A MODEL FOR THE USE OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM IN CHINESE SMALL AND MEDIUM ENTERPRISES (SMES)

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ABSTRACT

Major organizations are maturing and have extensively used Enterprise Resource Planning (ERP) System systems. However, due to intense rivalry, China's small and medium enterprises (SMEs) have not yet implemented ERP systems. Therefore, the study aimed to test a model for the use of ERP System in Chinese SMEs. Using crosssectional research design and purposive sampling technique data were collected from 660 Chinese SMEs ERP users. The SEM analysis results show that organizational, environmental, and service quality factors have a positive and significant impact on ERP usage in Chinese SMEs, while system and information quality also positively influence both ERP usage and user satisfaction. Task-technology fit, driven by task characteristics, has a positive effect on ERP usage, and human self-efficacy contributes positively to both ERP usage and user satisfaction. Additionally, ERP usage and user satisfaction both have a positive and significant impact on SME performance. These findings suggested that SMEs in China should focus on the enhancement of ERP-related factors to increase ERP adoption. Additionally, improving system and information quality, alongside fostering user confidence, can significantly enhance both ERP usage and performance.

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CHAPTER 1
INTRODUCTION

1.1 Research Background and Significance

Small and medium-sized enterprises (SMEs) account for 99% of the total enterprises in China and serve as the foundation of our economic development. According to data from the Ministry of Industry and Information Technology(Song, 2022), SMEs contribute over 50% of the tax revenue, over 60% of the gross domestic product (GDP), over 70% of technological innovations, and over 80% of urban labor employment in China. The digital transformation of enterprises refers to empowering them with digital technology, leveraging technological advancements to drive innovation, transforming production and operational models, and even reshaping the overall structure of the enterprise, ultimately enhancing their economic efficiency(Srisathan et al., 2020). In this new era driven by data, for SMEs to thrive in the market, seizing opportunities and actively utilizing digital technology for innovation to propel their development is imperative. Otherwise, they risk falling behind and being phased out. With the continuous progress of technological innovation, the advantages of Chinese small and medium-sized enterprises (SMEs) in global economic integration are becoming increasingly prominent(Song, 2022). Simultaneously, supporting China's policies in innovation and creation promotes the application and development of information technology. In 2022, the Shanghai National Accounting Institute compiled a list of the top ten information technologies influencing accounting professionals in China (as shown in Figure 1.1), among which next-generation ERP technology was included. The depth and breadth of the application of ERP systems in SMEs are steadily increasing(Alaskari et al., 2021). However, China's small and medium-sized enterprises (SMEs) face many challenges in their digital transformation. First, the proportion of companies undergoing this transformation is low(Yulianto et al., 2020). Currently, the number of companies in China undergoing digital transformation accounts for only about 25% of all enterprises, far lower than Europe's 46% and the United States' 54%. Second, the outcomes of these transformations could be more satisfactory. According to the "2019 China Enterprise Digital Transformation Index," only 9% of all enterprises have achieved significant results in digital transformation, with an average score of only 45 points. Despite many companies recognizing the urgency of transformation and investing substantial funds in upgrades, industry survey data indicates that over 9 0% of companies need help to achieve significant results in their transformation efforts(Saleem et al., 2020). Properly guiding the digital transformation of small and medium-sized enterprises has become an urgent and crucial task. The progress of China's SMEs is ongoing, but a gap remains in becoming an economic powerhouse, requiring continuous enhancement of enterprises' capabilities in information technology innovation(Alsafi & Fan, 2020).

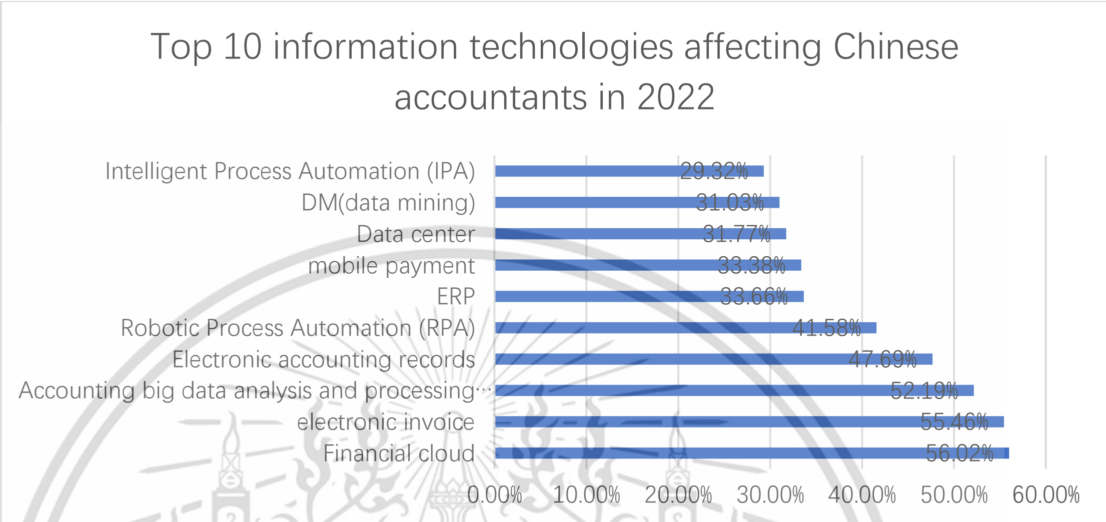


Figure1.1 Top 10 information technologies in China in 2022

Source: China National Radio Online, Image provided by Shanghai National Accounting Institute

The importance of Enterprise Resource Planning (ERP) systems has been widely recognized in the literature.(Abdelghaffar, 2012) Explored the advantages of ERP systems in decision support, highlighting their potential benefits beyond transaction processing. Among various studies, the implementation of ERP systems in Small and Medium-sized Enterprises (SMEs) has become a focal point. (Alaskari et al., 2021) emphasized the importance of situating small businesses' environmental practices within the context of national policy arrangements to address performance barriers. (Wu & Wang, 2007) explored the impact of management consultants on ERP system implementation in SMEs, emphasizing the role of negotiation and interaction between internal managers, consultants, and project members.(Yulianto et al., 2020) discussed the process of ERP implementation and business process re-engineering in Chinese SMEs, noting the chaos that can result from project drift. Innovation has been identified as a key factor in the success of SMEs, with (Awan et al., 2021) discussing the importance of promoting innovation and investing in research and development. (Yulianto et al., 2020) Investigated the determinants of supply and demand for trade credit in micro, small, and medium-sized enterprises, highlighting the factors influencing financial decisions in these organizations. (Yasiukovich & Haddara, 2020) studied the adoption of Software as a Service (SaaS) ERP systems in SMEs, identifying factors such as software fit to the business and vendor support as key determinants. The study (Jo & Bang, 2023a) focused on the moderating role of environmental uncertainty in ERP adoption in SMEs, emphasizing the influence of external forces and environmental factors on technology adoption decisions.

Despite the many advantages of ERP systems in the management of Small and Medium-sized Enterprises (SMEs), they have not yet been widely adopted by SMEs for management purposes. The barriers include issues such as the influence of corporate culture, the quality of ERP systems, employee acceptance, and the data processing capabilities of ERP systems. To explore these factors, this study uses the "TOE and IS D&M" model for analysis, incorporating the TTF theory and self-efficacy theory. The research comprehensively examines the various factors affecting the use of ERP systems in Chinese SMEs, as ERP systems have not been widely adopted in these enterprises, and many still rely on traditional management methods. Therefore, this study makes an important contribution to promoting the adoption of ERP systems in Chinese SMEs for management.

1.2 Research Problems

Enterprise Resource Planning (ERP) systems have become essential tools for modern enterprises to enhance their management processes. The benefits of ERP systems to enterprise management have been widely studied in the literature. Yasiukovich et al. (Yasiukovich & Haddara, 2020) conducted a case study on legacy system migration in New York State Agencies, highlighting the complexities involved in the process, including business process management, technical and financial project feasibility, cost-benefit analysis, consultant management, and ERP implementation. Salim(Salim et al., 2015) provided a brief review of current literature on ERP implementation across various industries, discussing applications in public places, government offices, and industries, and reviewing four important ERP-related cases. Hossain et al.(L. Hossain & Shakir, 2001) emphasized the concept of a successful IT investment initiating a "virtuous cycle," suggesting that companies that successfully implement IT respond by investing in more IT. Faasen et al. (Faasen et al., 2013) conducted an empirical study on the benefits of enterprises using ERP systems, analyzing the benefits through a questionnaire survey. Salim et al. (Salim et al., 2015) analyzed the effectiveness of ERP implementation at a plantation company in Indonesia, identifying criteria affecting ERP implementation based on literature and expert interviews. These studies collectively demonstrate the significant benefits of ERP systems to enterprise management, including improved efficiency, cost-effectiveness, and enhanced decision-making processes.

However, despite the efficiency, cost benefits, flexibility, effectiveness, and timeliness that ERP systems bring to enterprise management, some key issues still exist in their use within small and medium-sized enterprises (SMEs) in China.

The first key problem that small and medium-sized enterprises (SMEs) face when implementing Enterprise Resource Planning (ERP) systems is the lack of a scientific and reliable method for selecting ERP software(Xulu et al., 2020). There is a wide range of ERP products available in the market, but traditional evaluation methods may not be precise or complex enough to ensure an objective and scientific selection process. Furthermore, the inherent business models of ERP systems may not always align with the specific needs of niche market companies, posing a significant challenge for their adoption (Salim et al., 2015).

The second problem concerns the attitudes and measures taken by the enterprise itself towards using ERP. The impact of top management teams on the performance of SMEs adopting commercial open-source ERP systems has been emphasized, highlighting the assimilation process and its effect on company performance (Haji Salum & Abd Rozan, 2016). To increase the chances of successful ERP system implementation in SMEs, businesses must build realistic business cases using a proposed framework (Lewandowski et al., 2013). However, there is currently a lack of research and guidance on how SMEs can prepare effective business cases for ERP adoption.

The third problem is the significant influence of external forces and environmental factors on ERP usage in SMEs. Social capital and individual factors play an important role in influencing knowledge-sharing behavior (L. Hossain & Shakir, 2001). Additionally, environmental uncertainty has been studied in Jordanian SMEs, highlighting its moderating role between institutional pressures and ERP adoption, emphasizing the importance of external forces and environmental factors in shaping ERP adoption decisions (Ling et al., 2012).

Another key problem is the lack of expertise and training required to use ERP systems. ERP systems require specialized knowledge and computer skills to prepare data entry and transfer, which in some cases also involves data processing. Some employees lack these skills, hindering their ability to learn how to use the system (Yasiukovich & Haddara, 2020). Additionally, to use ERP systems, employees need access to computers and the internet. In some SMEs, the inability to provide essential infrastructure for all employees can affect the adoption and use of ERP systems (Awan et al., 2021).

Overall, there is limited research on the factors influencing the use of ERP systems in Chinese SMEs. This study aims to address the aforementioned issues and fill the research gap by investigating the factors that affect the adoption of ERP systems in Chinese SMEs. Further research and guidance are crucial to resolving these challenges and enhancing the successful adoption and utilization of ERP systems in SMEs.

1.3 Research Questions

This study aims to address the background and significant research questions by proposing the following research questions:

RQ1: How does implementing ERP systems influence the operational efficiency and performance of SMEs in China?

RQ2: What roles do organizational factors (such as leadership support and resource allocation) and environmental factors (like competitive pressure and technological change) play in ERP adoption and use among Chinese SMEs?

RQ3: How do user satisfaction, system quality, and user self-efficacy impact the long-term success and continued use of ERP systems in SMEs?

1.4 Study Objectives

The main objectives of this empirical study can be categorized into three major parts:

1. The first objective is to empirically determine the influence of organizational structure and environment on ERP system use. Additionally, it aims to assess the impact of ERP system quality, information quality, and service quality on both the utilization of ERP systems by small and medium-sized enterprises and the satisfaction of system users.

2. The second objective of this study is to empirically establish whether the utilization of ERP systems by small and medium-sized enterprises and user satisfaction with the system have a moderating effect on enhancing the performance of these enterprises.

3. The third objective of this study aims to develop an information system success model for enhancing the performance of small and medium-sized enterprises in China, thereby gaining a competitive advantage in the market.

1.5 Research Scope

Population: The scope of the study consists of small and medium-sized enterprises (SMEs) registered in the Public Service Demonstration Platform of the Ministry of Industry and Information Technology of the People's Republic of China in Jiangsu Province. These SMEs are either currently using information systems for enterprise management or are planning to do so.

Study Variable: The variables in this study are classified into types: exogenous latent and endogenous latent, using a type interval rating scale.

a) Exogenous latent variables include observable variables:

The organization, consisting of three observable variables

Environment, composed of three observable variables

Task characteristic, consisting of three observable variables

Task-technology fit, consisting of three observable variables

Human self-efficacy,   consisting of three observable variables

System Quality is composed of three observable variables

Information Quality, consisting of three observable variables

Service Quality is composed of three observable variables

b) Mediating latent variables include:

ERP use consists of three observable variables

User Satisfaction: comprising three observable variables

c) Endogenous latent variables include observable variables:

SME performance, comprising three observable variables

The scope of the study consists of small and medium-sized enterprises (SMEs) registered in the Public Service Demonstration Platform of the Ministry of Industry and Information Technology of the People's Republic of China in Jiangsu Province. These SMEs are either currently using information systems for enterprise management or are planning to do so.

1.6 Research contributions

The benefits of this empirical study can be divided into two main parts:

1. This study will help explain the use of information technology in small and medium-sized enterprises, thereby expanding the understanding of the Information System Success Model and its application in these enterprises.

2. From an academic perspective, this study holds significant importance as it helps confirm the appropriate application of the Information Technology Success Model in explaining the interrelationships between system quality, information quality, service quality, system usage, user satisfaction, and enterprise performance. Hence, this study will expand the theoretical knowledge of corporate information technology. It extends the literature on enterprise management and information technology while providing a comprehensive viewpoint on the correlation between information technology and performance in small and medium-sized enterprises.

1.7 Definition

This research defines the following key terms as follows:

1.7.1 ERP

ERP (Enterprise Resource Planning) is an integrated management system designed to consolidate a company's resources—such as human resources, finance, production, sales, and inventory—into a unified information platform for management and control. An ERP system centralizes the data from various business departments through information technology, enabling cross-departmental information sharing and workflow collaboration. This enhances operational efficiency, optimizes resource allocation, reduces costs, and provides rapid decision support for the enterprise.

1.7.2 Small and Medium-Sized Enterprises (SMEs)

Small and medium-sized enterprises (SMEs) are, in fact, a collective term for both medium-sized enterprises and small-sized enterprises. In all industries, except for the retail sector, the lower threshold for categorizing a business as a medium-sized enterprise is typically set at a yearly revenue or sales turnover of 30 million RMB. The retail industry's threshold is often set at 10 million RMB.

1.7.3 Organization

The organizational factors are descriptive and directly associated with the availability and utilization of ERP systems. The information system framework considers enterprise size and scale issues, social impact, individual differences, organizational mission, senior management, available expertise, product offerings, organizational culture, ownership structure, facilitating conditions, information sources, and communication channels.

1.7.4 Environment

Environmental changes must be anticipated, monitored, evaluated, and incorporated into organizational decision-making because they often signify fundamental changes in resource requirements, even though the company's resources and core competencies may take time to adjust. ERP systems' technical and strategic aspects are equally important in creating competitive advantages in a dynamic environment.

1.7.5 Human Self-Efficacy

The belief is that an individual can successfully use an ERP system to achieve business and task outcomes.

1.7.6 System Quality

A measure of the information system itself. These measures typically focus on the usability and performance characteristics of the assessed system.

1.7.7 Information Quality

The expected characteristics of information system outputs.

1.7.8 Service Quality

Represents the quality of support users receive from the information system department and IT support staff.

1.7.9 System Use

Represents the extent and manner in which users engage with the information system.

1.7.10 User Satisfaction

Refers to the level of satisfaction users experience while utilizing the information system. It is considered one of the most critical metrics for measuring information system success.

1.7.11 SME Performance

The benefits of small and medium-sized enterprises (SMEs) constitute the extent to which information systems contribute to stakeholders' success in the enterprise.

1.7.12 Task characteristic

Task characteristics refer to the attributes and features of a task. They describe the requirements and impact of the task on individuals or teams during its execution.

1.7.13 Task-technology fit

Task-Technology Fit (TTF) refers to the degree of alignment between information technology's characteristics and a task's requirements.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section provides a literature review for the current study. It encompasses reviewing prior literature relevant to the research topic and the theories underpinning the study. The first part discusses ERP systems in China and their related concepts. The second part examines the current status of ERP applications in Chinese SMEs. The third part reviews Delone and McLean's Information Systems Success Model, the Technology-Organization-Environment framework, and the Self-Efficacy theory, which are the theoretical foundations of this study. The following part explores the concepts and theories upon which the research is built. Subsequently, the section discusses the relationships between the research constructs and presents the conceptual framework.

2.2 ERP Systems

2.2.1 ERP Concepts

Enterprise Resource Planning (ERP) systems are comprehensive software packages comprising a set of standard functional modules (production, human resources, sales, and finance) integrated by suppliers. They can be adapted to specific customer needs(Yulianto et al., 2020). Figure2.1 illustrates the key modules typically found in ERP systems

Figure 2.1 Key enterprise resource planning modules

Source: https://www.softwaresuggest.com/blog/erp-system-modules/

The significance of ERP for the development of enterprises is substantial. According to Cui Xuran(Abdelghaffar, 2012), implementing ERP can significantly enhance enterprises' material and financial management levels. By reducing raw materials and spare parts inventory, ERP systems enable companies to minimize inventory and reduce production costs. By managing planned value projects and other aspects, ERP systems can shorten the time of existing capital occupation, increase capital turnover, and maximize the economic benefits of enterprises. ERP integrates the processes of finance, HR, production, supply chain, services, procurement, and more into a single system, thereby maximizing resource utilization efficiency. Implementing ERP can help companies fulfill customer orders promptly and efficiently, including procurement, production, and sales. Based on specific circumstances related to orders and production processes, adjustments and optimized decisions can be made to enhance enterprises' operational and managerial efficiency (Yulianto et al., 2020).

2.2.2 Development and Evolution of ERP Systems

Although ERP systems are often considered products of the 1990s, their development can be traced back to the 1960s. They started with non-integrated custom inventory control packages and then transitioned to Material Requirements Planning (MRP) software in the 1970s, with minimal integration(Wu & Wang, 2007). From there, an upgraded version called MRP II was developed in 1980, featuring more integration, and later evolved into fully integrated software packages known as ERP systems in the 1990s. ERP systems are evolving towards ERP II, including internal and external integration within organizations (Bharadwaj, 2000). The table provided by Shakir and Hossain(Shakir, 2001) illustrates the changes in broadening the expected user categories, encompassing factory managers and supervisors, end users, and external stakeholders.

The development of ERP systems has undergone five stages: the Order Point Inventory Management stage, the Basic ERP stage, the Closed-Loop MRP stage, the MRPII stage, and the ERP stage. The formation of ERP theory (Bharadwaj, 2000) has been associated with the increasing complexity of enterprise products, intensifying market competition, and the globalization of information systems. It aims to achieve comprehensive balance and optimization management of various resources within an enterprise, including human resources, financial resources, physical resources, information, time, and space.

Table 2.1 The Evolution of ERP Systems

System	Year	Focus	Users
IC	1960's	Inventory control is based on traditional inventory concepts.	-Plant -Managers

System	Year	Focus	Users
			-Supervisory staff
MRP	1970's	A high-level scheduling, priority, and capacity management system is built around a bill-of-material process in a manufacturing environment.	-Plant managers -Supervisory staff
IMRPII	1980's	An extension of MRP to the shop floor and distribution management activities is needed.	-Plant managers -Supervisory staff
ERP	1990's	MRP U was further extended to cover areas like Engineering, Finance, Human Resources, Projects Management, etc.(i.e., the complete set of activities within a business enterprise),	-Managers -Supervisory staff -End-users
ERP II	2000's	Most ERP systems enhance their products to become `Inter-organizational* and Internet Enabled°. New modules are added to the product portfolio, i.e., CRM, SCM, Data warehousing, and Al.	-Mira, as well as extra-organizational stakeholders (suppliers, customers, partners)

Source： Adapted from Shakir & Hossain, 2002:225(L. Hossain & Shakir, 2001)

As shown in the table above, the level of integration, both within and outside the organization, has shifted from minimal or no integration to complete integration. This implies that previously isolated information systems have been integrated to provide a comprehensive information resource(L. Hossain & Shakir, 2001). This also means that when organizations choose to implement ERP, there will be a fundamental shift in how they use information systems. Some argue that these changes are driven by technological advancements, moving from two-tier to three-tier mainframes, blending centralized and distributed architectures, including internet networks, especially with improved ERP II versions(L. Hossain & Shakir, 2001). The organization's focus has shifted from a single-department perspective limited to traditional inventory concepts to an inter-organizational and multi-faceted perspective(L. Hossain & Shakir, 2001). This encompasses product management, customer relationship management, supply chain management, data warehousing, and artificial intelligence (L. Hossain & Shakir, 2001).

2.2.3 Main Functions of ERP Systems

Nowadays, there is a multitude of suppliers for ERP systems. Due to the distinct styles and focal points of each vendor's products, there are differences in the module structures of their ERP products; the ERP module is shown in Figure 2.2. By analyzing various ERP systems, we can identify the fundamental functions common to ERP systems: production control, logistics management, financial management, and human resources management. The primary functions of ERP systems are illustrated in the following diagram(Alaskari et al., 2021).

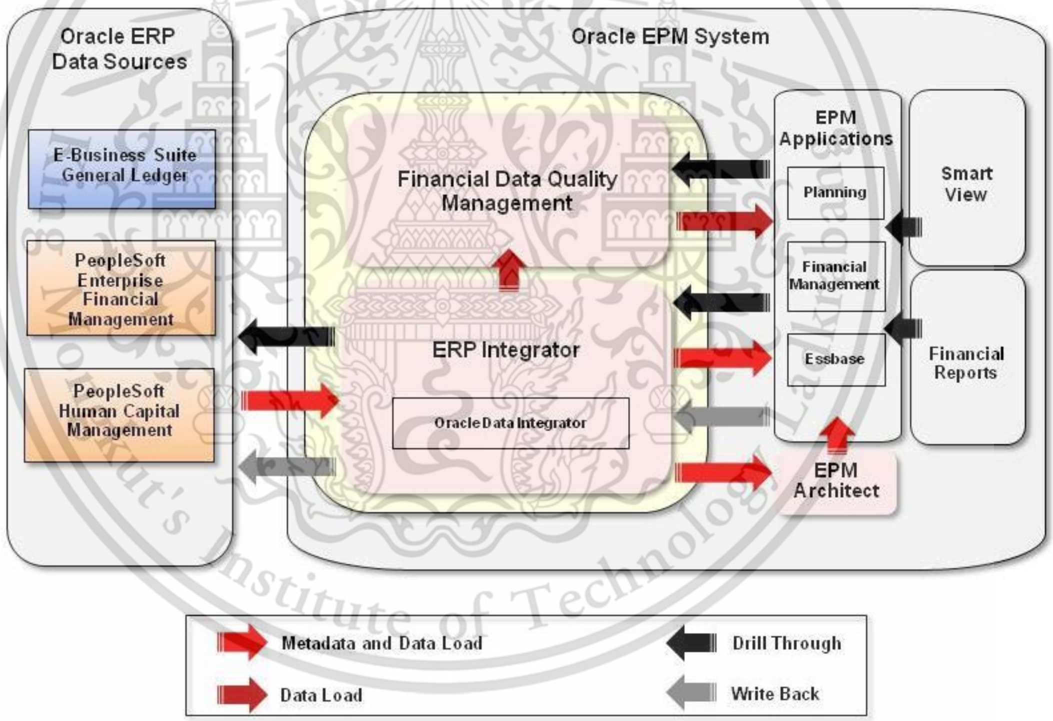


Figure 2.2 ERP System Functionality Diagram

Source：https://images.app.goo.gl/eXt41kKTvKsHejff7

The software components of an ERP model are the most visible components to users and are considered ERP products. It includes several standard modules, as shown in Figure 2.3, some of which are listed as follows(Alaskari et al., 2021):

(1) Financial: The financial module is typically the backbone of an ERP system. It encompasses general ledger, accounts receivable, accounts payable, fixed assets, and inventory

control financial cost accounting module(Ling et al., 2012).

(2) Human Resources (HR): Human Resources is a component of the ERP system. HR automates human resource management processes, including payroll, recruitment, business travel, and leave allocation. It focuses on automating HR tasks from the employer's perspective(Ling et al., 2012). The emphasis of management functions is on empowering employees to manage their employment conditions. Tedious tasks, such as assigning vacation days to employees, can be predetermined and allocated to employees. Payroll is typically integrated with the financial module, handling all accounting issues and check preparation related to employee salaries, wages, and bonuses(Ling et al., 2012).

