMEs in Bac Ninh.

Invest in a synchronized IT infrastructure and modern accounting software, build a DT roadmap suitable for the scale of the enterprise.

Enhance the digital capabilities of the accounting team through training in technology skills, data analysis, and the use of accounting software.

Improve internal control and data management processes to ensure the accuracy, transparency, and security of accounting information.

State management agencies need to improve the legal framework and have policies to support SMEs in DT and human resource training.

Technology solution providers need to develop flexible, user-friendly accounting software that is suitable for the specific characteristics of SMEs.

3.5. Future research directions.

Future research could expand its scope to large enterprises, FDI, and the public sector; analyze the impact of AI, blockchain, and cloud computing on AIS; conduct research over time; combine TAM and IDT theories; and enhance case studies to clarify the operating mechanisms of digital AIS.

CONCLUSION

The dissertation has systematized the theoretical foundation of the AIS in SMEs based on six structural components and clarified the distinction between computerization and DT. The research confirms that AIS DT is a process of synchronous changes in technology, data, processes, human resources, and internal control.

Based on foundational theories such as information processing theory, innovation diffusion theory, resource-based theory, and the Technology–Organization–Environment (TOE) framework, the dissertation has developed a research model of factors affecting AIS in the context of DT, including managerial awareness, human resource quality, financial capacity, IT infrastructure, and the external environment.

Survey results from 357 SMEs in Bac Ninh show that many enterprises have implemented accounting software, e-invoices, digital signatures, electronic tax filing, and digital banking services. Some enterprises have initially connected data between departments and improved awareness of the role of accounting information in management. However, AIS still faces limitations in human resource capacity, data standardization, process integration, software utilization, IT infrastructure, and internal control. Many enterprises mainly use AIS for compliance purposes rather than effectively exploiting its managerial functions.

The analysis results indicate that the process of improving AIS is simultaneously influenced by multiple factors, among which managerial awareness and human resource quality have the most significant impact. On this basis, the dissertation proposes a system of solutions to improve AIS according to its six structural components, while emphasizing the need to apply solutions appropriate to the size, operational characteristics, and digital maturity level of each SME group.

From a scientific perspective, the dissertation contributes to enriching the theoretical foundation and research framework of AIS in the context of DT. From a practical perspective, the study provides empirical evidence on the current status of AIS in SMEs in Bac Ninh and proposes feasible solutions. The findings confirm that improving AIS is an inevitable requirement for SMEs, contributing to enhanced accounting information quality, management efficiency, and enterprise competitiveness in the DT era.

LIST OF PUBLISHED ARTICLES

- 1) Nguyen Thi Luong (2025), *“Factors affecting the level of digital transformation of accounting information systems in small and medium - sized enterprises in Bac Ninh province”*, Finance Magazine, September 2025.
- 2) Nguyen Thi Luong (2025), *“Development of supporting industries in Bac Ninh province: Insights from the growth of paper and packaging manufacturing enterprises*. Economic and Forecast Review, February 2025
- 3) Nguyen Thi Luong (2026), *“Assessment of the digital transformation maturity level of accounting information systems in smes in Bac Ninh province”*, Vietnam Economics & Finance Review, February 2026.
- 4) Nguyen Thi Luong (2026), *“Key factors influencing the digital transformation of accounting information systems in small and medium-sized enterprises in Bac Ninh province”*, Vietnam Economics & Finance Review, May 2026.