(3) Supply Chain Management (SCM): SCM involves the supervision of materials, information, and finances throughout the process from suppliers to manufacturers, wholesalers, retailers, and ultimately to consumers (Power, 2005). SCM involves coordinating and integrating these flows within and between companies.

The SCM flow can be divided into three main processes:

- Product flow;
- Information flow and
- Financial flow.

The product flow involves the movement of goods from suppliers to customers and any customer returns or service needs. Information flow includes the transmission of orders and updates on delivery status. Financial flow includes credit terms, payment schedules, consignment, and ownership arrangements(Ling et al., 2012).

(4) Supplier Relationship Management (SRM): With increasing dependence on contractors and suppliers for materials, logistics, and manufacturing capabilities, managing these relationships becomes crucial. To maximize profitability, companies must be able to select appropriate suppliers quickly, establish strategic relationships, and collaborate effectively with them to achieve business objectives. Supplier Relationship Management (SRM) describes the practices needed to develop extended interactions with product and service suppliers. SRM enables companies and their suppliers to collaborate in strategic procurement and purchasing while managing the entire process from an enterprise-wide perspective(Vukosavic & Stefanovic, 1991).

(5) Customer Relationship Management (CRM): CRM refers to a set of methods, software, and terms that typically include internet capabilities, helping businesses manage customer relationships in an organized and efficient manner (Harsono, 2014). Companies establish a database about their customers. This database describes various relationships with sufficient detail so that management, sales representatives, and customer service agents can access information, match customer needs with product plans and offerings, remind customers about

service needs, and understand other products the customer has purchased.

(6) Business Intelligence (BI): BI applications are decision-support tools that provide real-time, interactive access to critical business information for analysis and manipulation (Lim et al., 2013). Users can access and leverage vast information, analyze relationships, and understand trends supporting business decisions. These tools prevent the potential loss of internal knowledge due to accumulating large-scale information, which may not be easily accessible or available in usable forms(Lim et al., 2013).

The different software components of ERP systems clearly illustrate that ERP is not just a financial system but includes elements such as CRM and SCM.

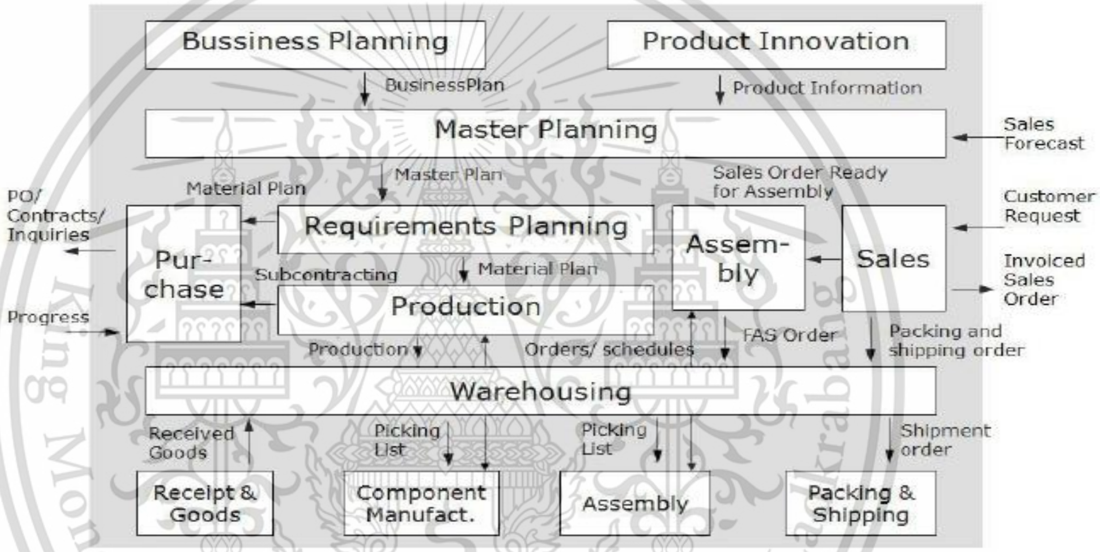


Figure 2.3 ERP System Functionality Structure Diagram

Source: Spectrum Software(https://www.fanpusoft.com/)

2.2.4 Reasons for implementing ERP system

The implementation of ERP systems has become a key strategic decision for many organizations, primarily driven by operational, financial, and strategic motivations. One core reason for implementing ERP systems is to streamline business processes and improve operational efficiency. ERP systems integrate various business functions, such as accounting, inventory management, and human resources, into a unified system, eliminating redundancies and reducing errors caused by manual data entry(Abdelghaffar, 2012). The automation of processes significantly boosts productivity, which is crucial for maintaining competitiveness in the market (Yulianto et al., 2020).The reasons for implementing enterprise management software vary significantly. Literature primarily points to reasons related to technological, operational, and organizational aspects (Awan et al., 2021). Implementing ERP systems makes companies more efficient, eliminates redundancies, and enhances productivity and management effectiveness. The key features of modern ERP systems include real-time pervasion, automation, and integration of organizational data and business processes (Jo & Bang, 2023a). Moreover, these systems can improve management decisions and operations (Ahn & Ahn, 2020). According to Almajali (Almajali et al., 2022), "One of the main reasons companies implement ERP is the need for accurate and timely accounting information, optimizing company processes, and the potential to share information across all areas of the organization." Therefore, information management is crucial in today's competitive market(Yulianto et al., 2020).

Another key reason for implementing ERP is the desire to improve decision-making quality and provide real-time access to critical business data. By centralizing data and providing analytical tools, ERP systems enable managers to make informed decisions quickly, facilitating better strategic planning and resource allocation (Valdebenito & Quelopana, 2019). This capability is especially important in fast-changing industries, where timely and accurate information is crucial to responding to market fluctuations.

In addition, ERP systems help organizations comply with industry regulations and standards, ensuring the consistency and standardization of financial data. This is particularly important in industries with strict compliance requirements, such as manufacturing and finance, where maintaining accurate records is vital for compliance audits (Yasiukovich & Haddara, 2020). The scalability of ERP systems is also a significant factor in their adoption. As businesses grow, they often face increased operational complexity. ERP systems offer scalability, allowing companies to add new modules or features as needed without disrupting existing operations(Xulu et al., 2020).

Finally, ERP systems improve customer satisfaction by better managing inventory, order processing, and delivery. Real-time tracking and integrated communication capabilities help businesses deliver better service to customers, thereby increasing customer loyalty(Yasiukovich & Haddara, 2020).

In conclusion, the reasons for implementing ERP systems are multifaceted, including streamlining operations, improving decision-making quality, ensuring compliance, supporting growth, and enhancing customer satisfaction. These benefits make ERP systems strategically important in modern enterprises.

2.2.5 Benefits of ERP use

The implementation of ERP systems offers a wide array of benefits for organizations across different industries. ERP systems are designed to integrate various business functions, streamline processes, and enhance data visibility. These benefits are particularly evident in several key use cases across manufacturing, retail, healthcare, and service industries.

In the manufacturing sector, ERP systems help optimize production planning and control. By integrating functions such as inventory management, procurement, production scheduling, and quality control, ERP systems ensure that materials are available when needed, production processes are efficient, and products meet quality standards. For instance, in a case study of a manufacturing firm, ERP enabled real-time tracking of production lines, resulting in better resource utilization, reduced lead times, and improved product traceability (Yasiukovich & Haddara, 2020). ERP systems also provide predictive analytics, allowing companies to forecast demand and adjust production schedules accordingly, thus minimizing waste and enhancing customer satisfaction through timely deliveries (Valdebenito & Quelopana, 2019).

In the retail sector, ERP systems are employed to improve inventory management and optimize supply chain operations. Retailers benefit from the real-time tracking of inventory levels across multiple locations, which ensures that stockouts are minimized and overstocking is avoided. Additionally, ERP enables accurate order processing and fulfillment by automating tasks such as order entry, billing, and shipping (Almajali et al., 2022). Retailers can also leverage ERP systems to enhance customer relationship management (CRM) by gathering data on customer preferences, purchase patterns, and service interactions, thus improving personalized marketing efforts and customer loyalty(Xulu et al., 2020).

In healthcare, ERP systems are increasingly used to streamline administrative and clinical operations. Hospitals and healthcare providers integrate their patient management(Lewandowski et al., 2013), billing, procurement, and human resources functions into a unified system. ERP systems help ensure that patient data is accurately recorded, enabling better decision-making in patient care. They also facilitate the management of medical supplies and equipment, ensuring timely procurement and reducing stockouts or overstocking, which is crucial for maintaining continuous operations in hospitals(Seethamraju, 2015).

In the service sector, ERP systems are used to manage projects, human resources, and customer service. Service organizations, such as consulting firms or IT service providers, utilize ERP to track billable hours, manage client projects, and allocate resources efficiently. By automating scheduling and time-tracking functions, ERP reduces administrative burden, allowing employees to focus on high-value tasks. ERP also supports financial management by integrating budgeting, accounting, and reporting functionalities, which provide real-time insights into the organization's financial health (Wu & Wang, 2007).

ERP systems provide a solution that addresses a wide range of challenges across different industries. By integrating business functions and automating workflows, they enhance operational efficiency, support better decision-making, and improve overall organizational effectiveness. Whether in manufacturing, retail, healthcare, or service sectors, the use of ERP systems offers significant advantages, including improved resource management, cost reduction, enhanced customer satisfaction, and streamlined operations.

2.3 Chinese Small and Medium-sized Enterprises

2.3.1 The Definition of SMEs

Compared to small and medium-sized enterprises (SMEs) in developed capitalist countries, SMEs in China are more diminutive and exhibit different characteristics. In the practice of social recognition and formulating supportive policies, there are two broad definitions for SMEs: a broad definition that includes all enterprises except those officially recognized as large enterprises, encompassing medium-sized, small, and micro-enterprises, and a narrow definition that excludes micro-enterprises from the broad category of SMEs(He et al., 2020).

The Law of the People's Republic of China on the Promotion of Small and Medium Enterprises also defines small and medium enterprises, as shown in Table 2.2. However, there still needs to be more clarity on the number of employees, sales, total assets, and other indicators, and these criteria still need to be disclosed. The definition of SMEs in this law only considers the tangible resources of enterprises. It does not consider intangible resources, such as the management level of the enterprise and whether the enterprise possesses core technology and independent intellectual property rights(He et al., 2020). Despite these limitations, the definition provided by the "People's Republic of China SME Promotion Law" remains the most detailed. In this context, when referring to SMEs in this article, it aligns with the definition in the law.

Table 2.2: Definition of SMEs in China

Industry	Category	Revenues	Employee
Agriculture, forestry, animal husbandry and fishery	Medium-sized Enterprise	¥20,000,000 —¥5,000,000	——
	Small Enterprise	¥5,000,000—¥500,000	——
Industrial Designer	Medium-sized Enterprise	¥400,000,000 —¥20,000,000	1000 —300
	Small Enterprise	¥20,000,000 —¥3,000,000	300—20
Construction enterprise	Medium-sized Enterprise	¥800,000,000 —¥60,000,000	——

Industry	Category	Revenues	Employee
	Small Enterprise	¥60,000,000 — ¥3,000,000	——
Retail trade	Medium-sized Enterprise	¥400,000,000 — ¥50,000,000	200—20
	Small Enterprise	¥50,000,000 — ¥10,000,000	20—5
Retail industry	Medium-sized Enterprise	¥200,000,000 — ¥5,000,000	300—50
	Small Enterprise	¥5,000,000 — ¥1,000,000	50—10
Transportation industry	Medium-sized Enterprise	¥300,000,000 — ¥20,000,000	1000-300
	Small Enterprise	¥20,000,000 — ¥2,000,000	300-20
Warehousing industry	Medium-sized Enterprise	¥300,000,000 — ¥10,000,000	200-100
	Small Enterprise	¥10,000,000 — ¥1,000,000	100-20
Mail business	Medium-sized Enterprise	¥300,000,000— ¥200,000,000	1000— 300
	Small Enterprise	¥200,000,000— ¥1,000,000	300—20
Hotel industry	Medium-sized Enterprise	¥100,000,000— ¥20,000,000	300-100
	Small Enterprise	¥20,000,000— ¥1,000,000	100-10
Catering industry	Medium-sized Enterprise	¥100,000,000— ¥10,000,000	300-100
	Small Enterprise	¥60,000,000—	100-10

Industry	Category	Revenues	Employee
		¥3,000,000	
Information transmission industry	Medium-sized Enterprise	¥100,000,000—¥10,000,000	2000-100
	Small Enterprise	¥1,000,000—¥1,000,000	100-10
Software and information technology services	Medium-sized Enterprise	¥100,000,000—¥10,000,000	300-100
	Small Enterprise	¥10,000,000—¥500,000	100-10
Real estate development and management	Medium-sized Enterprise	¥2,000,000,000—¥10,000,000	——
	Small Enterprise	¥10,000,000—¥1,000,000	——
Property management company	Medium-sized Enterprise	¥50,000,000—¥10,000,000	1000—300
	Small Enterprise	¥10,000,000—¥5,000,000	300—100
Leasing and business service	Medium-sized Enterprise	¥1,200,000,000—¥80,000,000	300-100
	Small Enterprise	¥80,000,000—¥1,000,000	100-10
Other	Medium-sized Enterprise	——	300-100
	Small Enterprise	——	100-10

Note: Other industries not specified (including scientific research and technical services, water conservancy, environment and public facilities management, residential services, repair and other services, social work, culture, sports and entertainment, etc.)

Source: Document No. 300 of the Ministry of Network Industry and Information Technology of the Central People's Government of the People's Republic of China (2011)(He et al., 2020)

2.3.2 The Importance of Small and Medium-sized Enterprises (SMEs)

The employment potential and long-term economic growth contribution of small and medium-sized enterprises (SMEs) have been historically overlooked, with many scholars emphasizing the mechanisms of large enterprises (Saleem et al., 2020). However, recent research has focused more on the benefits brought by SMEs. SMEs are increasingly recognized as a significant component of the global business inventory. It is suggested that SMEs have become primary contributors to new employment, innovation, productivity, utility, and economic growth in developing (Kongolo, n.d.)and developed economies (Isaac et al.,2021), attracting more attention from scholars and policymakers.

One of the most frequently mentioned benefits of SMEs is the creation of job opportunities. Generally, SMEs constitute over 99% of all enterprises, creating over 50% of employment positions (Isaac et al.,2021). For instance, Behrouzi (Song, 2022) points out that SMEs generate employment and new job patterns. Relative to their size, small and young enterprises create more job opportunities than their counterparts(He et al., 2020; Song, 2022). As mentioned in the introduction, according to 2005 statistics, SMEs provided approximately 75 million jobs in the European Union, accounting for 66% of total employment. Furthermore, it is noteworthy that 93.2% of SMEs in the EU are small enterprises with fewer than ten employees (Ahmed et al., 2021). Surprisingly, during the period from 1988 to 2001, while large enterprises were losing jobs, SMEs experienced an increase in employment. During economic recessions, SMEs exhibited a slightly lower employment reduction rate than large enterprises (Varum & Rocha, 2013).

It is essential to emphasize that the contribution of SMEs to employment can be comparable to that of large enterprises only when both small and medium-sized enterprises are considered together (He et al., 2020; Song, 2022). Small enterprises, however, still play a crucial role in job creation, as they generate most new job opportunities.

As of 2021, the number of SMEs in China has reached 48.81 million, showing an 8.5% growth compared to the previous year, as shown in Figure 2.4. The fastest-growing sectors for SMEs include professional services and wholesale retail. The distribution of SMEs (excluding those with fewer than ten employees) across industries is uneven, with over 70% of SMEs concentrated in professional services (including internet and technology services), logistics, wholesale, retail, and manufacturing. In contrast, the number of SMEs in telecommunications, finance, education, transportation, and public utilities is less than 10%. Additionally, SMEs are unevenly distributed geographically, with the majority located in the southeast coastal regions. Among them, the SMEs in the Jiangsu, Zhejiang, and Shanghai postal zones rank first.

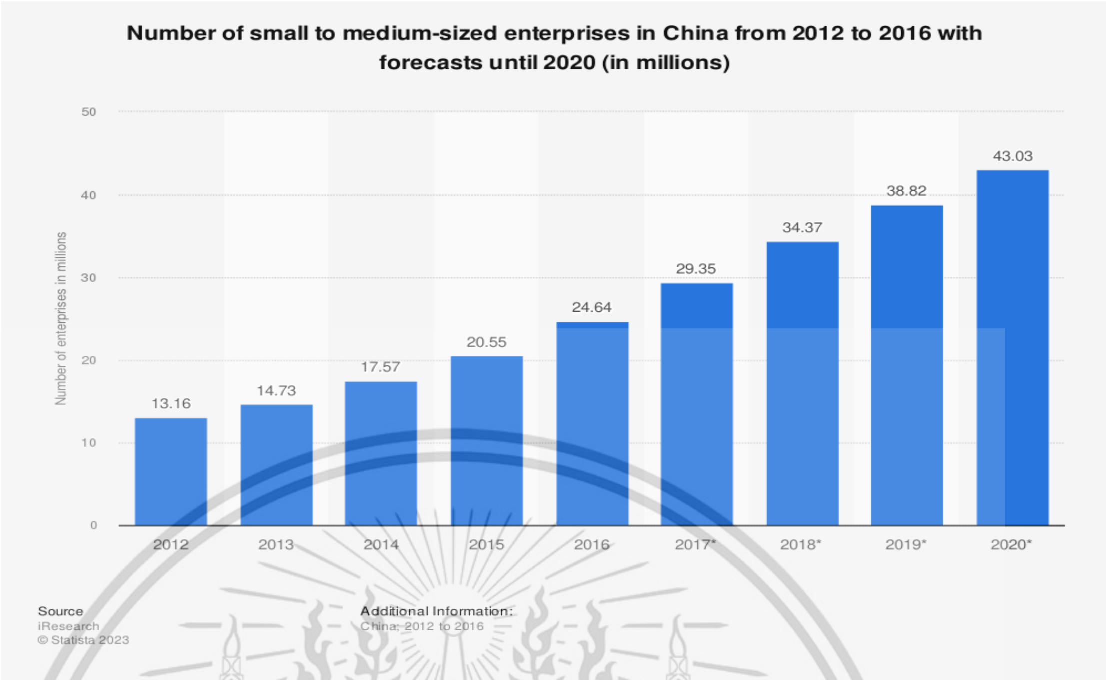


Figure 2.4 Number of Chinese SMEs

Source: iResearch@statista 2023(https://www.statista.com/statistics/783899/china-number-of-small-to-medium-size-enterprises/)

Small and medium-sized enterprises (SMEs) are crucial because they contribute a substantial share of the Gross Domestic Product (GDP) (Jones et al., 2007). Although estimating the exact contribution of SMEs to GDP is challenging, it is generally believed to range between 30% and 60% of the GDP (Isaac et al.,2021). Hence, SMEs positively impact economic growth(Saleem et al., 2020).

Finally, some scholars have also mentioned the potential of SMEs to advance social development (Isaac et al.,2021). Specifically, under certain conditions, such as stable economic and employment growth, a positive relationship exists between SME development and local production systems, economic democracy, and collective welfare (Isaac et al.,2021). Under certain circumstances, SMEs exhibit the potential to advance economic democracy. Studies on developed countries, such as industrial zones in Italy, Baden-Wuttenberg in Germany, southwest Flanders in Belgium, and southeast Jutland in Denmark, have confirmed these views (Saleem et al., 2020).

2.3.3 Obstacles to implementing ERP in SMEs

China's small and medium-sized enterprises (SMEs) still have a relatively low level of digitization, with ICT (Information and Communication Technology) spending accounting for approximately 30% of total enterprise ICT spending in China. According to a survey by IDC

(Internet Data Center), about two-thirds of SMEs consider digitization very or relatively important for their companies. At the current stage, digital technologies have enhanced operational efficiency for SMEs and promoted the transformation of business models. However, in the actual digitization process, SMEs face challenges such as a lack of successful cases and inadequate IT infrastructure capabilities(Awan et al., 2021), and the reasons for implementation failure are shown in Figure 2.5.

1.Shortage of digital skills and talent within my company

In the process of implementing ERP systems, the lack of digital skills and talent is considered one of the most significant obstacles, accounting for the highest proportion at 17%. Studies indicate that the successful implementation of ERP systems depends on employees' understanding and proficiency in the system. However, many companies, especially small and medium-sized enterprises, have notable deficiencies in digital skills and technical talent. (Lewandowski et al., 2013) point out that the complexity of ERP systems requires employees to possess a certain level of technical background and digital operational skills; otherwise, inefficiencies and operational errors may occur. (Salim et al., 2015) found that in some companies, the lack of skilled personnel limits the effective use of ERP, further leading to communication barriers and delays in business processes.

2.Lack of necessary technologies to enable digitaltransformation

In the process of implementing ERP systems, the lack of necessary technologies to support digital transformation poses a significant challenge for many companies, accounting for 14% of the obstacles. Studies have shown that ERP systems require a solid technological foundation, including advanced IT infrastructure and digital tools that can support seamless integration and data flow across various business functions. However, many enterprises, particularly small and medium-sized businesses, face technology gaps that hinder the effective deployment of ERP systems (Abdelghaffar, 2012). For instance, outdated hardware, incompatible software, and insufficient network capacity often lead to system lags, operational inefficiencies, and limited functionality in ERP systems (Wu & Wang, 2007).

According to Almajali (Almajali et al., 2022), the absence of essential digital technologies restricts companies from utilizing ERP to its full potential, impacting data processing and real-time information sharing. Haji Salum et al.(Haji Salum & Abd Rozan, 2016)highlight that without an adequate technological base, ERP systems are less likely to support advanced applications such as big data analytics and process automation, which are critical for companies seeking to improve productivity and decision-making.

3.Lack of budget/commitment from management

The lack of budget or commitment from management is one of the common barriers to the implementation of ERP systems, accounting for 11%. Research indicates that the implementation of ERP systems not only requires substantial initial investment but also ongoing maintenance and support. However, many companies, especially small and medium-sized enterprises (SMEs), face budget constraints and are unable to allocate sufficient funds for this transformation process (Haji Salum & Abd Rozan, 2016). Additionally, the lack of strong commitment and support from management can lead to the failure or delay of ERP projects(Lewandowski et al., 2013).

Management's commitment and support are critical to the successful implementation of ERP systems, as they are responsible not only for approving funding but also for ensuring sufficient resources and guidance for the project team during implementation. Jo and Bang (Jo & Bang, 2023a) point out that if management does not have clear strategic goals or sufficient support, ERP projects are often unable to align with the company's overall objectives, resulting in issues such as budget overruns, delays, or suboptimal results (Salim et al., 2015). For example, ERP implementation requires collaboration and adjustment across multiple departments. Suppose management fails to provide adequate support in resource allocation and decision-making. In that case, it may lead to a lack of cooperation between departments, thereby affecting the effectiveness and final outcome of the system (Haji Salum & Abd Rozan, 2016).

4.Lack of insight into operational and customer data

Lack of insight into operational and customer data is another significant barrier to ERP system implementation, accounting for 11%. Many organizations, especially SMEs, face challenges in collecting and analyzing the vast amount of data generated through their operations and customer interactions. Without clear insights into this data, companies may struggle to make informed decisions regarding their ERP system selection, implementation, and optimization (Haji Salum & Abd Rozan, 2016).

ERP systems are designed to integrate various business functions and improve decision-making by providing real-time, accurate data. However, organizations that lack the necessary tools or strategies for data collection and analysis may fail to leverage ERP systems effectively (Salim et al., 2015). Furthermore, without a proper understanding of their operational and customer data, companies may struggle to define the right goals and key performance indicators (KPIs) for the ERP system, leading to misalignment between the system's capabilities and the company's needs (Wibowo & Sari, 2018). This lack of insight can result in underutilization of the system and hinder its full potential to improve operational efficiency and customer satisfaction (AlBar & Hoque, 2019).

5.Lack of proper digital transformation roadmap

The lack of a proper digital transformation roadmap is another common barrier to the implementation of ERP systems, accounting for 10%. A digital transformation roadmap provides businesses with a clear strategic plan and execution steps to ensure a smooth transformation process. However, many companies fail to create a comprehensive and clear digital transformation strategy when implementing ERP systems, resulting in a lack of direction and goals during the implementation process(H.-Y. Lin et al., 2006a).

Studies show that digital transformation involves not only the introduction of technology but also the full coordination of organizational structure, culture, processes, and technology (Ruivo et al., 2020). Without an effective roadmap, ERP implementation may become chaotic, lacking necessary adjustments and optimizations, and could even lead to resource wastage and project failure (Lakshmanan & Mehta, 2010). Additionally, the absence of a roadmap may cause companies to face challenges at different stages without strategies to address them, increasing risks and uncertainties during the implementation process (AlBar & Hoque, 2019).

6.Lack of digital mindset/cultural challenges in the organization

A lack of a digital mindset or cultural challenges within the organization is another common barrier to ERP implementation, accounting for 10%. A digital mindset involves not only the introduction of technology but also requires organizations to undergo profound changes in management concepts, work processes, and culture. However, many companies have yet to cultivate a mindset that supports digital transformation, leading to difficulties in managing technological change during ERP implementation, both for employees and management (Al-Johani & Youssef, 2013).

Studies show that digital transformation requires organizations to break traditional thinking patterns and promote cross-departmental collaboration and innovation (Wibowo & Sari, 2018). However, inherent cultural barriers within organizations may lead to resistance to new technologies and fear of change, with employees potentially feeling uncomfortable or lacking trust in the ERP system, which affects its acceptance and successful implementation(Lakshmanan & Mehta, 2010). For example, some employees may prefer to continue using old ways of working, resisting the introduction of new systems, which can result in poor communication and collaboration during the implementation process (Al-Johani & Youssef, 2013).

7.Cultural resistance to change

Cultural resistance to change is a significant barrier to ERP implementation, accounting for 10%. Organizational culture plays a crucial role in shaping employees' attitudes toward new technologies and processes. In many cases, employees are resistant to changes introduced by ERP systems due to fear of the unknown, discomfort with new workflows, or perceived threats to their job security (Haji Salum & Abd Rozan, 2016). This resistance is particularly common in organizations with a long-standing tradition of working with outdated systems or manual processes, where there may be a reluctance to adopt digital tools and standardized procedures (Awan et al., 2021).

Cultural resistance can manifest in various forms, including reluctance to embrace new software, lack of collaboration between departments, and low levels of enthusiasm for the transformation process. Research indicates that without addressing cultural resistance, ERP implementation projects can face delays, cost overruns, and lower overall success rates (Awan et al., 2021). For example, employees may resist the changes brought by ERP systems, such as new work practices and reporting requirements, leading to difficulties in system adoption and utilization (H.-Y. Lin et al., 2006a).

To overcome this barrier, organizations must foster a culture of change and innovation. Management should engage employees in the transformation process, provide adequate training, and communicate the benefits of the ERP system to ensure employees feel involved and confident in the new way of working. Successful ERP implementation often requires a change management strategy that addresses cultural resistance and promotes a positive mindset towards digital transformation(Yulianto et al., 2020).

8.Digital transformation is too big

Another obstacle faced by many businesses when implementing ERP systems is the perception that "digital transformation is too big" accounting for 9%. This issue is particularly prevalent in companies that have not yet fully digitized, especially in small and medium-sized enterprises (SMEs). For these businesses, digital transformation may appear to be a complex and overwhelming process, lacking clear implementation steps and strategies (Almajali et al., 2022). Due to the absence of a systematic digital transformation plan within the company, management often does not know where to begin, which can lead to delays or failure of the project (Faasen et al., 2013).

Many companies fail to recognize the gradual nature of digital transformation, and they hope to complete the entire transformation at once, which often leads to unrealistic expectations and project scope creep (Ruivo et al., 2020). Due to a lack of experience and expertise, business managers may struggle to effectively evaluate which processes should be prioritized for digitization or in which areas implementing ERP would provide the most value. This lack of direction often leaves businesses feeling confused during the transformation process, and may even lead them to abandon the attempt altogether.

9.Too expensive/not worth it in my industry

Another common barrier that many enterprises face when implementing ERP systems is the belief that "it is too expensive/not worth it in my industry," accounting for 9%. This perspective is often found in businesses that lack a clear understanding of the cost and return on investment (ROI) of ERP systems. Particularly in small and medium-sized enterprises or certain industries, companies may believe that the high costs of ERP systems do not provide enough value, especially when their business processes are relatively simple (Almajali et al., 2022). These enterprises may not have clear digital transformation needs or feel that their existing manual operations or decentralized systems are sufficient to support day-to-day operations. As a result, they are skeptical about the ROI of ERP systems, believing the improvements may not justify the substantial cost (H.-Y. Lin et al., 2006a).

Additionally, certain industries may find traditional ERP solutions less applicable, especially those with specific needs and smaller scales. In such cases, enterprise management may perceive ERP systems as overly complex and not suited to their business requirements (Haji Salum & Abd Rozan, 2016). For example, businesses in some industries may rely on more basic technologies or customized solutions and fail to see how an ERP system would add extra value, making the introduction of ERP systems seem like an unworthy investment.

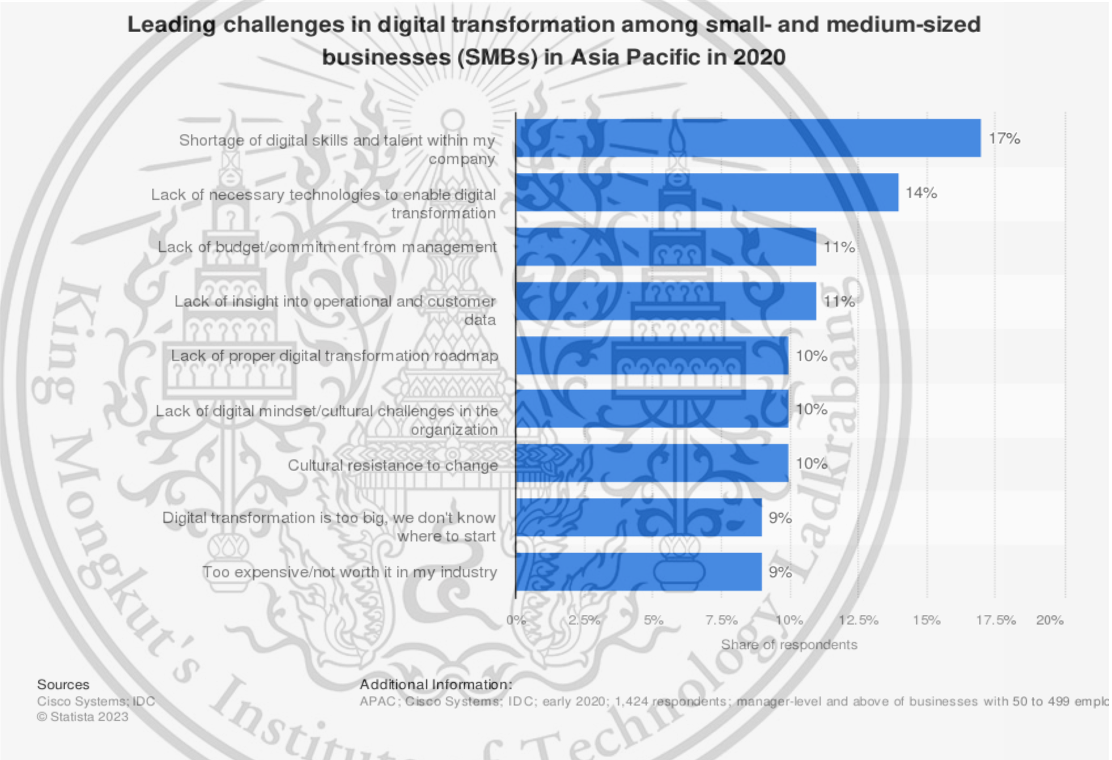


Figure2.5 Survey on Small and Medium-sized Enterprises (SMEs) in China – Challenges in Enterprise Digitalization (2020)

Source:iResearch@statista2023(https://www.statista.com/statistics/1223347/apac-top-challenges-in-digital-transformation-smbs/)

Data Center defines the future SMEs as ecosystems and technologically advanced organizations capable of expanding their survival and market adaptability to drive productivity, competitiveness, and sustained business growth. SMEs with promising future development will undoubtedly be data-driven, customer-centric, and highly automated and operate as innovative entities that continually practice and rapidly iterate to provide novel solutions(Yulianto et al., 2020).

1. Customization

Customization is considered one of the most significant barriers for small and medium-sized enterprises (SMEs) in adopting and implementing cloud ERP. Cloud ERP packages are typically standardized, and customization can become complicated, expensive, and time-consuming. Therefore, flexibility is crucial for both SMEs and cloud service providers during the ERP adoption process(Haji Salum & Abd Rozan, 2016). A case study conducted by (Varum & Rocha, 2013) revealed divergent views among SMEs regarding Software as a Service (SaaS) ERP. Two companies involved in the case study regarded it as a permanent solution. At the same time, two other organizations viewed it as a temporary workaround to be later replaced by a locally customized solution. Consequently, limitations on customization in cloud ERP systems may hinder SMEs from implementing such systems, especially if they plan to expand into more complex ERP operations. Choosing an inappropriate cloud ERP package can impact the adoption process, including the timeline, budget, goals, and success. Implementation may require extensive customization for SMEs if the selected package does not meet their needs and requirements (Yulianto et al., 2020). Providing a standard cloud ERP platform for all SMEs may introduce customization barriers for system suppliers (Haji Salum & Abd Rozan, 2016). As demonstrated by the case study (Seethamraju, 2015), limitations on customization opportunities have created tension between suppliers and adopters, necessitating consultants to address these issues to meet the demands of dissatisfied company managers. It is worth noting that, for suppliers, simple customization is easier to achieve than requests for more complex modifications (Al-Johani & Youssef, 2013). Although (Gupta et al., 2015) and ((Lewandowski et al., 2013)agree that customization is a significant challenge in providing standardized applications in cloud ERP for all users, the authors argue that this challenge may not be as critical for SMEs as it is for large enterprises. A quantitative data analysis comparing the differences in customization between SMEs and large enterprises shows that the lower complexity of systems and processes in SMEs reduces implementation issues related to customization. This is a critical characteristic for large enterprises that require highly integrated solutions with their complex legacy systems. Therefore, SMEs that need moderately complex integration with existing systems should be aware of the limitations of customization in cloud ERP systems(Eze et al.; n.d.,2013). Some also suggest that, despite the recognized challenges of customization, the benefits provided by cloud ERP systems for SMEs outweigh these challenges (Yulianto et al., 2020).

2. Vendor Lock-in/Switching Costs

Concerns about the integrity of cloud ERP vendors have been raised by (Gupta et al., 2015). Trust becomes a critical success factor as vendors possess significant essential data. Moreover, switching cloud ERP providers can be challenging for companies due to the vendors' ownership of user information and data. If there is an anticipation of such risks, negotiating Service Level Agreements (SLAs) can help both parties clarify their expectations and understanding of the agreement. However, SLAs often overlook confidentiality, leaving room for potential conflicts (Srisathan et al., 2020).

Additionally, the literature suggests that subscription costs of cloud ERP systems may influence the decision-making of small and medium-sized enterprises (SMEs) concerning cloud ERP vendors, as it involves financial implications (Gupta et al., 2015). The research findings of (Seethamraju, 2015) indicate that, in the long term, the total cost of monthly cloud ERP subscription costs will not be significantly cheaper than local ERP solutions. Even though adopting a monthly subscription model based on usage, switching cloud ERP vendors incurs substantial additional indirect costs related to data, system, and process transfers. In contrast, (Yulianto et al., 2020) emphasize that the total costs associated with cloud ERP implementation are significantly lower than on-premise implementations. The latter involves hardware, technical support teams, and maintenance expenses.

3. Compliance

Compliance with cloud ERP software and its adaptation to the adopting organization are crucial success factors. The system must create value for the company and seamlessly support business processes (Seethamraju, 2015). Data migrated from traditional systems or business functions during the transition must be of high quality, meaning it should have consistent formats and be timely and accurate (Yulianto et al., 2020). Small and medium-sized enterprises (SMEs) must also determine compliance with jurisdiction and regulations based on geographical location (Gupta et al., 2015). As regulations, such as GDPR, and jurisdiction standards vary by location and can be complex, companies may face the risk of cloud ERP non-compliance if not appropriately addressed beforehand (Lakshmanan & Mehta, 2010).

Moreover, some studies emphasize concerns about environmental compliance regulations and energy standards associated with cloud operations (Awan et al., 2021). On the other hand, other research discusses challenges SMEs face due to government pressure requiring them to adopt ERP systems to comply with specific regulations (e.g., Sarbanes-Oxley Act) (Salim et al., 2015).

4. Integration

Some existing research papers indicate that data integration is considered a significant challenge in the adoption of cloud ERP for small and medium-sized enterprises (SMEs) as it may lead to implementation difficulties and delays (Gupta et al., 2015; Haji Salum & Abd Rozan, 2016). When discussing challenges related to customization, Duan (Duan et al., 2015) point out integration issues affecting both cloud ERP suppliers and adopting organizations. For instance, a study on Indian SMEs found that planning extensive customization led to project complexity, ultimately causing a mismatch between the ERP software and the company(Awan et al., 2021). Customization challenges depend on the complexity of a company's infrastructure and organizational culture (Duan et al., 2015). In a case study by Seethamraju(Seethamraju, 2015), the integration of cloud ERP in a company faced a delay of two and a half years, which can be explained by change management issues related to organizational culture. Furthermore, Gupta (Gupta et al., 2015) suggests that integrating some applications in cloud ERP with local ERP systems can be challenging, and incorporating a new cloud ERP system with old local ERP systems may significantly increase the implementation costs of the transition project.

5. Data Extraction

More discussion of data extraction and migration in the literature on cloud ERP needs to be conducted (Bjelland & Haddara, 2018). When extracting information and data with familiar names from the cloud, small and medium-sized enterprises (SMEs) may encounter issues of data mismatch because users might find it challenging to determine which data to select for extraction, leading to uncertainty during the data extraction process (Gupta et al., 2015). Therefore, data extraction could be a crucial challenge in SMEs' adoption of cloud ERP. Additionally, the security and speed of data extraction pose issues for SMEs, as they are significantly affected by the limitations of using the public cloud, which can slow down connection speeds. Hence, the extraction process may be more cumbersome for users employing public clouds than private clouds(Awan et al., 2021).

6. Readiness

A case study (Seethamraju, 2015) revealed that the technical and business process readiness of ERP-adopting organizations could influence the choice between implementing cloud ERP or traditional on-premise ERP systems. Some companies utilize old-fashioned systems to handle ERP operations, limiting their growth due to inefficient business processes and technological quality issues associated with their ineffective ERP operations. Lack of readiness in terms of technical and process understanding could lead to delays in implementation (Alsafi & Fan, 2020; Parthasarathy & Kumar, 2016). Furthermore, the implementation of cloud ERP is not successful, possibly due to inadequate preparedness from the vendor in terms of process analysis and support. The discovery phase will likely be prolonged (Aljoghaiman & Bhatti, 2022). ERP consultants should identify potential issues they might encounter during the adoption project, ensuring the system operates smoothly during and after the project's discovery phase (Lakshmanan & Mehta, 2010).

7. Data Security

In cloud ERP systems, data and sensitive information are controlled by cloud service providers, which may be perceived as a threat to the privacy, confidentiality, and security of small and medium-sized enterprises (SMEs). Consequently, data security risks are often considered one of the most significant concerns associated with cloud ERP implementation (Al-Johani & Youssef, 2013; Alsafi & Fan, 2020; Gupta et al., 2015; Haji Salum & Abd Rozan, 2016). When implementing a cloud ERP system, companies entrust sensitive business data to the software vendor, such as customer, financial, and other operational information. As cloud ERP vendors solely manage all maintenance, updates, and application development, monitoring and protecting this data become a primary concern for SMEs (Gupta et al., 2015). Concerns related to the vendor's internal infrastructure, other companies using the same infrastructure, hacker attacks, and the privileged control of sensitive data by the vendor constitute the core issues of security in cloud ERP implementation, as cloud services are often considered suitable for operations where privacy and data security are less critical (Faasen et al., 2013). In contrast, Johansson (Ruivo et al., 2020) and Yasiukovich (Yasiukovich & Haddara, 2020) suggest that security issues in cloud ERP implementation are relatively low for SMEs compared to large enterprises. They argue that cloud ERP systems may enhance data security for SMEs through the high-level security provided by the vendors, which SMEs may not be able to implement; Duan (Duan et al., 2015) believe that the security risks for SMEs are lower, though they should still be considered. Despite the viewpoint of the company managers in the case study conducted by Seethamraju (Seethamraju, 2015), who considered security issues not a primary concern in cloud ERP implementation, the literature reviewed in this study confirms that security has been identified as the top challenge in cloud ERP adoption.

8. Performance

Salum(Haji Salum & Abd Rozan, 2016) identifies the unpredictability of system performance during deployment as a significant concern. Unstable performance may result from unreliable or slow internet connections, unsatisfactory services provided by cloud vendors, or downtime of cloud servers, thereby reducing system reliability. Similarly, Gupta (Gupta et al., 2015) find that the performance of small and medium-sized enterprises (SMEs) is affected by their network dependence when implementing cloud ERP systems, as they often cannot access high-speed connections. They argue that multi-tenancy might lead to increased data download and upgrade delays. Furthermore, it is noted that the functionality related to applications beyond the core ERP modules and integration with limited vendor-provided features may be restricted by collaboration with other departments within the organization, affecting the performance of SMEs. Duan's (Duan et al., 2015) study suggests that the performance of SMEs is closely related to the limited network reliability and connectivity risks, threatened by downtime, data processing, and transmission pressures.

2.3.4 Current situation of ERP adoption in SMEs

The adoption rate of ERP in China's small and medium-sized enterprises (SMEs) is relatively low. According to market research, among enterprises with a business scale exceeding 5 million RMB, less than 5% use computer management software for auxiliary management. This not only indicates a significant potential for development in the software solutions industry for SMEs but also reflects the challenges faced by the industry(Yulianto et al., 2020).

China has many small and medium-sized enterprises, and the lower ERP penetration rate suggests substantial growth potential. On the one hand, the robust growth of the Chinese economy enables enterprises to invest in ERP(Zheng & Khalid, 2022), with the overall growth rate of the ERP industry expected to be at least twice the GDP growth rate. On the other hand, during the "14th Five-Year Plan" period, the rapid development of the digital economy, its extensive reach, and its profound impact are unprecedented. This is driving a profound transformation in production methods, lifestyles, and governance, making ERP a key player in reshaping global resource elements, restructuring the international economic framework, and changing the global competitive landscape(Zheng & Khalid, 2022).

Simultaneously, the domestic ERP market remains highly fragmented. Regionally, the ERP penetration rate is higher in the eastern coastal areas(Zheng & Khalid, 2022). In terms of industries, the manufacturing sector has consistently been the vertical with the highest ERP investment. This implies excellent growth opportunities for the ERP market in central and western regions or industries outside of manufacturing, as shown in Figure 2.6 in China's ERP market share growth.

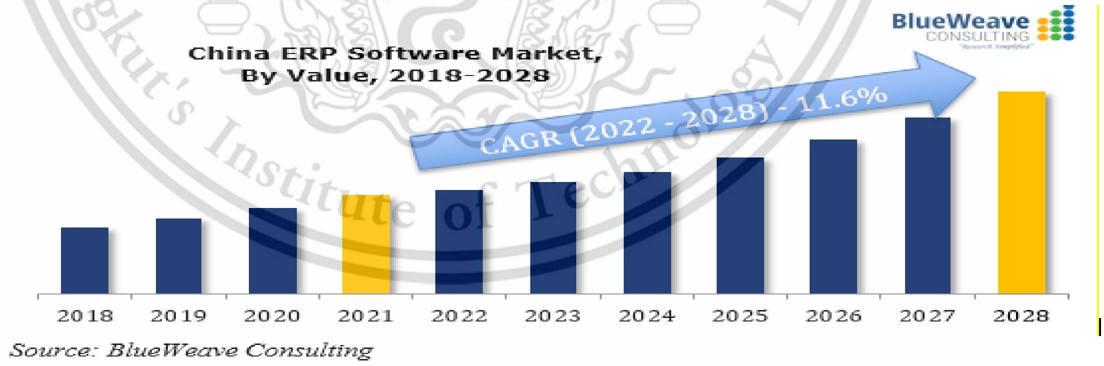


Figure 2.6 Market size forecast of the ERP industry in China from 2023 to 2028

Source: BlueWeave Consulting(https://www.blueweaveconsulting.com/report/china-erp-software-market)

The distribution of enterprise system development and implementation approaches is as follows, as shown in Figure 2.7:

- Self-developed and Implemented by the Enterprise: 4.33%

- Outsourced Development and Self-Implemented by the Enterprise: 23.16%
- Directly Implemented by Software Vendors: 35.25%
- Implementation Plan Formulated by Management Consultants: 37.26%

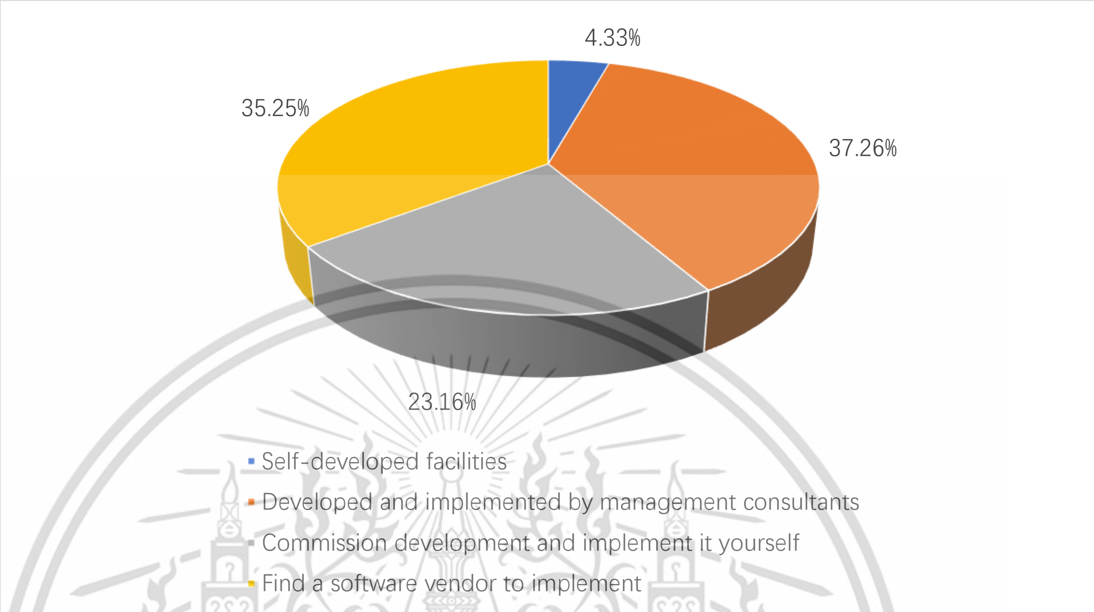


Figure 2.7 System development diagram

Source: BlueWeave Consulting (https://www.blueweaveconsulting.com/report/china-erp-software-market)

Several distinct stages have been experienced in the process of enterprise informatization. Initially, the focus was mainly on self-development or outsourcing development, which was relatively low-end and cost-effective. However, this approach brought about several application issues, such as system limitations, difficulties in upgrades, vacancies due to personnel changes, and the inability to meet standardized management requirements. These challenges proved inadequate to meet the high-end development needs of enterprises.

Consequently, most enterprises shifted towards directly engaging highly market-oriented software vendors for implementation. However, this transition also encountered corresponding difficulties. For instance, challenges included selecting a software company and determining a system's suitability. Relying solely on the recommendations of software companies needed to be increased. Even if a software company could guarantee technical aspects, Emore is more than just a simple IT system; it requires alignment with the enterprise's development plans. A comprehensive assessment and analysis of the current state of the enterprise are necessary to formulate a scientific, complete, and practical implementation plan to supervise project implementation. This is something both enterprises and software need help may struggle to achieve. To mitigate these risks and avoid misconceptions that ERP implementation might bring to the enterprise, the involvement of management consultants is currently the most widely adopted approach.

Through surveys, it was found that enterprises consider the scientific nature of the implementation plan to be the key to the success of ERP implementation. Leadership involvement accounts for 8%, the responsibilities of management consultants are at 13%, the choice of software companies constitutes 57%, internal execution and endorsement within the enterprise are at 18%, and other factors contribute to 4%. This aligns with the current cognitive landscape of both domestic and foreign software companies. The selection of software systems is closely related to the enterprise's development plans and operational status. In choosing software systems, enterprises prioritize practicality, followed by considerations like pricing, application functionality, scalability, and related service support.

The significant benefits that successful ERP implementation brings to enterprises include a direct increase in economic efficiency, followed by the standardization and normalization of management, and subsequently, an enhancement of industry competitiveness. Additionally, it contributes to improving the enterprise's image, elevating management thinking, and motivating employees to take initiative. Among these, 63% believe it can enhance economic efficiency, 13% believe it is more conducive to scientific and standardized management, 11% think it enhances management thinking, 8% see it as improving the enterprise's image, and 5% consider it is boosting employee initiative, as illustrated in the following Figure2.8.

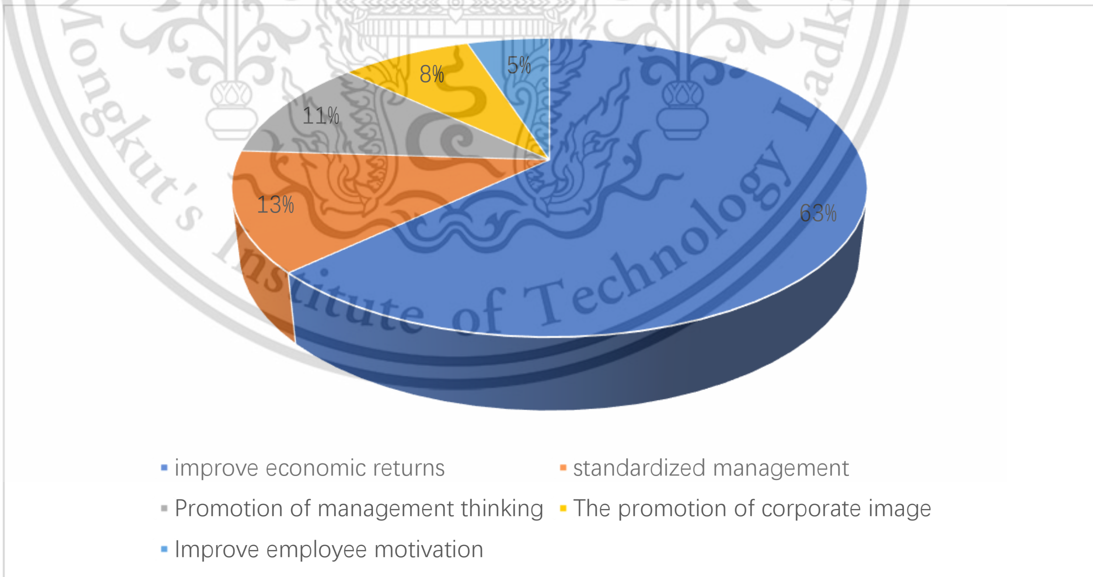


Figure 2.8 ERP implementation effect diagram

Source: BlueWeave Consulting (https://www.blueweaveconsulting.com/report/china-erp-software-market)

2.4 IS Success Model

2.4.1 Concepts and Theories of the IS Success Model

To provide a comprehensive and universal definition of information system success encompassing various evaluation perspectives, DeLone and McLean reviewed existing definitions and corresponding measurement indicators of information system success, categorizing them into six major classes. Consequently, they developed a multidimensional measurement model where different success categories exhibit interdependent relationships (DeLone & McLean, 1992a).

1. System quality measures the performance of an information system within a defined scope, including aspects like ease of access, system flexibility, integration, response time, the realization of user expectations, and system stability.

2. Information quality gauges the quality of information received from system outputs, covering accuracy, precision, relevance, timeliness, completeness, conciseness, and pertinence.

3. Usefulness assesses the utilization of information within a user's information system, encompassing aspects like usability, frequency of use, and motivational factors.

4. User satisfaction measures the contentment or reflection of users concerning evaluated information system outcomes, including aspects like user satisfaction and enjoyment.

5. Individual impact evaluates the influence of information on user behavior within the information system. "Impact" gauges the system's ability to provide users with improved decision-making states after receiving information, measuring factors such as user confidence, quality of decision analysis, efficient decision-making, the time required to complete a task, and changes in decision-making behavior.

6. Organizational impact evaluates the influence of information on organizational potential, measured in terms of performance indicators such as profit, sales growth, and productivity. This framework of the IS success model is illustrated in Figure 2.9.

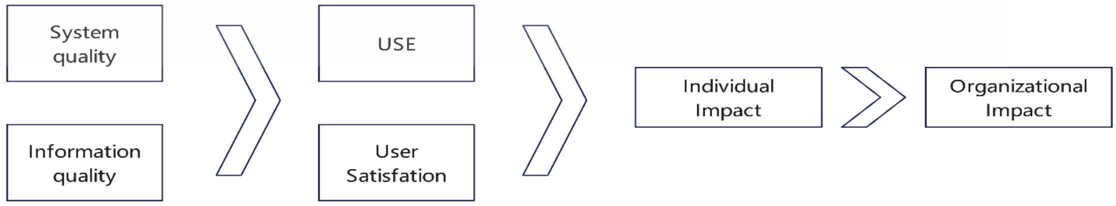


Figure 2.9 Framework of the IS Success Model

Source: (DeLone & McLean, 1992a)

In summary, the Information Systems Success Model depicted in Figure 2.1 aims to reflect relevant variables. Within this framework, the six variables represent the natural progression of the Information Systems Success Model. These variables are not just six independent variables within success; they are interrelated dimensions of technological success. The development and review of this success model are crucial before its utilization as a metric, serving as tools to measure the outcomes of the Information Systems Success Model(DeLone & McLean, 1992a).

The nature of the Information Systems Success Model is crucial, highlighting the importance of selecting influential variables, measuring different dimensions, and defining assessments. The model's construction should rely on the research's objectives and primary context (DeLone & McLean, 1992).

In the subsequent years, some researchers modified or expanded this model, while others adapted it for specific applications, such as knowledge management (DeLone & McLean, 2004; Jennex & Olfman, 2004) or e-commerce (DeLone & McLean, 2004) systems. Acknowledging these potential improvements to the original model, D&M recognized these modifications and accordingly revised their model (DeLone & McLean, 2003). The updated model is depicted in Figure 2.10.

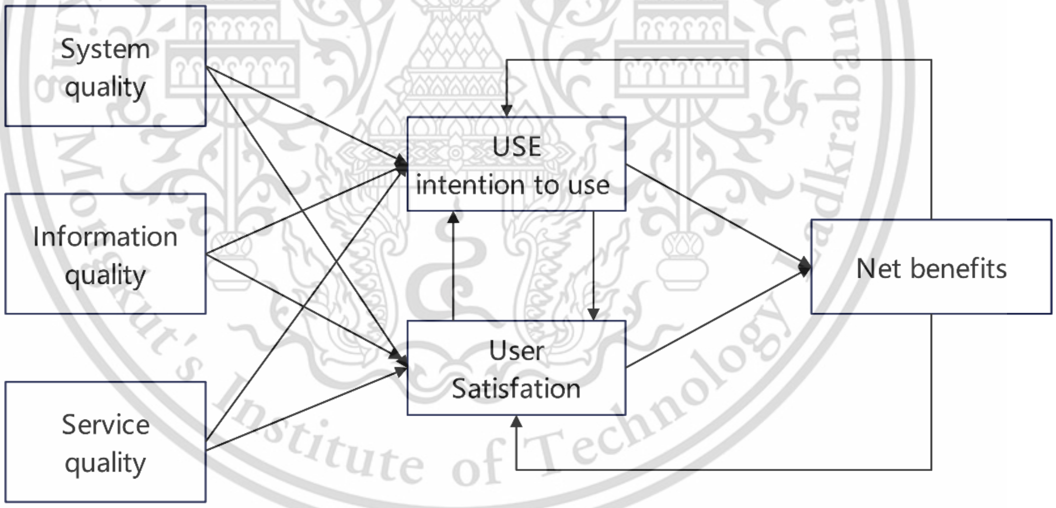


Figure2.10 The reformulated IS Success model(2002)

Source: (DeLone & McLean, 2002)

D&M also modified its model to address some limitations of the original model. In the updated model, an essential addition was the inclusion of service quality as another aspect of information system success (Pitt et al., 1995). This addition was necessitated by the evolving nature of information systems, requiring consideration of service quality when assessing information system success. D&M also recommended allocating different weights to system quality, information quality, and service quality based on the background and application of the model.

Another modification involved removing individual and organizational impact as separate variables and replacing them with net benefits. This change addressed criticisms regarding the broader effects of information systems beyond individual and organizational levels. Hence, the updated model considered benefits occurring at any analytical level (workgroups, industries, and society), reflecting the success of information systems (Myers et al., 1997; P. B. Seddon et al., 1999). Researchers should determine the choice of using the model at different levels.

Seddon (P. B. Seddon et al., 1999)proposed a notable re-specification of the original model. He focused on the model containing elements of both a process model and a variance model, which he believed made the model challenging to explain and use. His changes separated the components of process and variance. However, D&M argued that this made the model overly complex and less concise. D&M highlighted that their original model, as a process model, comprised three components: building and using the system and the effects of its use. Each of these steps was necessary but insufficient to produce the desired outcomes. They further supported the variance components by citing numerous empirical studies that comprehensively or partially examined parts of the model.

DeLone & McLean (DeLone & McLean, 2003)improved the model for information system success, known as the "Updated DeLone & McLean Information System Success Model (DeLone & McLean, 2003)," which evolved from their previous models in 1992 and 2002. Although this model has not been empirically validated, it guides further research in various disciplinary fields. As a result, numerous researchers, such as Seddon and Kiew (P. Seddon & Kiew, 1996), Goodhue and Thompson(Goodhue & Thompson, 1995), Huy (Huy et al., 2019), Jurison (Jurison, 1996), Saarinen (Saarinen, 1996), Guimaraes and Igbaria (Guimaraes & Igbaria, 1997), Igbaria and Tan (Igbaria & Tan, 1997), Rai et al. (Rai et al., n.d.-a), and DeLone and McLean (DeLone & McLean, 2003), have dedicated efforts to explore relationships across multiple dimensions to measure the outcomes of the information system success model.

The development of the DeLone and McLean model (DeLone & McLean, 2003) is based on empirical studies, demonstrating theoretical advancements built on the research of their previous models(DeLone & McLean, 2002; P. Seddon & Kiew, 1996). Through 285 modifications between 1993 and 2002, slight changes were observed in the intermediate variables of the model. By 2002, the use variable was measured based on its intended usage dimension. However, in 2003, the revised model separated the use variable from intention, leading to a distinct feedback loop for user satisfaction linked explicitly to user usage. If users are satisfied, it will lead to an intention to reuse, resulting in renewed satisfaction, as depicted in Figure 2.11 (DeLone & McLean, 2003).

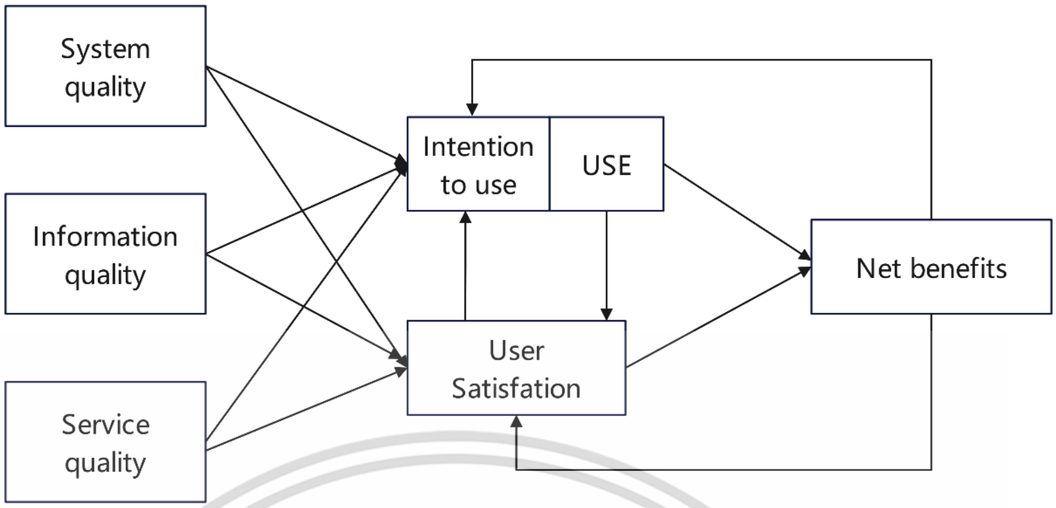


Figure 2.11 The reformulated IS Success model(2003)

Source: (DeLone & McLean, 2003)

As shown in Figure 2.3, the improved information system success model in 2003 categorizes quality into three dimensions: information quality, system quality, and service quality. Each variable should be distinct from others, as each influences its usage and user satisfaction. Furthermore, there is a close relationship between usage and user satisfaction regarding process—usage leads to satisfaction; as for causality, positive experiences result in increased user satisfaction. Generally, an increase in satisfaction leads to a rise in usage intention and quantity. However, usage and user satisfaction outcomes yield a net benefit variable (DeLone & McLean, 2003).

DeLone & McLean (DeLone & McLean, 2003) suggested that usage intention could serve as an alternative measure in certain situations. As mentioned earlier, usage intention is an attitude, while usage is a behavior. Attitudes and behaviors are interconnected, making them challenging to measure. Therefore, many researchers opt to retain just one variable: usage.

2.4.2 IS Success Model and ERP

Based on ERP literature and the information system research model proposed by Ives and others, this study identifies factors influencing the successful implementation of ERP in China. Drawing from DeLone and McLean's Information Systems Success Model, dependent variables for measuring ERP implementation success are defined.

Enterprise Resource Planning (ERP) systems are designed to seamlessly integrate all information flows within a company, including accounting, finance, supply chain, human resources, and customer information(Acar et al., 2017). In this era of global competition, businesses must make optimal choices in resource allocation to survive and thrive. However, limited literature has focused on the metrics of ERP system success. Despite being crucial, measuring the success of ERP system implementation is challenging due to the substantial financial and human resource investments involved. Several information systems (IS) success models, including the a priori model and the revised Gable model proposed by Gable Guy G., have been used to measure the success of ERP systems, as ERP systems are a type of information system. This paper attempts to discuss all popular IS and ERP system success models in the literature. The first part below discusses IS success models, followed by ERP system success models. All models, including their application areas and the dimensions included in the models, are summarised and presented in Table.

Table 2.3. Summary of Successful ERP System Usage Based on the IS Model

No	Model	Author	Area	Dimensions/ Phases included in the model
1	ERP Model	(Gable et al., n.d.-a,2013)	Taiwan, China	1. System quality, 2. information quality, 3. satisfaction, 4. individual impact 5. organisational impact
2	ERP-success measurement approaches	(Rosemann & Wiese, n.d.,2010)	Moroccan	1. Finacial/ Cost 2. Internal 3. Customer 4. Innovation & learning
3	Shoh and Markus Model	(Soh & Markus, n.d.,2002)	Canadian	1. IT expenditure, 2. IT assets, 3. IT Impact, 4. Organizational performance
4	Markus and Tanis Model	(Markus et al., 2000)	Malaysia	1. Project chartering 2. The project 3. Shakedown 4. Onward and Upward
5	Ex-ante evaluation of ERP software	(Stefanou, n.d.,2001)	Turkey	1. Business vision 2. ERP selection 3. ERP implementation 4. ERP operation/ Maintenance/ Evolution

No	Model	Author	Area	Dimensions/ Phases included in the model
				5. Evaluation
6	Task-Technology Fit (TTF)	(Smyth, n.d.,2001)	Saudi Arabian	1. Organisational Factors 2. Task 3. ERP 4. User 5. Perceived usefulness 6. User satisfaction 7.TTF 8. ERP success
7	The extended ERP Systems Success measurement model	(Ifinedo & Nahar, n.d.,2006)	Moroccan	1. Vendor/Consultant quality 2. System quality, 3. information quality, 4. individual impact 5. Workgroup Impact 6. Organisational impact
8	Revised IS success model	(Chien & Tsaur, 2007)	Taiwan, China	1. System quality, 2. information quality, 3. Service quality, 4. user satisfaction, 5. intention to use 6. Benefit of use 7. Business Value.
9	ERP success model	(B. Chung et al., 2008)	China	1. User related Variables, 2. Project related Variables, 3. Subjective Norm, 4. Perceived usefulness, 5. Perceived ease of use, 6. Intension to use, 7, Progress, 8. Quality, ERP Benefits
10	Modified ERP	(Mukti & Rawani,	Developing	1. System quality,

No	Model	Author	Area	Dimensions/ Phases included in the model
	Systems Success model	2016)	Nations	2. information quality, 3. Service quality, 4. Perceived ease of use 5. Perceived usefulness, 6. Intension to use, 7. Attitude, 8. benefit of use, 9. user satisfaction, 10. Business Value
11	Research model for ERP systems success	(H.-Y. Lin et al., 2006a)	Qatar	1. system quality 2. information quality 3. system use 4. user satisfaction 5. individual impact
12	ERP success model	(Almajali et al., 2022)	Jordanian	1. Information quality 2. system quality 3. service quality 4. training quality 5. IT-business strategic alignment 6. ease of use 7. user satisfaction 8. use
13	ERP implementation success model	(Chaveesuk & Hongsuwan, n.d., 2017)	Thailand	1. Information quality 2. system quality 3. external service quality 4. internal service quality 5. user satisfaction 6. ERP Implementation Success
14	An Extended Framework for	(Zare & Zareravasan,	New Zealand	1. system quality 2. information quality

No	Model	Author	Area	Dimensions/ Phases included in the model
	ERP post-implementation Success Assessment	2014)		3. service quality 4. individual impact 5. workgroup impact 6. Organizational impact 7. internal-organizational impact
15	TOE, TAM, and IS success model	(Jo & Bang, 2023a)	South Kore	1. system quality 2. information quality 3. top management support 4. service quality 5. ICT skill 6. ICT infrastructure
16	ES SUCCESS MODEL	(Gable et al., n.d., 2000)	Queensland	1. System Quality 2. Information Quality 3. Satisfaction 4. Individual Impact 5. Organization Impact

A review of all popular models indicates significant differences in the dimensions used for system success measurement. Most models employ system quality, information quality, and user satisfaction as criteria for measuring system success, with a few focusing on the system's impact on individual and organizational performance. The various fundamental dimensions of these models are summarised in Table 2.3.

The synthesis of various models shows that specific dimensions are crucial for system success (e.g., organizational factors related to human support, organizational clarity, and factors associated with vendors). In contrast, other dimensions form the foundation for measuring success (e.g., system quality, information quality, organizational impact, project success, and benefits realization). The first set of dimensions can be termed success factors, and the second can be called success indicators. Organizations must understand these factors and indicators, focusing on elements that ultimately lead to system success.

Following the logical framework of the updated DeLone and McLean Information Systems Success Model, this study proposes a success model applicable to ERP systems. Since

ERP systems are integrated information systems covering all necessary business processes, this model includes system quality, information quality, and service quality. Information quality is measured based on the accuracy, timeliness, completeness, relevance, and consistency of ERP-provided information. System quality is assessed based on the usability, functionality, reliability, flexibility, data quality, and integrability of the ERP system. Service quality is evaluated based on the level of ERP service, reliability of ERP services, and the responsiveness and assurance of ERP service providers. When additional processes are required in ERP projects, the quality of services provided by service providers and the information department will also be incorporated into this model, as these additional processes often act as bridges between ERP software packages and organizational practices.

2.5 Theory and concept of TOE model

The ERP system adoption model focuses on enterprises as the research subject, and external variables should be selected based on the application characteristics of ERP. The Technology-Organization-Environment (TOE) framework is considered when choosing these external variables. This framework posits that an organization's adoption of new technology is mainly influenced by technological, organizational, and environmental factors, as depicted in Figure 2.12. The TOE framework offers a categorization method for factors affecting an organization's adoption of new technology. It is widely applied in studies on the organizational adoption of new technology and has been confirmed to be universally applicable(Baker, 2011).

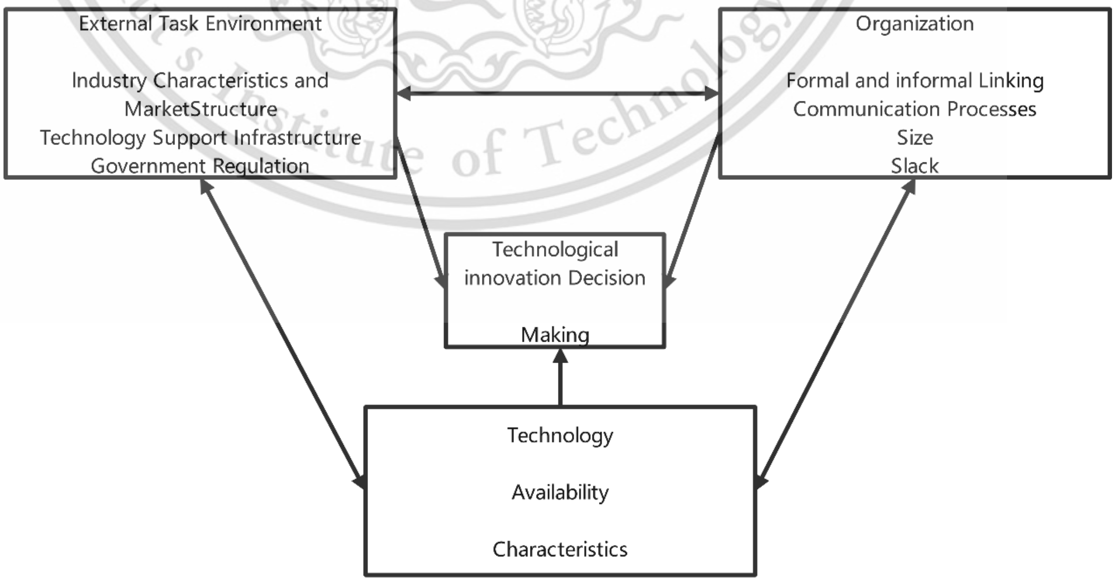


Figure 2.12 TOE Model

SOURCE: Rocco DePietro, Edith Wiarda & Mitchell Fleischer (1990)

2.5.1 Definition of TOE

The TOE framework, developed by Tornatzky (Tornatzky et al., 1990), is used to study organizational-level technology adoption for various IS and IT services and products. It has evolved into a widely accepted theoretical perspective for IT adoption (K. Zhu et al., 2004). By incorporating organizational, technological, and environmental variables, TOE proves more beneficial than other models in exploring the value creation associated with researching technology adoption, use, and innovation (M. A. Hossain & Quaddus, n.d.; K. Zhu et al., 2004). Furthermore, it is not confined to the company or organizational size (Wen & Chen, 2010). Thus, it offers a comprehensive view encompassing user acceptance, implementation hurdles, impact on value chain operations, inter-company diffusion post-adoption, factors influencing business innovation adoption choices, and leveraging technology for organizational development (Mohamed et al., 2009; K. Zhu et al., 2004).

According to Tornatzky (Tornatzky et al., 1990), there are approximately three types of background factors that may influence the acceptance, innovativeness, and implementation of technology. These three categories of background factors within the TOE framework are explained below:

(1) Technological context encompasses variables influencing the adoption of individual, organizational, and enterprise innovation (Gangwar et al., 2014). It includes some innovation characteristics from IDT that affect adoption likelihood (Dedrick & West, 2003). Apart from innovation characteristics, researchers have incorporated several other variables. Studies indicate that system integration, complexity, perceived expected benefits, perceived unexpected benefits, and standardization are important variables, while observability is considered inconsequential (Dedrick & West, 2003; Musawa & Wahab, n.d.).

(2) Organizational context refers to succinct organizational measures, such as size, scope, and implementation principles(Raimee, 2021). Adoption tendencies are influenced by formal and informal internal communication and control systems within the organization and the company's resources and innovation capacity(Dedrick & West, 2003). In a business environment, key variables include financial resources, senior management support, company structure, business slack, development capabilities, information capabilities, operational capabilities, strategic use of technology, trust, technological resources, innovation support, human capital quality, organizational knowledge acquisition, professional skills, infrastructure, and organizational training, while financial capability and technological capability are considered irrelevant(Dube et al., 2020; M. A. Hossain & Quaddus; n.d.,2020). Company size is essential in adopting RFID, e-commerce, and ERP, while EDI adoption is deemed irrelevant(M. A. Hossain & Quaddus, n.d.,2020). The authors explain that organizations of

various sizes recognize the critical importance of technology for their business success and are willing to invest heavily in improving their competitive advantage. Additionally, senior management commitment varies across contexts (B.-N. Hwang et al., 2016). In the context of EDI, some organizational factors were also studied by Huang et al. (B.-N. Hwang et al., 2016), who found that the potential strength of partners, trust in partners, and relationship commitment with partners are important factors, while actual strength of partners and dependence on partners were considered irrelevant. Thus, it presents a comprehensive picture of factors influencing sustained innovation.

(3) Environmental context emphasizes the domain where the company leads its business tasks, focusing on external factors influencing business, such as government incentives and regulations (Raimee, 2021). It includes aspects related to industry characteristics, such as competition, relationships with buyers and suppliers, and stages of the business lifecycle(LeRouge & Webb, n.d.). Essential factors in the environmental context include customer demands, competitive pressures, external pressures, internal pressures, trade partner pressures, supplier support, business dependence, ecological uncertainty, information power, and network power, while government regulation was not identified as a significant variable (M. A. Hossain & Quaddus, n.d.,2011; Musawa & Wahab; n.d.,2012). Thus, it presents a comprehensive picture of factors influencing the adoption of cutting-edge technology.

2.5.2 The TOE model and ERP system

The TOE theory provides an appropriate perspective for a profound understanding of the post-implementation success of ERP (Enterprise Resource Planning) systems, primarily because it fully considers the deployment characteristics of ERP in the post-implementation phase. After implementation, the deployment of ERP systems is a process where the system permeates daily operations, meaning that ERP's operational and managerial philosophy gradually integrates with business processes and decision-making(Mabert et al., 2003). This close integration is reflected in two main aspects.

Firstly, ERP systems have a broad impact on organizations. Unlike other single-function systems (such as MRP), ERP systems comprise numerous modules and applications that form a comprehensive information system. Its deployment involves almost all functional departments of an organization, such as production, sales and distribution, and accounting. Once implemented, the ERP system becomes the business infrastructure, seamlessly integrating various business processes.

Secondly, ERP systems have far-reaching effects on organizations. It influences the organization's operations from a macro to a micro level in the organizational hierarchy. The ERP system is deeply embedded into the organization's everyday operations. For example, daily work relies on schedules generated by the ERP system, and management decisions depend on various data produced by the system.

The breadth and depth of integration indicate that the post-implementation success of ERP systems will be influenced by multiple factors associated with the organization. Therefore, the TOE theory provides an appropriate theoretical foundation for comprehensively identifying potential factors affecting post-implementation success.

Many studies applying the TOE framework to validate the success of IT innovations have contributed to enhancing organizational potential (Teo et al., 2008). Teo et al. points out that despite the widespread use of the TOE framework in previous research, specific internal factors within each aspect, including technological, organizational, and environmental factors, differ(Teo et al., 2009), as shown in the literature studies listed in Table 2.4.

Table 2.4. Summary of Successful ERP System Usage Based on the TOE Model

Reference	Area	Technological context factors	Organisational context factors	Environmental context factors
(Raymond & Uwizeyemungu, 2007)	Canadian manufacturing SMEs	-Assimilation of CIM systems	-Size and structure -Type of production -Operational capacity -Innovation capacity -Financial capacity	-Commercial dependence -Networking intensity
(Pan & Jang, 2008)	Taiwan, China	-IT Infrastructure -Technology readiness	-Perceived barriers -Size	-Production and operations improvement -Enhancement of products and services -Competitive pressure -Regulatory policy

Reference	Area	Technological context factors	Organisational context factors	Environmental context factors
(Kouki et al., 2009)	Indian	- ERP attributes -IT/ERP expertise	-Top management support -Strategic Alignment -User involvement -Absorptive capability -Reward system	-Institutional pressures -Vendor support -Consultant effectiveness
(Schniederjans & Yadav, 2013)	China	-IT capability level	-Understanding user -Change management -Implementation plan -Project management -Top management support	- External pressure -Trust
(Xu et al., 2017)	Chinese SMEs	-Relative advantage - Compatibility - Complexity	-Top management support - Organization fit -Financial commitment	-Competitive pressure
(Awa et al., 2016)	SMEs in Port Harcourt	-ICT infrastructures -Technical know-how -Perceived	- Size of the firm -Demographic composition - Scope of business	-External support -Competitive pressure -Trading partner

Reference	Area	Technological context factors	Organisational context factors	Environmental context factors
		compatibility -Perceived values - Security	operations - Subjective norms	readiness

2.5.3 Model Integration

The current study integrates theoretical models for a comprehensive understanding of the sustained usage of ERP for the following reasons. As an information technology, ERP operates across the entire organizational scope and is influenced by environmental factors. Therefore, technological, managerial, and environmental factors must be considered (TOE framework) (Tornatzky et al., 1990). This concept is based on the understanding that technologies like ERP are not only influenced by technological complexity but also by the organizational context of their implementation and the broader external environment shaping their evolution. Additionally, ERP systems are integral information systems. The success of such systems inevitably increases users' willingness to continue using them. This introduces the Information System Success Model, which considers system and information quality crucial for success(Davis, 1989). System quality and information quality are at the core of this success, and they play a profound role in determining the system's overall efficiency and, consequently, its attractiveness among users. In essence, while the TOE framework provides a macro perspective covering external and internal organizational factors, the Information System Success Model focuses on aspects related to system quality.

The TOE framework has been widely validated for explaining the adoption and implementation of ERP (Ahn & Ahn, 2020). This framework encompasses three core backgrounds influencing the acceptance of new technology: technological, organizational, and environmental (Priyadarshinee et al., 2017). The technological background includes Information and Communication Technology (ICT) skills and ICT infrastructure(AlBar & Hoque, 2019). ICT skills are crucial factors influencing the intention to adopt ERP. Members of companies lacking ICT skills may feel dissatisfied and have no motivation to invest time (Lutovac & Manojlov; n.d.，2012). Employees with higher ICT skills can continue using ERP seamlessly. It has been established that ICT infrastructure positively impacts the intention to adopt ERP (AlBar & Hoque, 2019). As the level of ICT infrastructure improves, users can more efficiently utilize ERP. Based on these perspectives, the current study considers ICT skills and ICT infrastructure as key factors influencing the intention to continue usage. Although TOE is a theoretical foundation for implementing technological innovations(Tornatzky et al., 1990), some scholars primarily apply it to adoption intention (Awa et al., 2016).

This study introduces the factors above into the research model, incorporating leading factors such as system quality and information quality from the DeLone and McLean (D&M) Information System Success Model (DeLone & McLean, 2003). This model has been widely validated, refined, and extended in the IT/IS literature (Chaveesuk & Hongsuwan, n.d.). It has been found that system quality influences ERP usage and user satisfaction (Wibowo & Sari, 2018). In the ERP environment, information quality is a critical determinant of user satisfaction(Wibowo & Sari, 2018). When ERP systems are more stable and provide more accurate information, users perceive the system as more useful and easier to use.

In summary, this paper applies TOE to study the factors determining the intention to use ERP. As technological factors, based on prior research from the IS success model, it introduces system quality and information quality. Organizational and environmental factors come from previous research within the TOE framework.

2.6 Theory and concept of Task-technology fit（TTF）

Goodhue and Thompson proposed the Task-Technology Fit (TTF) in (Goodhue & Thompson, 1995). Its primary purpose is to assess the successful match between tasks and information technology. Goodhue and Thompson put forth the viewpoint that information technology should assist in job performance while being accepted and willingly used by people in the workplace. Therefore, technology, tasks, and individuals influence job performance and user self-efficacy. In a related study focusing on trust funds, Gebauer and Shaw(Gebauer et al., 2004) they analyzed the relationship between tasks and technology from the perspectives of behavioral and organizational effects. They emphasized the critical importance of robust information technology. The theoretical model of TTF is illustrated in Figure 2.13.

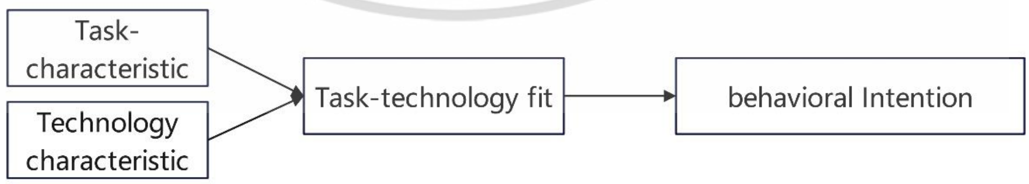


Figure 2.13 Task-technology fit model

Source: (Goodhue & Thompson, 1995)

2.6.1 Concept and Theories of task characteristic

Goodhue and Thompson(Goodhue & Thompson, 1995)define tasks as "the ultimate result from input to output, originating from an individual's use of information technology." Task characteristics imply exploring whether the use of technology involves non-routine and dependency features. Different manufacturers develop ERP systems that vary based on various purposes. However, the primary objective is to effectively deal with cross-data integration and explore the most efficient information for the entire operation. According to the research proposed by Goodhue and Thompson (Goodhue & Thompson, 1995), task characteristics will directly or indirectly influence the nature of a specific system or affect the effectiveness of information technology. Alkhwaldi's (Alkhwaldi et al., 2023) research also reiterates that task and technology characteristics directly impact task-technology fit.

Table 2.5 Literature on task characteristic

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Valdebenito & Quelopana, 2019)	Task characteristic	Task interdependence Task urgency	Mobile banking
(Lu & Yang, 2014)	Task characteristic	Applicability Task interdependence	SNS
(P.-F. Hsu et al., 2015)	Task characteristic	Applicability Task tacitness	ERP
(Cheng, 2020)	Task characteristic	Task tacitness Task interdependence	Cloud ERP
(W.-S. Lin & Wang, 2012)	Task characteristic	Fits with the work tasks Match with the interests	EKR
(Cheng, 2019)	Task characteristic	Task interdependence Task urgency Task tacitness	Cloud ERP
(Alabama et al., 2023)	Task characteristic	Task interdependence Task urgency	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
		Task tacitness	
(Doargajudhur & Dell, 2019)	Task characteristic	Task urgency	BYOD
(Abugabah et al., 2015)	Task characteristic	Task interdependence Task urgency Task tacitness	ERP
(Rajan & Baral, 2015)	Task characteristic	Task interdependence	ERP
(Wang & Fan, 2021)	Task characteristic	Perceived locality Perceived seasonality Perceived eco-friendliness	Livestreaming e-commerce

Table 2.5 presents a literature review summary of the TTF model. According to the literature, observed variables for task characteristics include 1) Task interdependence, 2) Task tacitness, and 3) Task urgency. The study focuses on task-technology fit in ERP systems. These models capture the factors that influence task-technology fit and consider them significant determinants for enterprises' adoption of ERP systems.

According to literature, concepts, theories, and researchers' studies on the Task characteristic, the following environmental model has been developed, incorporating three observed variables, as shown in Figure 2.14.

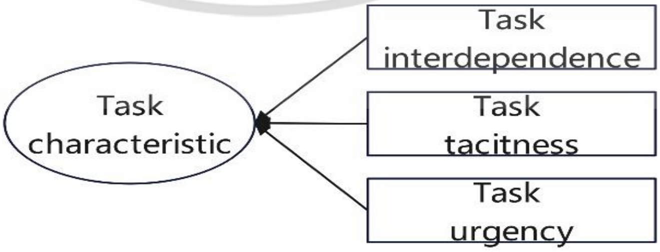


Figure:2.14 Task Characteristic Model

2.6.2 Concept and Theories of task-technology fit

Scholars define task-technology fit as the degree to which a system meets user needs, aligns with user interests, and adapts to tasks (W.-S. Lin & Wang, 2012). Additionally, Lu and Yang(Lu & Yang, 2014) describe it as the extent to which a system assists in completing all tasks and adapts based on task requirements (Lu & Yang, 2014). The construction of task-technology fit encompasses various perspectives on its indicators, as described in Table 5. Regarding technology use within organizations, actual technology usage and user satisfaction cannot provide a complete picture of task characteristics, i.e., whether the technology matches the tasks is not considered(Jeyaraj, 2022). Task-technology fit is crucial for technology use within organizations (D'Ambra & Wilson, 2004). Many studies have investigated the positive impact of task-technology fit on usage behavior.

Table 2.6 Literature on task-technology fit

Scholar/Researcher	Latent Variables	Observed Variables	Context
(D. Y. Lee & Lehto, 2013)	Task-technology fit	Fits with the work tasks Meet the work needs	YouTube
(Larsen et al., 2009)	Task-technology fit	Fits with the work tasks Meet the work needs	AIS
(Lu & Yang, 2014)	Task-technology fit	Fits with the work tasks Enough to complete the work tasks	SNS
(Zhou et al., 2010)	Task-technology fit	Meet the work needs Enough to complete the work tasks Appropriate to the job	Mobile banking
(W.-S. Lin & Wang, 2012)	Task-technology fit	Fits with the work tasks Match with the interests	E-learning system
(Negahban & Chung, 2014)	Task-technology fit	Fits with the work tasks Necessary to the work tasks Meet the work needs	Iraqi SMEs ERP
(Ruivo et al., 2014)	Task-technology fit	Enough to complete the work tasks Appropriate to the job	Portuguese SMEs
(Jeyaraj, 2022)	Task-technology fit	Available when needed	SME ERP
(Jung et al., 2023)	Task-technology fit	Necessary to the work tasks Appropriate to the job Available when needed	ERP

Table 2.6 presents a literature review summary of the TTF model. According to the literature, observed variables for task-technology fit include: 1) Fits with the work tasks, 2) Necessary to the work tasks, and 3) Meet the work needs. The study focuses on task-technology fit in ERP systems. These models capture the factors that influence task-technology fit and consider them significant determinants for enterprises' adoption of ERP systems.

According to literature, concepts, theories, and researchers' studies on the Task-technology fit, the following environmental model has been developed, incorporating three observed variables, as shown in Figure 2.15.

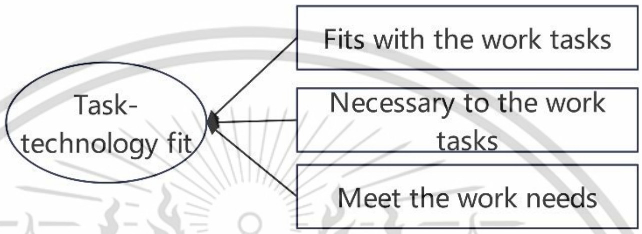


Figure 2.15 Task-technology fit Model

2.7 Concept and Theories of Organization

Organizational factors are descriptive and directly related to the availability and utilization of internal resources (Wymer & Regan, 2005). The proposed information systems framework considers issues about enterprise size and scale (Awa & Ojiabo, 2016), social impact(Venkatesh & Davis, 2000), individual differences (Awa et al., 2015), organizational mission (Awa et al., 2016), top management, available expertise, product offerings, organizational culture, ownership structure (Scupola, 2009), enabling conditions(Tornatzky et al., 1990), as well as information sources and communication channels (Kannabiran & Dharmalingam, 2012).

Organizational background refers to descriptive measures associated with the organization, such as company scope, size, and management beliefs(Mohamed et al., 2009). Adoption tendencies are influenced by formal and informal internal organizational communication, control mechanisms, and the organization's resources and innovation capability (Dedrick & West, 2003). Critical variables in organizational background encompass financial resources, company structure, organizational flexibility, innovation capability, knowledge capacity, operational capability, strategic application of technology, trust, technological resources, top management support, support for innovation, human capital quality, organizational knowledge accumulation, expertise, infrastructure, and organizational readiness. Financial capacity and technological capability have been identified as non-significant factors (M. A. Hossain & Quaddus, n.d.; Musawa & Wahab, n.d.).

Table 2.7 Literature on Organization

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Awa et al., 2015)	Organization	Size of the firm Demographic composition Scope of business operations Subjective norms	Smes ERP
(Amini & Bakri, 2015)	Organization	Top management support	Smes ERP
(Valdebenito & Quelopana, 2019)	Organization	Organizational Readiness Top Management Support	Smes ERP
(AlBar & Hoque, 2019)	Organization	Top Management Support Organizational Culture	Saudi Arabia ERP
(Ilin et al., 2017)	Organization	Firm Size Top Management Support Internal technical competence	Western Balkan Peninsula ERP
(J et al., 2023)	Organization	Firm Size Employee's knowledge/Experience Information Intensity	Iraqi SMEs ERP
(Ruivo et al., 2014)	Organization	Training Best Practices Organizational fit	Portuguese SMEs

Table 2.7 summarizes the literature review on the organizational level of TOE. According to the literature, observed variables at the organizational level include 1) Leadership involvement, 2) Effective project management, and 3) Organizational fit. The relationship between organizational-level influences and ERP adoption has led to the development of various models. These models emphasize capturing factors influenced by organizational capabilities at the organizational level and consider them as crucial factors affecting the adoption of ERP by enterprises.

1. Leadership Involvement

Leadership involvement implies support in ethical, financial, and resource allocation aspects and real-time realization of project/organizational goals. Commitment and support from top management are crucial for the success of ERP implementation (Aljoghaiman & Bhatti, 2022). Top management serves as the starting point for accepting the handling of ERP or continuing the same business operations, acting as negotiators between business and technology. Top management support enhances technical knowledge involvement in the organization; it is a vital guide to minimizing ERP implementation issues and a determining factor in judging the success of ERP implementation(Muinde et al., 2016). Based on the responsibilities and commitments of top management, they should formulate policies and strategies, determine overall objectives for the entire organization, devise plans to achieve the desired goals, and establish the institution's organizational structure (Muinde et al., 2016).

Implementing an ERP system brings profound changes to the organization and its processes. Therefore, senior management must recognize that communication is essential to ensure that employees understand and accept the changes brought about by ERP (Balsmeier & Nagar, 2002). Thus, organizational support is crucial for the successful adoption of ERP. Implementing the system often requires significant changes in the organizational structure, employee roles and tasks, reward systems, control and coordination mechanisms, and workflow. Therefore, the commitment and communication forms of top management related to the system implementation are crucial for the legitimacy of the implementation process and the morale of employees after execution (Venkatesh & Bala, 2008). Lee et al.(S. Lee et al., 2010) found that organizational support positively correlates with TAM factors. While organizational support has been identified as crucial for the successful adoption of new systems, more work needs to be done on the impact of internal technical support on the acceptance of technology (S. Lee et al., 2010).

2. Organizational readiness

Effective project management ensures the planned implementation of ERP systems, which can smoothly connect various aspects of the organization(Markus & Tanis, n.d.; Umble et al., 2003). This frictionless connection contributes to effective communication and interaction within the organization. This way, comprehensive real-time information with a unified symbol set can be generated to enhance decision-making, yield managerial benefits, and promote collaboration between departments, bringing operational benefits(Ke et al., 2006).

Similarly, effective project management ensures that the system can automate many routine tasks and operations, especially for organizations that rely heavily on manual processes. This increased automation speeds up processing and reduces human errors. Therefore, productivity will be enhanced, resulting in operational benefits.

Conversely, poorly managed ERP projects are highly correlated with reimplementation(Umble et al., 2003), which not only incurs additional investment ((K. Hsu et al., 2006) but also delays the time for the ERP system to realize its benefits. Worse still, reimplementation lowers user morale, leading to resistance towards the ERP system and negatively impacting users' effective use.

3. Organizational culture

Jo (Jo & Bang, 2023) revealed that adapting project implementation to current cultural styles is a significant reason for project implementation failures. Companies implementing ERP systems must alter their business processes to align with the best practice processes of the ERP. This change affects both the client's culture and is constrained by its culture (B.-N. Hwang et al., 2016). Deelert (Deelert et al., 2020) concluded that built-in value biases reflect the development culture within information systems design methodologies. As this study only examines companies using Baan IV, a system developed in the Netherlands and applied in China, it is necessary to determine whether there are cultural differences between the Netherlands and China. Jo & Bang's(Jo & Bang, 2023b) definition of national culture, a comparison can be made using four dimensions: power distance, collectivism versus individualism, femininity versus masculinity, and uncertainty avoidance. According to literature, concepts, theories, and researchers' studies on organizations, the following organizational model has been developed, incorporating three observed variables, as shown in Figure 2.16.

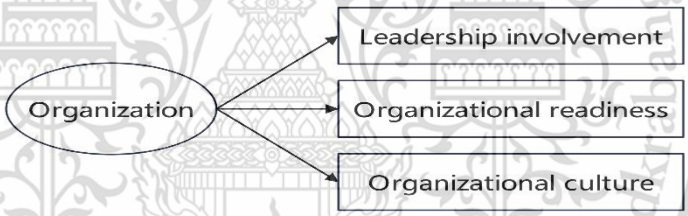


Figure 2.16 Organization Model

2.8 Concept and Theories of Environment

Organizations tend to innovate and engage in strategic and tactical issues, often influenced by opportunities and threats and strengths and weaknesses imposed by their environment (SWOT) (Raymond & Uwizeyemungu, 2007). Managing change involves anticipating (eliminating surprises), responding to environmental trends (Abell, 1978), and deploying actions resulting from strategic and affirmative decisions. Awa and Kalu(Awa et al., 2010) argue that environmental changes must be anticipated, monitored, assessed, and incorporated into organizational decision-making as they frequently imply fundamental changes in resource requirements. However, the company's resources and core competencies are rarely easily adjustable. ERP systems' technical and strategic aspects are almost equally significant(Yen & Sheu, 2004)in creating competitive advantages in competitive and dynamically changing environments(Teo et al., 2008).

The decision to adopt ERP by businesses is influenced by industry factors such as peer influence, the pace of technological change, external support, government regulations, competitive pressures, preparedness of trading partners (e.g., suppliers, distributors, and vendors), market volatility, and the coercive influence of customers (Raymond & Blili, 1997; Tornatzky et al., 1990), as well as perceived trust (Awa et al., 2010). Factors covered in our framework include external support, competitive pressures, and preparedness of trading partners. Recognizing retaliatory measures and endless vicious cycles, studies(K. Zhu & Kraemer, 2005) acknowledge that competitive pressure is critical for strategic necessity and innovation adoption. Clemons (Clemons, 1986) analyzes the importance of competitive pressure on adoption and highlights how modern technology changes the rules of the competition game, reshapes industry structures, and demonstrates novelty in outperforming competitors. Information technology platforms have triggered changes in industry structures, such as disintermediation and re-intermediation (Bailey & Bakos, 1997), providing new competitive means, and altering competition rules through lock-ins (Varian, n.d., 1998), electronic integration (Zaheer & Venkatraman, 1995), and online-offline coordination (Steinfield et al., 2002).

Table 2.8. Literature on Environment

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Awa et al., 2015)	Environment	External support Competitive pressure Trading partners' readiness	Smes ERP
(Amini & Bakri, 2015)	Environment	Competitive pressure Regulatory support	Smes ERP
(Valdebenito & Quelopana, 2019)	Environment	Competitive Pressure Vendor Qualities	Smes ERP
(AlBar & Hoque, 2015)	Environment	Regulatory Environment Competitive Environment	Saudi Arabia ERP
(Ilin et al., 2017)	Environment	Industry characteristics Technology support infrastructure Government regulation	Western Balkan Peninsula ERP
(Mohammed et al., 2023)	Environment	Competitive pressure Industry sector Supplier efforts and external	Iraqi SMEs ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
		computing support	
(Ruivo et al., 2014)	Environment	Competitive pressure	Portuguese SMEs

Table 2.8 summarizes the literature review on the TOE environmental level. According to the literature, observed variables at the ecological level include 1) competition pressure, 2) external support, and 3) government regulation. The relationship between organizational-level influences and the adoption of ERP has led to the development of several models. These models emphasize capturing factors influenced by environmental-level TOE capabilities and consider them crucial factors affecting enterprises' adoption of ERP.

1. Competition pressure

Industrial pressure, such as pressure from competitors and partners, enhances the benefits of switching to ERP systems, while government support involving policies and funding for cloud ERP systems does not. Similarly, Al-Shboul (AL-Shboul, 2018) found that competitive pressure influences the decisions of small and medium-sized enterprises in developing economies, whereas government pressure does not. AlBar(AlBar & Hoque, 2019) revealed that competitive and regulatory environments are significant and influential factors.

The tendency for organizational innovation and engagement in strategic and tactical issues is often determined by opportunities and threats and strengths and weaknesses (SWOT) brought about by its environment (Raymond, 2001). Managing change involves anticipating (eliminating surprises) and responding to environmental trends (Abell, 1978), deploying actions resulting from strategic and proactive decisions. Awa and Kalu(Awa et al., 2010) argue that changes in the environment must be forecasted, monitored, assessed, and incorporated into the organization's decision-making processes, as they often suggest fundamental shifts in resource requirements, even though a firm's resources and core capabilities are rarely easily adjustable. ERP systems' technological and strategic aspects are equally important for creating a competitive advantage in a dynamic environment (Yen & Sheu, 2004). It emphasizes that operational effectiveness, strategic positioning, and proactive decision-making are internal and external objectives for any enterprise.

2. External support

The relationship with trading partners is crucial for operators and scholars. While the relationship with partners may be associated with successful relationships between buyers and sellers, it is considered essential, particularly in the context of Interorganizational Systems (IOS) rooted in the Internet. The swift response from partners can be observed from the rapid reaction of potential partners, becoming a key focus in inter-organizational systems planning, contributing to enhancing the capability of system planning between organizations (H.-F. Lin & Lin, 2008). In situations of mutual dependence, the connections between companies and trading partners strengthen. Companies tend to gain better insights into their trading partners' needs and external risk opportunities.

3. Government regulation

The regulatory environment has a positive impact on both Small and Medium Enterprises (SMEs) and Large Enterprises (LEs) (Ahn & Ahn, 2020). Salim(Salim et al., 2015) discovered that, according to the Theory of Planned Behavior (TPB) model, government pressure is a decisive influencing factor for SME owners. The concept of subjective norm in the TPB model involves societal pressure to behave or not behave in a specific way. Due to the strong subjective norm, SME owners intend to adopt cloud ERP systems, even when they lack the necessary resources and capabilities. At this point, perceived behavior control has no effect. Conversely, Das (Das & Dayal, 2016) found no evidence supporting the subjective norm effect in the context of the education sector in India.

According to literature, concepts, theories, and researchers' studies on the environment, the following environmental model has been developed, incorporating three observed variables, as shown in Figure 2.17.

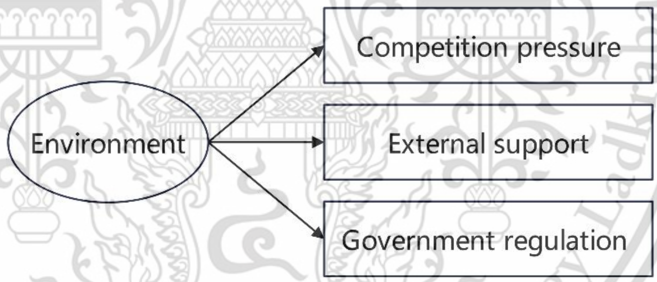


Figure 2.17 Environment Model

2.9 Concept and Theories of Human Self-efficacy

2.9.1 Self-efficacy theory

Self-efficacy refers to an individual's perception of their ability to plan and take action to achieve specific goals. Computer self-efficacy (CSE) refers to an individual's judgment of their ability to use computers in various contexts (Compeau & Higgins, 1995; Radjab, 2014).

Self-efficacy is the belief that individuals have in their ability to accomplish tasks and can be conceptualized broadly, covering a generalization of functions (Bandura, n.d.， 1982). This concept can encompass similar tasks, as shown in Table 2.7, such as computer self-efficacy (Compeau & Higgins, 1995) or specific tasks, for example, computer self-efficacy for a particular application (Agarwal & Karahanna, 2000). When related to the Theory of Planned Behavior (TPB), Ajzen (Ajzen, 1991) refers to perceived behavioral control (a core concept in TPB) as most consistent with Bandura's idea of "perceived self-efficacy."

Table2.9. Definitions of self-efficacy

Scholar/Researcher	Definitions
(Bandura, n.d. , 1986)	Human behavior and motivation are affected by individuals' self-beliefs about their capabilities.
(C. Lee et al., 1994)	Self-efficacy is a person's judgment of their ability to execute the course of action required to attain their desired performance.
(Compeau & Higgins, 1995)	self-efficacy does not measure what people have done in the past but makes judgments about what they could do in the future.
(Chen et al., 2011)	Self-efficacy involves the individual's perception of how they can complete a task but not their existing skillset.
(Choi et al., 2021)	Self-efficacy has been considered one of the factors that directly or indirectly influences users' continuance intentions in the context of financial services.

From the above overview of the definition of self-efficacy(as shown in Table 2.9 above), it is evident that, although some studies directly use self-efficacy, its measurement is not a generalizable concept as competence is domain-specific. Therefore, Van Scotter (Van Scotter II & Garg, 2019) suggests using domain-specific self-efficacy rather than general self-efficacy, as research indicates that domain-specific self-efficacy has stronger predictive power when describing specific phenomena (Van Scotter II & Garg, 2019). Domain-specific self-efficacy has been developed and studied in various research contexts (Chen et al., 2011; Hashimy et al., 2023).

Table2.10 Domain-specific self-efficacy

Author	Kind of self-efficacy	Definition	Research area
(Holden & Rada, 2011)	Technological self-efficacy (TSE)	Users' confidence in successfully and purposefully using the technology itself.	Educational technology acceptance
(Compeau & Higgins, 1995)	Computer self-efficacy (CSE)	A judgment of one's capability to use a computer.	End-user computing

Author	Kind of self-efficacy	Definition	Research area
			behavior
(Ma & Liu, 2005)	Internet self-efficacy (ISE)	The estimate of one's capability to perform internet tasks.	Acceptance of web-based electronic medical records
(Hong, Eunyoung, 2014)	Smartphone self-efficacy (SSE)	The ability to operate specific functions on a smartphone, such as downloading and implementing software onto the smartphone, and the ability to overcome any technological barriers.	English vocabulary learning
(Forbes & Kara, 2010)	Investing self-efficacy	Participants' level of agreement with a single statement about their capability of achieving their long-term financial goals.	Investment competency
(S. Shim et al., 2019)	Financial self-efficacy (FSE)	Sense of one's ability to perform responsible financial behaviors.	Financial capability

A summary of research on domain-specific self-efficacy is presented in Table 2.10. Application-specific computer self-efficacy (AS-CSE) predicts related beliefs more strongly than general computer self-efficacy (CSE)(Agarwal & Karahanna, 2000; D. Hwang & Min, 2015). Therefore, we consider ERP self-efficacy, which represents an individual's belief in their ability to successfully use an ERP system to achieve business and task outcomes, as the most appropriate level of abstraction for studying beliefs and attitudes toward ERP systems. In the following sections, based on this paper's research model of ERP usage, self-efficacy is defined as user self-efficacy.

2.9.2 Human self-efficacy

The enterprise ERP usage studied in this paper involves a stage that requires a substantial amount of data input, a complex configuration process, user adaptation and training, system adaptation, and process adaptation. The implementation phase typically involves two types of stakeholder efficacy: the ERP vendor transferring their knowledge to the company through their consultant team, and this stakeholder will be studied as part of service quality. Initially, the knowledge is assigned to a smaller group responsible for receiving training from the consultant team and training other end-users. We refer to this group as key users (Wu & Wang, 2007). Key users are more likely to establish a certain level of trust and acceptance among end-users. These particular users also include personnel from the business department who have a deep understanding of the needs of other users, making it easier and more effective to establish connections between them. For this study, key users represent computer self-efficacy in ERP. We believe that key users may play a role in driving the success of enterprise ERP implementation (Wu & Wang, 2007) and may influence users' perception of utility (Davis, 1989), thereby affecting user satisfaction (DeLone & McLean, 1992, 2003).

Table 2.11. Literature on Human self-efficacy

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Mullins & Cronan, 2021)	Human self-efficacy	Previous experience Learning ability Social influence	Smes ERP
(Bjelland & Haddara, 2018)	Human self-efficacy	Social influence Learning ability	ERP
(Ifinedo & Nahar, n.d.2021)	Human self-efficacy	Previous experience Social influence Learning willing	ERP
(Shivers-Blackwell & Charles, 2006)	Human self-efficacy	Regulatory Environment Competitive Environment	ERP
(Chou et al., 2014)	Human self-efficacy	Learning ability Previous experience	ERP
(Shiau et al., 2020)	Human self-efficacy	Previous experience Learning ability Social influence	Financial technology

Table 2.11 summarizes the literature review on human self-efficacy. According to the literature, the variables observed in this study related to people's self-efficacy include 1) previous experience, 2) learning ability, and 3) social influence.

Based on the literature's concepts, theories, and research on human self-efficacy, the following human self-efficacy model has been developed, including three observed variables, as shown in Figure 2.18.

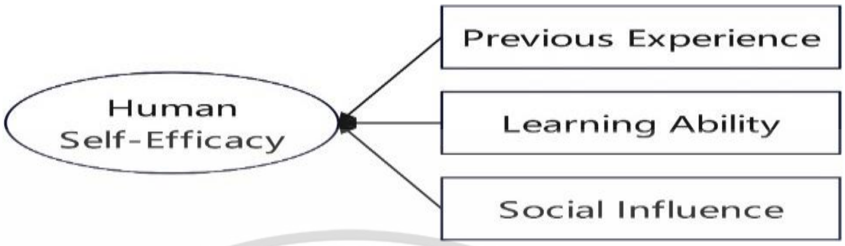


Figure 2.18 Human Self-efficacy Model

2.10 Concept and Theories of System Quality

The Information System Success Model variable is Service Quality (SQ). The knowledge provided by the information system must be safe and risk-free, and the system should be user-friendly to communicate and understand the users' needs. Essentially, Service Quality measures the level of service the information system provides and serves as a tool for market researchers to evaluate service quality. It is one of the determinants of information system effectiveness, measured by the empathy in the system's support for users. It is often assessed through the system's reliability, responsiveness, and support.

Table 2.12. Definitions of System Quality

Scholar/Researcher	Definitions
(DeLone & McLean, 1992)	System quality, as the Technical side of the IS model, defines system quality as: "The desired characteristics of the information system itself, which produces information.
(P. B. Seddon et al., 1999)	System quality is concerned with whether or not there are 'bugs' in the system, the consistency of the user interface, ease of use, quality of documentation, and, sometimes, quality and maintainability of the program code.
(Freeze et al., n.d.,2020)	System quality is the individual perception of a system's performance. From an e-learning perspective, the system quality is measured in terms of the hardware available to the user and the various software applications designed for their intended use and

Scholar/Researcher	Definitions
	needs.
(Chang, 2020)	System quality is defined as the degree to which the system's functionalities can best address customer needs with as much ease and as minimal problems encountered as possible.
(S.-K. Lee & Yu, 2012)	System quality measures of the information processing system itself.
(McKinney et al., 2002)	System quality takes into account performance characteristics, functionality, and availability.
(Petter et al., 2013)	System quality is a "Desirable characteristic of an IS. Ease of use, system flexibility, system reliability, ease of learning, intuitiveness, sophistication, flexibility, response time."
(Efiloğlu Kurt, 2019)	System quality refers to the desired features of a system, such as ease of use, flexibility, and comprehensiveness.

Table 2.12 provides researchers' definitions of system quality. System quality is related to the technical aspects of group communication, which involves how effectively a system conveys communication symbols (Irawan & Syah, 2017). It is assessed through the interaction between users and the system when performing specific tasks(Maes & Poels, 2006). Regardless of a system's knowledge, characteristics derived from the literature include its flexibility, consistency, credibility, functionality, user-friendly interface, usability, and response time(Rai et al., n.d.-b; Rivard et al.. DeLone & McLean(DeLone & McLean, 1992b, 2003) describe system quality as the features required by the information system. Existing literature indicates that system quality comprises four distinct but interconnected dimensions: adaptability, system performance, learnability, and ease of use.

Table 2.13. Literature on System Quality

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Sedera & Gable, n.d., 2004)	Systems Quality	Ease of use Ease of learning User requirements System features System accuracy Flexibility Sophistication	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
		Integration Customization	
(M. Shim & Jo, 2020)	Systems Quality	Adaptability Ease of learning Ease of use System features	ERP
(Petter et al., 2013)	Systems Quality	Ease of learning	ERP
(Chien & Tsaur, 2007)	Systems Quality	System features	ERP
(H.-Y. Lin et al., 2006)	Systems Quality	System reliability Speed of system responses Ease of use Flexibility of system	ERP
(Bernroider, 2008)	Systems Quality	Flexibility Interoperability Functionality	ERP
(Zare & Zareravasan, 2014)	Systems Quality	Data Accuracy System flexibility Easy-to-use system Easy-to-learn system System reliability Allowing for data integration System efficiency Allowing for customization Good database content	ERP
(Gable et al., n.d.-b, 2000)	Systems Quality	Ease of use Integration Functionality Flexibility Accuracy	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Chaveesuk & Hongsuwan, n.d.,2017)	Systems Quality	Ease of use Integration Functionality Flexibility Accuracy	ERP
(Sedera & Gable, n.d.,2003)	Systems Quality	Data Accuracy Data currency Database contents Ease of use Ease of learning Access User requirements System features System accuracy Flexibility Reliability Efficiency Sophistication Integration Customization	ERP

Table 2.13 provides a summary of the literature review on system quality. According to the literature, the observed variables related to system quality in this study include:1)System Configuration,2)System Integration,3)System Adaptability

1. System Configuration

ERP architecture demonstrates a robust system configuration, describing the functional scope and how all components are organized and integrated (Broadbent et al., 1999). A well-designed ERP architecture helps define how ERP system units seamlessly integrate into the organization (Nah et al., 2003). Conversely, a vague architecture may accumulate potential ERP system functional misalignment crises.

A robust system configuration also implies thorough ERP system testing before the organization fully relies on it for business operations (Al-Mashari et al., 2003). Due to the complexity of ERP systems, issues, and errors are inevitably present in ERP implementations, which can lead to system failures during normal operations. Comprehensive testing under quasi-real conditions helps identify these issues and errors early on, significantly reducing the likelihood of interventions and corrections during normal operation. This aids in minimizing the possibility of failures in realizing operational and managerial benefits.

In addition to configuring the ERP system itself, a robust system configuration requires high-quality data (Martinsons, 2004), as data is crucial for the proper functioning of ERP systems. Unlike the era before ERP, where data was handled fairly arbitrarily by users, the integrative nature of ERP stores data in a centralized database once absorbed into the ERP system. Hence, data flow permeates the entire organization (Ross & Vitale, 2000). Through refined data, ERP systems can generate reliable information, supporting real-time, frontline, and managerial decision-making, implying benefits in both operational and organizational aspects (Ross & Vitale, 2000).

2. System Performance Integration

System performance, referring to the performance characteristics of cloud ERP systems derived from the Information Systems (IS) Success Model (DeLone, 1992), has been identified as a switching benefit for small organizations in Taiwan (Chang, 2020). Peng (2014) found that the quality of cloud ERP surpasses that of local solutions, as it offers better support, superior system performance, effective system upgrades, and enhanced ERP mobility. This may reinforce the perceived relative advantage of cloud ERP discussed earlier. Moreover, Peng (2014) identified integration as a hurdle. IT consultants interviewed in the study believed that integration challenges are a more significant issue in cloud ERP than local ERP. Organizations ' control over the system is reduced, and vendors may need to allow seamless integration.

3. ERP Software Suitability

Many major international ERP vendors have entered the ERP market in China, including SAP, Oracle, J.D. Edwards, Baan, PeopleSoft, FourthShift, QAD, SSA, Symix, etc. They occupy over 90% of the Chinese market share (IDC, 1998). These ERP vendors use different hardware platforms, databases, and operating systems. Moreover, certain ERP software packages are only compatible with specific companies' databases and operating systems. Therefore, companies should conduct a needs analysis first, ensuring an understanding of the issues that need addressing, and then select the ERP system that best fits their requirements. Hardware selection follows specific ERP system requirements.

ERP software packages provide customers with ready-made business and software solutions. They may fail to fully meet a company's needs, especially when its business processes are unique. Therefore, customizing ERP systems to fit a company's needs is necessary. Choosing ERP systems that are easy to customize is crucial for minimizing costs and time consumption during the customization process. Additionally, upgrading ERP systems is essential since technological advancements are ongoing.

System Quality (SQ) is regarded as one of the top-level constructs in DeLone and

McLean's IS Success Model (DeLone, 2003). It is described as a system's technical efficiency level, considering usability, reliability, security, and flexibility. A high-quality system can facilitate user engagement, with its rating based on users' perceptions of the system and its usability. System quality is crucial for organizations' internal adoption of AIS (Accounting Information Systems). Based on DeLone and McLean's perspective (DeLone, 2003), effectively designing and implementing information systems can lead to efficient information systems. Although this construct has not been formalized as a direct influence on AIS usage in the IS Success Model, most focused studies have tested the direct relationship, yielding inconsistent results (Alzoubi, 2020).

The following system quality model is derived from the literature's conceptualization, theory, and research on system quality, including three observed variables, as shown in Figure 2.19.

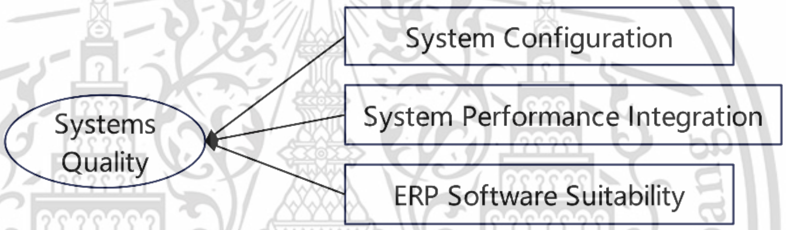


Figure 2.19 System Quality Model

2.11 Concept and Theories of Information Quality

Information quality refers to the value of the output generated by a system, perceived by various system users (Negash et al., 2003). Generally, information quality is measured by accuracy, timeliness, completeness, relevance, and consistency. Moreover, research indicates that information quality is essential in assessing overall information system success, particularly in network systems (Schaupp et al., 2006). Literature on information systems suggests that information quality influences information satisfaction (Delone and McLean, 2004; Park and Kim, 2008; Wixom and Todd, 2005).

Table 2.14. Definitions of Information Quality

Scholar/Researcher	Definitions
(P. B. Seddon et al., 1999)	Information quality concerns issues such as the relevance, timeliness, and accuracy of information an information system generates. Not all IT applications involve the production of

Scholar/Researcher	Definitions
	information for decision-making (e.g., a word processor does not produce any information), so information quality is not a measure that can be applied to all systems.
(Al-Okaily et al., 2021)	Information quality traditionally refers to measures of system output, namely the quality of the information that the system produces primarily in the form of reports. The desired characteristics include accuracy, precision, currency, reliability, completeness, conciseness, relevance, understandability, meaningfulness, timeliness, comparability, and format.
(Chang, 2020)	Information quality is defined as the extent to which the information provided best fits customer needs, usually based on how accurate, relevant, timely, and complete the information is to address such needs.
(S.-K. Lee & Yu, 2012)	Information quality measures of information system output.
(McKinney et al., 2002)	Information quality focuses on its usefulness for the user.
(Khand & Kalhoro, 2020)	Information quality is described as the strength with which users perceive e-learning information to be accurate, comprehensive, timely, organized, and up-to-date.
(Petter et al., 2013)	Information quality is defined as the desirable characteristics of the system outputs, that is, management reports and Web pages. For example, relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability.
(Hancerliogullari Koksalmis & Damar, 2022)	Information quality is defined as Desirable characteristics of the system outputs.

Table 2.14 Definitions of Information Quality by Researchers. Information quality is measured based on the characteristics of actual information transmitted by information systems and the degree to which this information matches user expectations in terms of accuracy, credibility, relevance, completeness, and conciseness (Bailey & Pearson, 1983; Rai et al., 2002; Wang & Strong, 1996). This attribute has been extensively studied in the field of information systems. For instance, Zhang, Lee, Huang, Zhang, and Huang (2005) consider information quality a critical determinant of ERP success. This attribute is frequently explored in studies

related to e-government adoption (e.g., Floropoulos et al., 2010; Lin et al., 2011; Shareef, Kumar, Kumar, & Dwivedi, 2011). DeLone and McLean (2003) describe information quality as a determinant factor in evaluating the success of e-commerce systems, focusing on relevance, completeness, ease of understanding, personalization, and security. Existing literature indicates that information quality comprises four distinct yet interconnected dimensions: accuracy, availability, completeness, and timeliness.

Table 2.15. Literature on Information Quality

Scholar/Researcher	Latent Variables	Observed Variables	Context
Koksalmis & Damar, 2022)	Information Quality	Availability Usability Understandability Relevance Format Conciseness	ERP
(Petter et al., 2013)	Information Quality	Accuracy Completeness Timeliness	ERP
(Jo & Bang, 2023)	Information Quality	Availability Completeness Timeliness	ERP
(Chang, 2020)	Information Quality	Accuracy	ERP
(Chien & Tsaur, 2007)	Information Quality	Accuracy Availability Completeness	ERP
(H.-Y. Lin et al., 2006)	Information Quality	Information Accuracy Timeliness The usefulness of data provision Information understandability Importance of information related to decision-making	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Hancerliogullari Koksalmis & Damar, 2022)	Information Quality	Integration	ERP
(DeLone & McLean, 2003)	Information Quality	Completeness Ease of understanding Personalization Relevance Security	E-Commerce
(Sedera & Gable, n.d.,2023)	Information Quality	Importance Availability Usability Understandability Relevance Format Content Accuracy Conciseness Timeliness Uniqueness	ERP
(Rizkiana et al., 2021)	Information Quality	Information Accuracy Timeliness of information provision The usefulness of data provision Information understandability	ERP
(Singha Chaveesuk,2017)	Information Quality	Relevance Completeness, Understandability Accuracy Timeliness	ERP
(Ali Zare,2014)	Information Quality	Providing timely information Providing understandable information Providing important	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
		information Providing brief/concise information Providing relevant information Providing usable information Providing available information	

Table 2.15 provides a summary of the literature review on system quality. According to the literature, the variables observed in this study related to system quality include:1) System Configuration,2) System Integration Performance,3) System Applicability (Suitability)

1. Data Accessibility

Shim (M. Shim & Jo, 2020) identified that user-friendly interfaces, data accessibility for end-users, and uninterrupted access to accurate information at the right time are the most influential factors perceived by Indian multinational companies. Haddara (Haddara & Elragal, 2022) also found that data accessibility is the most beneficial factor perceived by both small and large enterprises in Norway.

2. Database Timeliness

The information systems (IS) literature has seen significant research on Information Quality (IQ), considering it a crucial factor for businesses utilizing information technology. IQ refers to the system providing accurate, timely, complete, and user-relevant information, enabling users to make informed decisions. It is a crucial criterion for measuring the output quality generated by information technology(Alzoubi & Snider, 2020).

3. Content Integrity

In connection with this, high-quality information can minimize errors during the transaction process, generating accurate and valuable decision-making information. Numerous studies have been dedicated to exploring the relationship between IQ and the use of information technology, but these research results are inconsistent and have not formed conclusive conclusions.

Based on the concepts, theories, and research conducted in the literature on information quality, the following information quality model has been developed, comprising three observed variables, as shown in Figure 2.20.

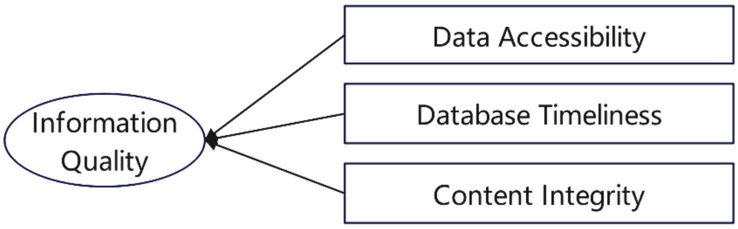


Figure 2.20: Information Quality Model

2.12 Concept and Theories of Service Quality

Service quality is defined as the subjective assessment by users of whether the service they receive from a portal meets their expectations (Ahn & Ahn, 2020). It can be effectively assessed through capabilities, after-sales service, empathy, trustworthiness, reliability, and response time. Since Delone and McLean(DeLone & McLean, 2002) included service quality as a measure in assessing the success of information systems, the updated model(Rai et al., n.d.-b,2000) has garnered considerable attention.

Table 2.16. Definitions of Service Quality

Scholar/Researcher	Definitions
(Pitt et al., 1995)	Service quality concerns the quality of the support system users receive from the IS department and IT support personnel. For example, the personnel staff's responsiveness, accuracy, reliability, technical competence, and empathy. SERVQUAL, adapted from the field of marketing, is a popular instrument for measuring IS service quality
(Fang et al., 2011)	Service quality was added to the original IS success model to reflect the importance of the services of the IS function. Service quality is commonly defined as how well a delivered service level matches customer expectations.
(DeLone & McLean, 2003)	Service quality is defined as the degree to which the service is delivered to best address customer needs regarding the support of the entity managing the system.
(Alshibly, 2014)	Service quality Measures of overall support provided by service providers.
(Petter et al., 2013)	System quality is described as the strength with which the user feels the system is easy to operate, connect, and learn and is enjoyable

Scholar/Researcher	Definitions
	during use.
(H.-F. Lin & Lin, 2008)	Service quality attributes include reliability, assurance, tangibility, responsiveness, interactivity, empathy, and functionality.
(Efiloğlu Kurt, 2019)	Service quality is the quality of the technical support the system users receive.
(Petter et al., 2013)	Service quality is defined as: "Quality of the service or support system users receive from the IS organization and IT support personnel in general or for a specific IS.

Table 2.16 provides researchers' definitions of service quality. There is contention regarding the efficacy of service quality assessment as a measure(Pitt et al., 1995). Although service quality assessment is among the most commonly utilized measures within information systems, it has faced criticism. However, Teo et al. (Teo et al., 2008), through confirmatory factor analysis, found that SERVQUAL indeed serves as a satisfactory tool for assessing information system service quality. Other service quality measures include evaluating support personnel's skills, experience, and capabilities (Guimaraes & Igbaria, 1997). With the increasing prevalence of outsourcing in system development and support, service quality often involves external vendors. The responsiveness of a vendor can influence perceptions of their "cooperativeness" (Zhou et al., 2009).

Table 2.17. Literature on Service Quality

Scholar/Researcher	Latent Variables	Observed Variables	Context
(DeLone & McLean, 2003)	Service Quality	Assurance Empathy Responsiveness	E-Commerce
(M. Shim & Jo, 2020)	Service Quality	Responsiveness	ERP
(Petter et al., 2013)	Service Quality	Responsiveness	ERP
(Chien & Tsaur, 2007)	Service Quality	Responsiveness Reliability Assurance	ERP
(Lutfi, 2023)	Service Quality	Assurance Support	Accounting Information System
(Bernroider, 2008)	Service Quality	System reliability Availability of	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
		service	
(Chaveesuk & Hongsuwan, n.d.,2017)	Service Quality	Reliability Experience Assurance Responsiveness Tangibles Empathy	ERP
(Zare & Zareravasan, 2014)	Service Quality	Providing prompt information to users Providing good interface Providing visually appealing features Providing the right solution to requests Dependable service provider Up-to-date facilities of service provider Experienced service provider and providing quality training and services	ERP

Table 2.17 presents a summary of the literature review on service quality. According to the literature, this study's observed information quality variables include 1) Assurance, 2) Reliability, and 3) Responsiveness.

Xie et al. (Xie, 2011)found that, in the context of using Customer Relationship Management (CRM) systems, there is a significant relationship between the phenomenon of "extended use" and ServQ evaluated by customers. Although the services provided by Information Systems (IS) personnel do not directly represent the quality of the Enterprise Resource Planning (ERP) system itself, through polite interactions with users, IS personnel provide a good ServQ (assurance), show concern for users' interests and understanding of their needs (empathy), as well as timely resolution of user issues (responsiveness). This may encourage users to learn and try more available features of the implemented system. Positive interactions with IS personnel may also promote a more satisfactory experience when using mandatory systems(Gorla et al., 2010).

Based on the literature's concepts, theories, and research on service quality, the following service quality model has been derived, comprising three observed variables, as shown in Figure 2.21.

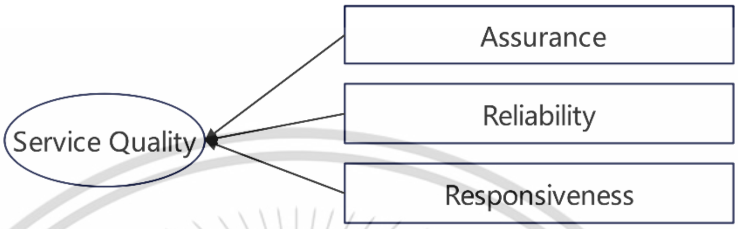


Figure 2.21 Service Quality Model

2.13 Concept and Theories of ERP Use

Specialized studies in information systems define system usage as the level of effort put forth in interacting with the information system, representing the output provided by the system within a unit of time(Lutfi, 2023). System usage depends on users' assessment of the system and whether they perceive it to enhance task performance and decision quality (Turkey et al., 2019). This naturally leads to increased user satisfaction and frequency of use (Alzoubi & Snider, 2020).

Table 2.18. Definitions of System Use

Scholar/Researcher	Definitions
(Choi et al., 2021)	System use is an important measure of system success.
(Ling et al., 2012)	A system is useful if it provides net benefits, as individual citizens decide on adoption based on benefits–risk assessment.
(S.-K. Lee & Yu, 2012)	Use recipient consumption of the output of an information system.
(DeLone & McLean, 2003)	Real usage is described as the extent to which individuals use the functions of information systems based on the nature, frequency, and period of use of particular technologies.
(Efiloğlu Kurt, 2019)	System use can be defined as the frequency or the degree of the use of the system.
(Petter et al., 2013)	System use is defined as" Intention to Use, or the users' belief

Scholar/Researcher	Definitions
	about their likelihood to use the IS.”
(Petter et al., 2008)	System use is defined as: “the degree and manner in which staff and customers utilize the capabilities of an information system.

Table 2.18 provides researchers' definitions of service usage. Empirical studies have employed various measures of information system usage, including usage intent, frequency of use, self-reported usage, and actual usage. These different measures may lead to mixed results between usage in the D&M model and other conceptualizations. For instance, studies have found significant differences between self-reported and actual usage(Payton & Brennan, 1999). Generally, heavy users tend to underestimate usage, while light users tend to overestimate it. This suggests that self-reported usage might not be a good substitute for system usage. However, Venkatesh et al. (Venkatesh et al., 2003), for example, found a significant relationship between usage intention and actual usage. Moreover, usage frequency might not be the best way to measure information system usage. Doll & Torkzadeh(Torkzadeh & Doll, 1999) suggested that more usage is sometimes better and developed a tool based on usage effectiveness rather than frequency or duration to measure usage. Burton-Jones & Straub (Burton-Jones & Straub, 2006) re-conceptualized system usage by incorporating the structure and functionality of system usage. Others have recommended examining usage from a multi-level perspective across individuals and organizations to understand this concept better (Burton-Jones & Gallivan, 2007).

Table 2.19. Literature on System Use

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Burton-Jones & Straub, 2006)	ERP Use	the structure of systems use the function of systems use	Literature review research
(Petter et al., 2013)	ERP Use	Frequency of use	ERP
(Bjelland & Haddara, 2018)	ERP Use	Frequency of use	ERP
(Chien & Tsaur, 2007)	ERP Use	Operating frequency ERP electronic report volume ERP usage function	ERP
(H.-Y. Lin et al.,	ERP Use	Ration of the use of the ERP	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
2006)		system Frequency of the use of report/information Degree of voluntary use of the ERP system Connection time	
(Lutfi, 2023)	ERP Use	Used frequently Service time Dependence	Accounting Information System
(DeLone & McLean, 2003)	ERP Use	Nature of use Navigation patterns Number of site visits Number of transactions executed	E-Commerce
(H.-Y. Lin et al., 2006)	ERP Use	Frequency of the use of report/information Degree of voluntary use of the ERP system Connection time	ERP

Table 2.19 presents a summary of the literature review on system usage. According to the literature, this study's observed information quality variables include 1) usage frequency, 2) usage quantity, and 3) Extended Use.

1. Usage Frequency

User satisfaction naturally leads to increased usage frequency (Alzoubi, 2020). User satisfaction refers to the extent to which users believe that the system's information can meet their needs. This implies that satisfaction originates from users' experiences in information search, satisfaction, and decision outcomes (Lutfi et al., 2022).

2. Usage Quantity

In the IS Success Model's specialized research, system usage is defined as the level of effort expended in the interaction with the information system, representing the output quantity provided by the system in a unit of time(Lutfi, 2023). System usage depends on users' evaluations of the system, that is, whether users perceive it enhances task performance and decision quality or vice versa (Turkey et al., 2019)(Tarhan, 2019).

3. Extended Use

Conceptualizing the system usage of ERP systems must recognize it as a rich, highly contextualized behavior. Since system usage typically involves the system, users, and tasks, the richness measure of system usage should ideally capture the quantity of these elements(Burton-Jones & Straub, 2006). In this regard, we consider extended use as an appropriate metric, as it considers the system context (i.e., breadth of usage) and task context (i.e., diversity in usage across different tasks) to conceptualize system usage. For implemented ERP systems, even though usage is mandatory, in this context, a measure with content validity and contextualization must reflect the autonomy of this usage and key usage behaviors contributing to the post-implementation success of the system. Therefore, extended use is defined as the extent to which employees are willing to use more features of the system and apply the ERP system to perform more tasks considered an effective metric for assessing the success of ERP systems(Bhattacherjee & Premkumar, 2004).

Extended use is crucial for the post-implementation success of ERP systems, as most companies implementing ERP rarely fully leverage the potential of their systems and achieve the promised return on investment(Jasperson et al., 2005). Research has found that in the early stages of implementation, users often need help understanding how to use the ERP system to support their work, and only a limited set of features are used. Simple and superficial usage of the ERP system is often observed when users initially adopt it (Po-An Hsieh & Wang, 2007). Over time, if users can discover additional useful features and apply them to their work, they may gain the full benefits of the ERP system (Park & Kim, 2008). In other words, by going beyond routine system usage, employees have the opportunity to fully exploit the system's assumed richest potential for supporting their work, thereby enhancing productivity and performance (Po-An Hsieh & Wang, 2007), as shown in Figure 2.22.

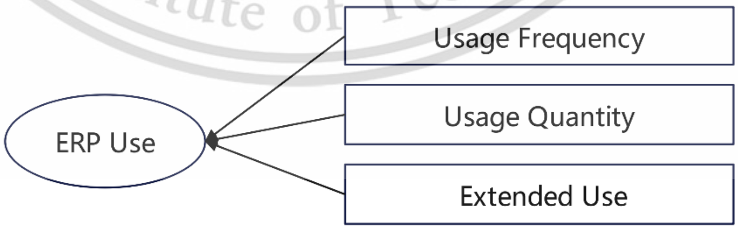


Figure 2.22 ERP Use Model

2.14 Concept and Theories of User Satisfaction

User satisfaction is considered one of the key dimensions of information system success. According to Delone and McLean (DeLone & McLean, 1992), user satisfaction is closely associated with system usage. Doll and Torkzadeh (Torkzadeh & Doll, 1999) developed a widely used tool for measuring user satisfaction called End-User Computing Satisfaction (EUCS). Palvia (Object, n.d.,1996) devised another comprehensive satisfaction model for small business users employing information technology. Palvia(Object, n.d.,1996)integrated factors like information quality, service quality (vendor, documentation), security, and hardware adequacy as precursors to user satisfaction. Delone and McLean(DeLone & McLean, 1992) delineated a detailed categorization of six major dimensions of information system success, where user satisfaction emerged as the most extensively used single metric. User satisfaction, as defined by Seddon and Kiew(P. Seddon & Kiew, 1996), pertains to the pleasant or unpleasant user experience related to the anticipated benefits of interacting with information systems. Similarly, Doll and Torkzadeh (Torkzadeh & Doll, 1999) defined user satisfaction as the user's perception of using a specific computer application, closely tied to the system's assistance in meeting all customer needs (P. Seddon & Kiew, 1996). Table 2.18 shows the definition of user satisfaction.

Table 2.20. Definitions of User Satisfaction

Scholar/Researcher	Definitions
(Ives et al., 1983)	User satisfaction measures the successful interaction between an information system and its users. It is also defined as the extent to which learners believe the information system meets their needs.
(Rizkiana et al., 2021)	Satisfaction is a subjective evaluation of the various.
(Ives et al., 1983)	User satisfaction is the degree to which the user feels that the system meets their information needs.
(S.-K. Lee & Yu, 2012)	User satisfaction recipient response to the use of the output of an information system.
(Alshibly, 2014)	User satisfaction is the employee's emotional attitude towards electronic human resource management interactions directly using it.
(Xinli, 2015)	User satisfaction is the degree to which users perceive systems as useful and desire their reuse,
(Petter et al., 2013)	User Satisfaction is defined as: "Users' level of satisfaction with the IS. Single item measures user satisfaction, semantic differential scales to assess attitudes and satisfaction with the system, and multiattribute scales to measure user information satisfaction. "

User satisfaction is considered the most common measure of success in information systems (P. Seddon & Kiew, 1996)(as shown in Table 2.20 above). In the context of websites, user satisfaction is crucial for establishing long-term relationships and plays a pivotal role in maintaining profitability and ensuring the website's overall success (Patterson, 1997). User satisfaction has consistently been a continual benchmark for information system success (for example, (Bhattacherjee & Premkumar, 2004; DeLone & McLean, 2002; McKinney et al., 2002)). Moreover, user satisfaction is also seen as a measure of success in the context of willingness (DeLone & McLean, 2003; McKinney et al., 2002; Schaupp et al., 2006).

Table 2.21. Literature on User Satisfaction

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Torkzadeh & Doll, 1999)	User Satisfaction	Content Accuracy Format Ease of use Timeliness	IS
(Petter et al., 2013)	User Satisfaction	Overall satisfaction with IS applications User information satisfaction	ERP
(DeLone & McLean, 1992)	User Satisfaction	Satisfaction with specific matters Overall satisfaction Individual measurement Multiple measurements Information satisfaction Discrepancy between required information and received information Enjoyment Software satisfaction Decision satisfaction	IS
(Chien & Tsaur, 2007)	User Satisfaction	Project Satisfaction Information satisfaction User satisfaction	ERP
(H.-Y. Lin et al.,	User Satisfaction	Information satisfaction	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
2006)		Software satisfaction System interface satisfaction Overall satisfaction The ERP project satisfaction	
(Lutfi et al., 2022)	User Satisfaction	Software satisfaction Information satisfaction Satisfaction with use	Accounting Information System
(DeLone & McLean, 2003)	User Satisfaction	Repeat purchases Repeat visits User surveys	E-Commerce
(Chaveesuk & Hongsuwan, n.d.,2017)	User Satisfaction	Efficiency Suitability Supporting	ERP
(Sedera & Gable, n.d.,2003)	User Satisfaction	Information Systems Overall Enjoyment	ERP

Table 2.21 presents a summary of the literature review on user satisfaction. User satisfaction is the feeling of pleasure or dissatisfaction toward implementing a system. Additionally, user satisfaction positively impacts performance and job satisfaction, including supporting the improvement of productivity and efficiency of ERP systems (Bento & Costa, 2013; Chaveesuk & Hongsuwan, n.d.,2017).

Therefore, three items are used to measure user satisfaction (Chaveesuk & Hongsuwan, n.d.,2017). In user-centered research, designing technical or business processes aims to make participants' work as effective and satisfying as possible(Alter, 2002). Hence, this study measures the impact of user-centeredness on users' satisfaction when using the ERP system. Theoretically, an effective information system will provide a high level of user satisfaction:

1)Efficiency, 2) Applicability, 3) Supportiveness

Based on the concepts, theories, and research on user satisfaction in the literature, an innovative model has been developed, encompassing three observed variables, as shown in Figure 2.23.

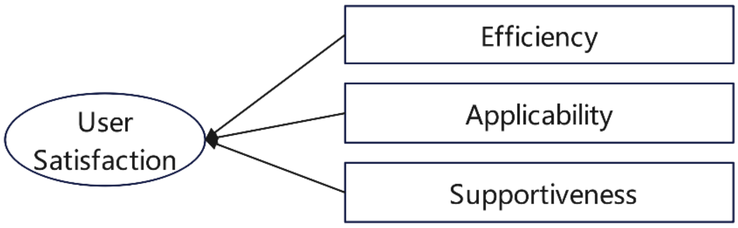


Figure 2.23 User Satisfaction Model

2.15 Concept and Theories of SMEs performance

Net profit is also considered one of the most crucial metrics for measuring the success of information systems, reflecting the extent to which information systems contribute to the success of various stakeholders, whether positively or negatively. Sometimes, this contribution is assessed by evaluating individual or organizational impacts (Williams et al., 2011). However, this study examines the benefits for small and medium-sized enterprises (SMEs) as performance, exploring and discussing the impacts on SMEs.

Table 2.22. Definitions of SMEs performance

Scholar/Researcher	Definitions
(Ives et al., 1983)	User satisfaction measures the successful interaction between an information system and its users. It is also defined as the extent to which learners believe the information system meets their needs.
(S.-K. Lee & Yu, 2012)	The net benefits are the most important success measure as they capture the balance of the positive and negative impacts of e-commerce on customers.
(DeLone & McLean, 2003)	It identifies improved customer experience, entertainment, reduced shopping costs, and real-time marketing offers as individual benefits from e-commerce.
(P. B. Seddon et al., 1999)	Net benefits is a comprehensive measure comparing past and expected benefits against past and expected costs attributed to an information technology system.
(Efiloğlu Kurt, 2019)	Net benefits are the contributions the information system provides at the individual, group, or organizational levels.
(Rizkiana et al., 2021)	Net benefits are grouped into two dimensions: individual impact and organizational impact. Net Benefits "Extent to which IS contributes to the success of individuals, groups, organizations, industries, and

Scholar/Researcher	Definitions
	nations.”
(Petter et al., 2013)	Improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, the creation of jobs, and economic development.

Table 2.22 presents researchers' definitions of net benefits. The anticipated primary benefits from Enterprise Resource Planning (ERP) are closely linked to the degree of integration facilitated among various organizational functions. Following adoption, the expected improvements in business performance might stem from operational and strategic gains (R.L. Jenson, 1995). Some of the most significant intangible benefits encompass internal integration, enhancements in information and processes, and improved customer service. Meanwhile, the primary tangible benefits include cost efficiencies in inventory, personnel, procurement, enhanced productivity, cash/order management, and overall profitability. However, when assessing the actual realized benefits by surveyed companies, it appears evident that they have yet to achieve the anticipated improvements in profitability or reductions in personnel, inventory, or system maintenance costs as expected.

Table 2.23. Literature on SMEs performance

Scholar/Researcher	Latent Variables	Observed Variables	Context
(DeLone & McLean, 1992)	SMEs performance	Application scope and coverage Number of key applications Reduction in operating costs Reduction in staff Overall productivity improvement Increased revenue Increased sales Increased market share Increased profits Return on investment	Literature

Scholar/Researcher	Latent Variables	Observed Variables	Context
		Return on assets Performance to operating expenses ratio	
(Torkzadeh & Doll, 1999)	SMEs performance	Task Productivity Task innovation Customer satisfaction Management control	ERP
(DeLone & McLean, 2003)	SMEs performance	Cost savings Expanded markets Incremental additional sales Reduced search costs Time savings	E-Commerce
(Petter et al., 2013)	SMEs performance	Cost reduction Productivity improvement Time savings	ERP
(Sedera & Gable, n.d.,2003)	SMEs performance	Organizational costs Staff requirements Cost reduction Overall productivity Improved outcomes/outputs e-government Increased capacity Business Process Change	ERP
(Chien & Tsaur, 2007)	SMEs performance	Enhance competitiveness Organizational coordination ability Increase productivity	ERP
(H.-Y. Lin et al., 2006)	SMEs performance	Job performance Decision effectiveness Accurate readiness for problems	ERP

Scholar/Researcher	Latent Variables	Observed Variables	Context
(Bernroider, 2008)	SMEs performance	Business process improvement Reduced cycle times Enabler for desired business processes Enhanced decision making Improved innovation capabilities	ERP
(Chaveesuk & Hongsuwan, n.d.,2017)	SMEs performance	Reduction in cycle time Reduce failure of process Redundancy of data Improving decision-making	ERP

Table 2.23 presents a literature review summary on performance. Based on the literature, variables related to performance observed in this study include 1) operational efficiency, 2) customer satisfaction, and 3)innovation growth.

ERP systems can enhance the transparency of the entire supply chain by eliminating information asymmetry and improving information speed. Therefore, adopting ERP may be associated with significant benefits regarding supply chain efficiency and inter-organizational communication (Akkermans et al., 2003). The impact of factors influencing ERP system implementation on organizations is reflected in net benefits. For small and medium-sized enterprises, this dimension of benefits affects organizations through operational efficiency, customer satisfaction, and innovation growth, as shown in Figure 2.24.

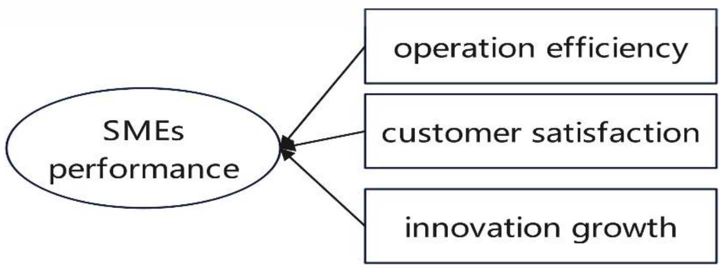


Figure 2.24 Net Benefits Model

2.16 Variable Relationship Analysis

2.16.1 Organizational Direct Impact on ERP Use

Hart highlighted several factors captured within organizational dimensions: company size, demographics, business scope, and the size of small and medium-sized enterprises (SMEs) (Awa et al., 2015). The text further indicates that company size has a significant positive correlation, being a critical adoption factor for RFID, e-commerce, and ERP, though not crucial for EDI adoption. Other studies emphasize that smaller enterprises often need more resources for entrepreneurship. Additionally, demographics show a significant negative correlation, moderately impacting ERP adoption. Research supports how demographic differences among management and their understanding of innovation affect organizational strategies. Business scope exhibits a significant negative correlation.

Other studies(D. Hwang & Min, 2015; K. Zhu et al., 2004; K. Zhu & Kraemer, 2005) emphasize that smaller-sized companies typically need more essential resources for entrepreneurship. Moreover, demographics show a notable negative coefficient, moderately affecting ERP adoption. Demographics are considered a crucial adoption factor, especially among non-adopters. Research studies(K. Zhu et al., 2004) support how demographic differences among management and their understanding of innovation impact organizational strategies. Business operations' scope presents a significant negative coefficient, indicating it's a critical adoption factor, although less of an obstacle for adopters than non-adopters. Business operations' scope has been repeatedly confirmed as a predictive factor for adoption(Tornatzky et al., 1990). Research indicates that broader business operations require e-commerce to reduce costs, integrate demands, improve inventory management, and benefit from synergies between modern applications and traditional business (Bailey & Bakos, 1997). Adopters recognize that organizational structure is a key adoption driver while being a smaller barrier for non-adopters. This finding supports previous research emphasizing the influence of social groups and others on behavior (Awa et al., 2015).

Weiner's Theory of Organizational Implementation Effectiveness (as shown in Figure2.25) (Rosemann & Wiese, n.d.,2008) serves as a conceptual model to guide the identification of determinants of Organizational Readiness for Change (ORC) (Rosemann & Wiese, n.d.,2008). ORC refers to organizational members' collective determination and capability to implement change, termed change commitment and efficacy. In essence, change value and information assessment can be predicted by background factors that broadly influence an organization's readiness for change, potentially acting as facilitators and barriers. The theory posits that when organizational readiness is high, organizational members are more likely to initiate change, invest greater effort in supporting change, and exhibit greater persistence in the face of obstacles or setbacks during implementation. The possible outcome is greater consistency and higher quality of intervention delivery (i.e., effective implementation). This theory is utilized as a guide for formulating interview guidelines, framing survey questions, and directing qualitative data analysis.

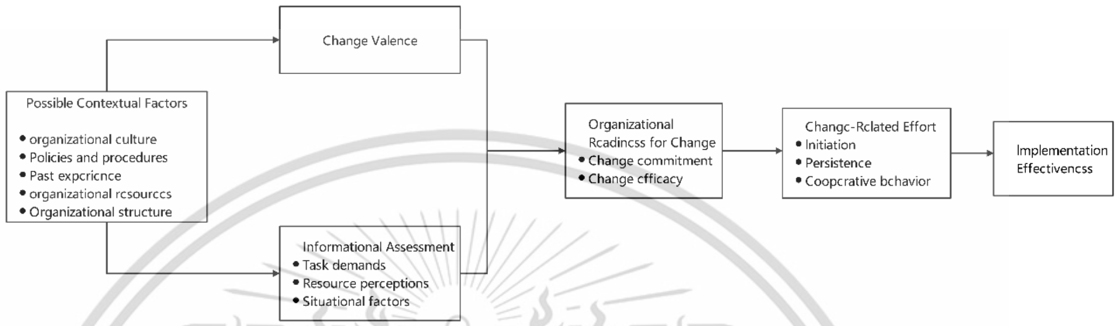


Figure 2.25 Determinants and outcomes of Organizational Readiness for change

SOURCE:(Weiner,2020)

The review of the above literature indicates that this study concludes a positive relationship between organizational firms and the use of enterprise resource planning (ERP) systems, as shown in Figure 2.26.

Hypothesis 1：

Figure 2.26 Relationship Model for organization and ERP use

2.16.2 Environment Direct Impact on ERP Use

Regarding the environment, external support and competitive pressures have been considered; both factors exhibit a significant negative correlation. Therefore, these two factors are key adoption drivers, yet they do not offer a partial explanation for ERP adoption. There are two aspects to explaining these findings: firstly, adoption is still in its infancy and needs to be more widely employed to establish competitive advantage; secondly, support schemes are seldom transparent and smoothly delivered (Awa et al., 2015). Previous research has yielded mixed results regarding the impact of competitive pressure on adoption; some scholars propose direct effects (K. Zhu & Kraemer, 2005), while others suggest indirect effects(C. Lee et al.,

1994) on adoption decisions, believing that an organization's willingness to adopt innovation largely depends on its intrinsic need for innovation(Bhattacherjee & Premkumar, 2004). Chauhan (Chauhan & Jaiswal, 2016) found a minimal impact of the external environment on ERP adoption decisions. Many studies acknowledge the strategic necessity of competitive pressure in altering game rules, restructuring industry structures, and surpassing competitors(K. Zhu & Kraemer, 2005). Other studies(Bhattacherjee & Premkumar, 2004) confirm external support as a crucial adoption determinant. In some countries like Nigeria, the dissemination of ICT platforms could be faster, and the issue of network externality is more associated with enterprises making substantial investments. This finding supports research proposing the integration of ERP and other related technologies and the need for integrated and electronically compatible transaction systems, contradicting the study by Wymer and Regan (Wymer & Regan, 2005), which found pressure from alliance companies not to be a significant adoption determinant(Awa et al., 2015).

Payton (Payton & Brennan, 1999) analyzed the significance of competitive pressure on adoption and suggested that modern technologies have changed competition rules, reshaped industries, and revealed novelties in surpassing competitors. Studies confirm that external support is a significant driver for ICT success (DeLone & McLean, 1992b) and a determining factor in actual adoption (Bhattacherjee & Premkumar, 2004). Scholars (Wymer & Regan, 2005)captured network externality with trading partners in their frameworks to ensure electronic interactions and transactions along the value chain. Awa, Ojiabo, et al.(Awa et al., 2015) propose that most ICT platforms transcend the digitization of individual enterprise operations; there is a need to establish comprehensive, electronically compatible transaction systems that connect enterprises with their trading partners to provide internet services for each other.

The adoption of Enterprise Resource Planning (ERP) is a decision that requires careful consideration, conscious efforts in search, and the use of the Bass model to mitigate perceived technological, financial, and social risks (Awa et al., 2015). Most traditional adoption theories have been criticized for harboring the misconception of accumulating traditions (Barki, n.d.,2007), technological determinism, and forecasts centered on technology Venkatesh et al., n.d.,2007), implying that technology, rather than individuals, determine the structure and behavior of an organization. By merging the construction of the T-O-E framework with some newly proposed constructions in the research model, social and behavioral constructivism has introduced human and non-human participants of the technological and social systems into the network. The assumptions of this model resemble Actor-Network Theory (ANT) as it emphasizes the dynamic capabilities and interactions of technological and social systems. The research framework is illustrated in Figure 1. The figure reports three adoption-driving factors (see (Tornatzky et al., 1990): technology, organization, and environment. These constructs are selected based on their rich academic research and specific applications to ERP solutions.

Woosang Hwang (W. Hwang & Min, 2013) suggested that four constructs (EE, IE, ERPI, and SCAP) could potentially impact the performance of focal company suppliers, as depicted in Figure 2.27. To ascertain the critical factors for successful ERP implementation, it was deduced that a company's external environment (EE) has a relatively minor impact on its decisions to adopt and implement ERP. However, through the mediating effect of the internal environment (IE), EE still indirectly influences ERP adoption and implementation (ERPI) decisions. Additionally, the study found that ERP can enhance the supplier capabilities of ERP adopters (SCAP).

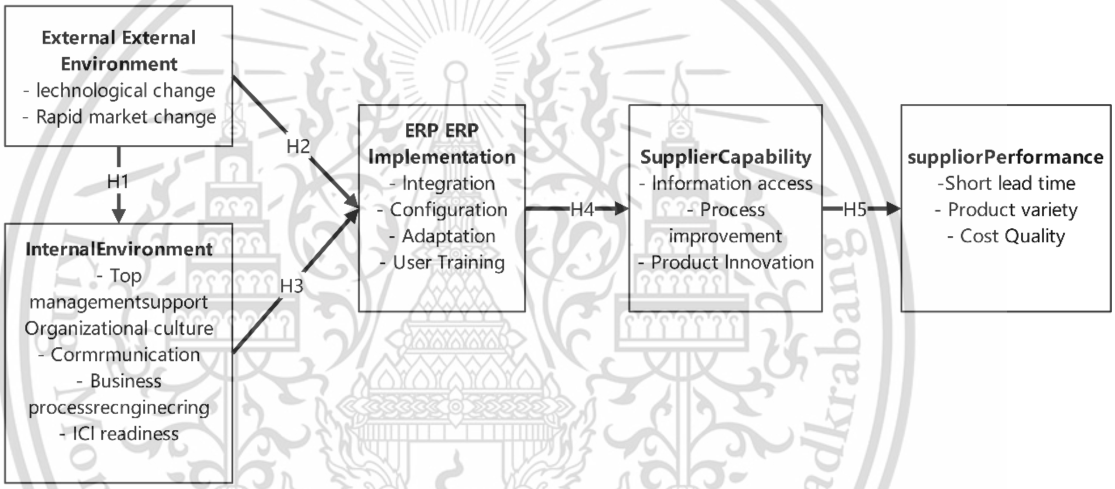


Figure 2.27 ERP Implementation Model

Source: (Woosang Hwang, 2013)

The review of the above literature indicates that this study concludes a positive relationship between the environment and the use of enterprise resource planning (ERP) systems in enterprises, as shown in Figure 2.28.

Hypothesis 2:

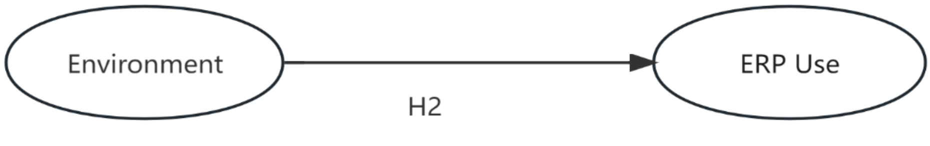


Figure 2.28 Relationship Model for environment and ERP use

2.16.3 The relationship between task characteristics and task-technology fit

Lu (Lu & Yang, 2014) studied the impact of task, social, and technological features on users' intentions when using SNS by integrating the Task-Technology Fit model and Social Capital Theory. The results showed that tasks were widely defined as actions where individuals transform inputs into outputs(Goodhue & Thompson, 1995). Tasks are work segments through which a person achieves objectives via actions. For student users, tasks refer to their course assignments, while for users engaged in specific jobs, tasks refer to their work. Therefore, we define tasks as work or course assignments individuals strive to complete. Social-technical fit had a dominant impact on users' intentions to use SNS, surpassing the influence of task-technology fit. This suggests the need to rethink the current Task-Technology Fit model by incorporating necessary social constructs in SNS research, as depicted in the model Figure 2.29 below.

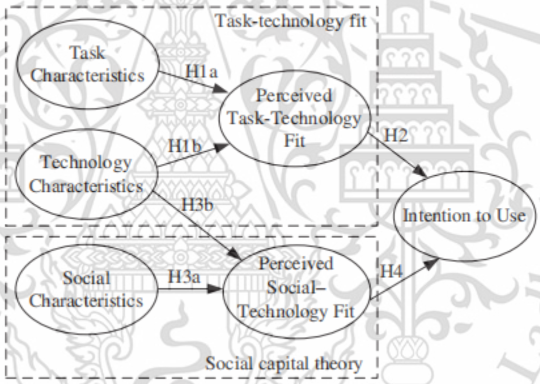


Figure 2.29 Intention to Use

Source:(Lu & Yang, 2014)

Carlos Tam (Carlos Tam, 2016) focused on mobile banking as the subject of study and proposed a model that combines the DeLone & McLean Information System Success Model and the Task-Technology Fit (TTF) model to evaluate the impact of mobile banking on individual performance. The results indicated that usage and user satisfaction are important prerequisites for personal performance and the importance of task-technology fit in moderating the effect of usage on individual performance. From a broad task-technology fit (TTF) perspective, tasks are individuals' actions to transform inputs into outputs to meet their information needs(Goodhue & Thompson, 1995). Task characteristics are the features of tasks that users may perform using information technology. Technological features are the tools (hardware, software, data) end users employ in executing tasks (Goodhue & Thompson, 1995). Attributes of these technologies, such as design and other factors, may influence usage and user perceptions of the technology. Design affects how technology is used and the extent of its use (Cheng, 2019). Therefore, poor or unexpected design choices may result in the technology being overlooked or replaced by other technologies. as depicted in the model Figure 2.30 below.

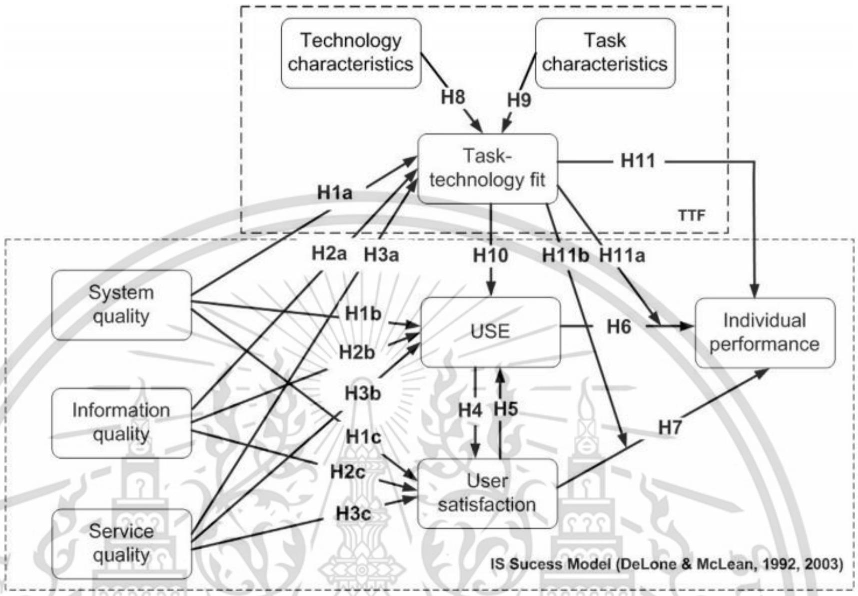


Figure 2.30 Research model

Source: (Carlos Tam, 2016)

The above literature review indicates that this study concludes a positive relationship between task characteristics and task-technology fit, as shown in Figure 2.31.

Hypothesis 3:

Figure 2.31. Relationship Model for Task characteristic and task-technology Fit

2.16.4 The relationship between task-technology fit and ERP use

Osama Isaac(Isaac et al., 2019) focused on the Internet as the subject of study, with the author concentrating on extending UTAUT by incorporating a mediating variable (i.e., Task-Technology Fit) and four outcome variables (i.e., decision quality, communication quality, knowledge acquisition, and user satisfaction). The researchers defined Task-Technology Fit as the degree to which a system meets user needs, aligns with user interests, and matches tasks (W.-S. Lin & Wang, 2012). Lu and Yang(Lu & Yang, 2014) described it as the degree to which a system fulfills all tasks and meets task requirements (Lu & Yang, 2014). Task-Technology Fit is crucial for technology use within organizations(D'Ambra & Wilson, 2004). Numerous studies have explored the positive impact of Task-Technology Fit on usage behavior. In their research, Norzaidi and Salwani(Mohamed et al., 2009) investigated Internet technology and found that Task-Technology Fit could predict actual technology usage. Similar results have been observed in other studies, where better alignment between system and user interests led to higher system usage rates(D'Ambra & Wilson, 2004; Mohamed et al., 2009), as depicted in the model Figure 2.32 below.

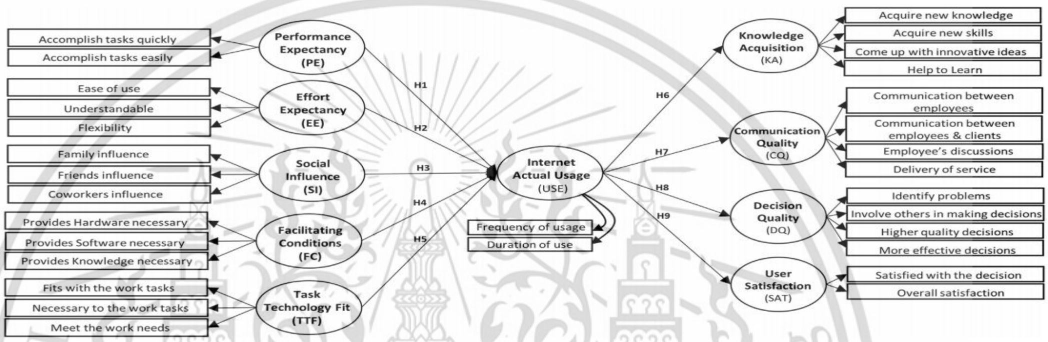


Figure 2.32 proposed extended UTAUT model

Source: (Isaac et al., 2019)

The above literature review indicates that this study concludes a positive relationship between task-technology fit and ERP use, as shown in Figure 2.33.

Hypothesis 4:

Figure 2.33 Relationship Model for task-technology Fit and ERP Use

2.16.5 The relationship between task-technology fit and SMEs performance

Carlos Tam (Carlos Tam, 2016) focused on mobile banking as the subject of study and combined the DeLone & McLean Information System Success Model with the Task-Technology Fit (TTF) model to assess the impact of mobile banking on individual performance. Task-Technology Fit (TTF) refers to the perceived match between task characteristics and technological features, positively influencing technology usage and individual performance(Goodhue & Thompson, 1995). Users who perceive that technology supports their tasks exhibit good individual performance. Therefore, the expected Task-Technology Fit is predicted to be an important antecedent of mobile banking usage and individual performance, as depicted in the research model Figure 2.34 below.

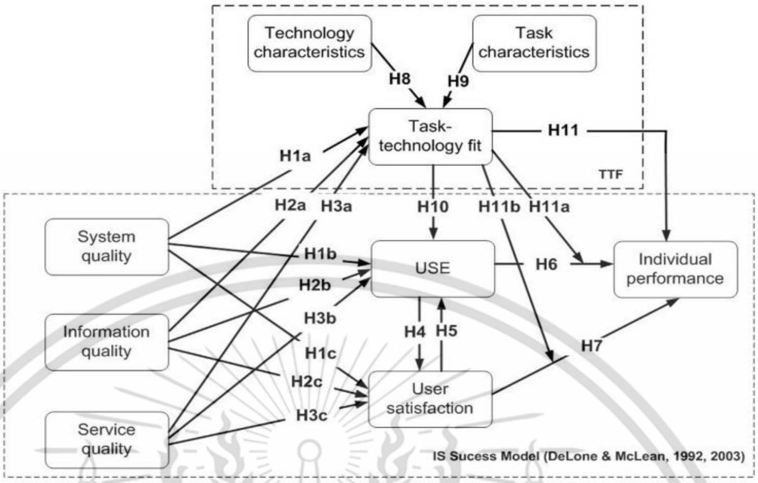


Figure 2.34 Research model

Source: (Carlos Tam, 2016)

The review of the above literature indicates that this study concludes that there is a positive relationship between task-technology fit and SME performance, as shown in Figure 2.35.

Hypothesis 5:

Figure 2.35 Relationship Model for task-technology Fit and SMEs performance

2.16.6 The relationship between human self-efficacy and ERP use

Researchers have found that high levels of self-efficacy can inspire individuals to exert greater effort to achieve anticipated outcomes, that is, to attain confirmation. Similarly, Chen et al. (Wen & Chen, 2010) demonstrated in their study on online shopping that internet self-efficacy can determine the impact on confirmation. Fagan et al. (Fagan et al., n.d.,2004) pointed out that technological self-efficacy reduces individuals' anxiety about using technological innovations. Individuals with higher technological self-efficacy are more likely to adapt to technological innovations than those with lower technological self-efficacy(Compeau & Higgins, 1995). In managing wealth using smartphones, users with higher technological self-efficacy believe they can download and operate wealth management applications (Hong, Eunyoung, 2014). These beliefs may generate positive behaviors, thus achieving the expected performance. Therefore, for users who perceive themselves as highly capable of performing specific smartphone tasks, perceived performance may exceed expectations of actual application.

Wen-Lung Shiau and Ye Yuan (Shiau et al., 2020)(as shown in Figure 2.36) employed the Expectation Confirmation Wen-Lung Shiau and Ye Yuan Model in conjunction with Self-Efficacy Theory to identify factors explaining the level of sustained intention in financial technology (fintech) adoption. Utilizing data collected from 753 FinTech users, this study applied Partial Least Squares Structural Equation Modeling to compare and select the research model with the strongest predictive power. The results indicated that financial self-efficacy, technological self-efficacy, and confirmation all positively influence perceived usefulness. Among these factors, economic and technological self-efficacy, directly and indirectly, affect perceived usefulness through confirmation. Perceived usefulness and confirmation are positively correlated with satisfaction. Lastly, perceived usefulness and satisfaction positively impact the sustained intention of fintech adoption.

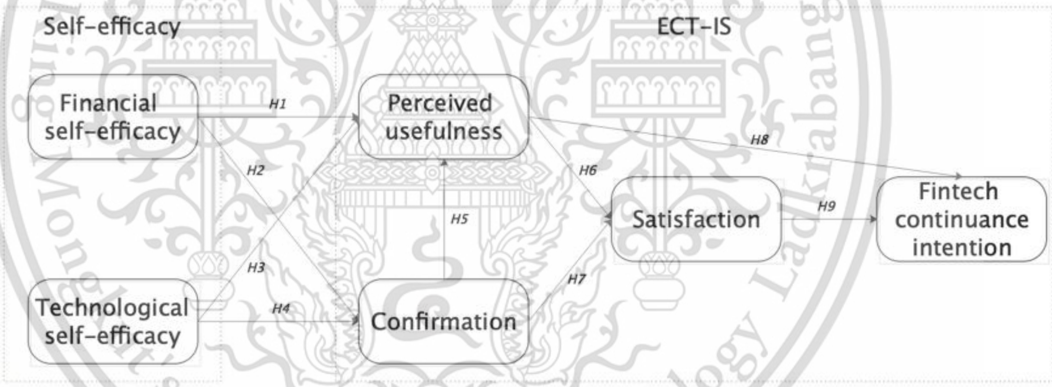


Figure 2.36 Self-efficacy and ECT-IS model

Source: (Shiau et al., 2020)

Based on the literature review, this study concludes a positive correlation between human self-efficacy and ERP use in small and medium-sized enterprises, as shown in Figure 2.37.

Hypothesis 6:

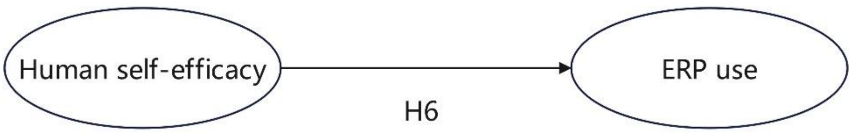


Figure 2.37. Relationship Model for task-technology Fit and SMEs performance

2.16.7 The relationship between human self-efficacy and user satisfaction

One intangible asset in an organization is human resources, involving employees' capabilities, knowledge, skills, behavior, attitudes, and talents. Human resources significantly build shareholder value(Kwamboka, n.d.,2005). Recognizing individuals' importance and value contributes to personal and organizational success (Alshibly, 2014).

In the literature review, key factors influencing ERP implementation include human resources. Human resources are uncontrollable and unpredictable but crucial for organizational success. Therefore, enhancing preparedness and understanding of human resources benefit enterprises (Onlaor & Rotchanakitumnuai, 2010).

Singha Chaveesuk et al. (Chaveesuk & Hongsuwan, n.d.,2017) aimed to study which factors are crucial for ERP in Thai organizations(Figure 2.38). They collected data from 306 respondents involved in ERP system implementation and analyzed the data using Structural Equation Modeling (SEM). The results indicated that system quality and information quality directly impact user satisfaction. Additionally, personnel quality not only directly affects user satisfaction but also influences the success of ERP implementation.

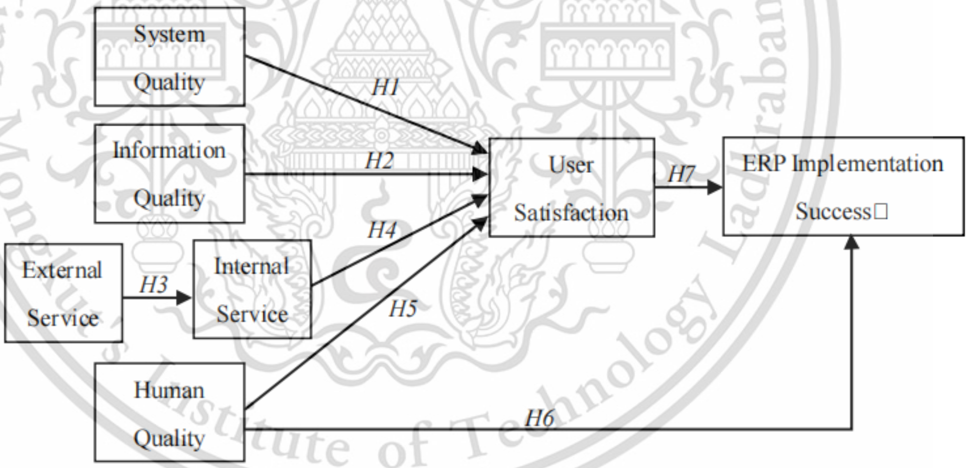


Figure 2.38 A proposed model of ERP implantation success in Thailand

Source: (Singha Chaveesuk,2017)

Reviewing the literature, this study concludes a positive correlation between human self-efficacy and user satisfaction in small and medium-sized enterprises, as shown in Figure 2.39.

Hypothesis 7:

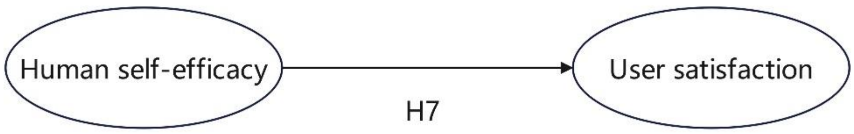


Figure 2.39 Relationship Model for human self-efficacy and user satisfaction

2.16.8 The Relationship between human self-efficacy and SMEs performance

According to the research by Duan et al. (Duan et al., 2015), the success of ERP system implementation can be measured from four dimensions: user satisfaction, individual impact, organizational impact, and expected improvement in business performance. In our study, we only considered the first two metrics since our unit of analysis is individuals. Individual impact includes enhancing personal productivity, improvement of task performance, decision effectiveness, quality, and the time required to make decisions. Previous research developed five items to measure performance improvement using ERP (PER). Four of these items are derived from studies by Dimoka et al. and Gefen et al., involving the degree of improvement in work performance (PER1), the degree of increased work productivity (PER2), the degree of increased task execution speed (PER3), and the degree to make task execution easier (PER4). Additionally, it includes the degree of overall satisfaction with the ERP system (PER 5).

Hwang (Y. Hwang, 2005) studied the impact of users' absorptive capacity on the use of Enterprise Resource Planning (ERP) in the context of South Korea(as shown in Figure 2.26). The three components considered were understanding, absorbing, and applying ERP knowledge. It was found that users' ability to absorb and apply knowledge has both a direct and an indirect impact on its value. The ability of users to understand ERP knowledge was found to influence their performance through the absorption and application of knowledge.

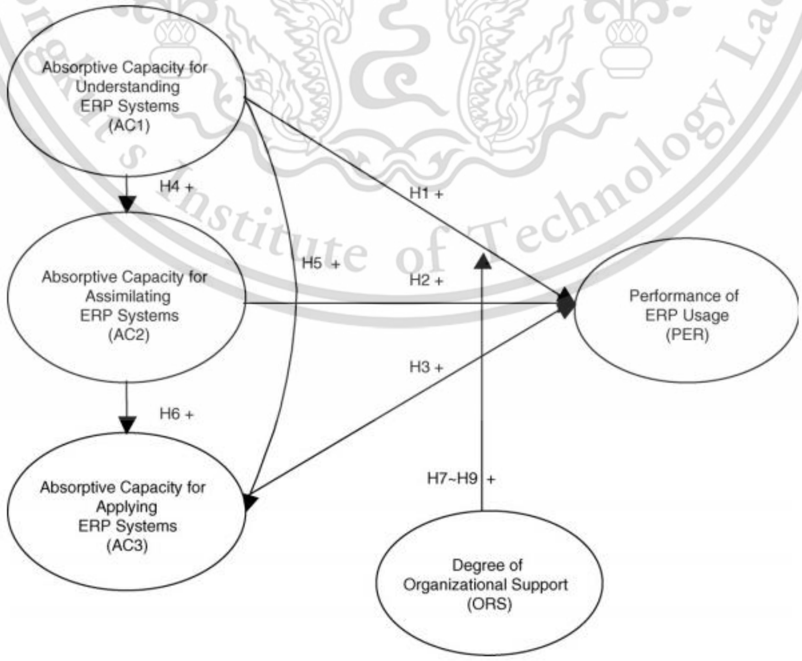


Figure 2.40 Performance of ERP usage model

Source:(Y. Hwang, 2005)

After reviewing the literature, this study concludes that there is a positive correlation between human self-efficacy and SMEs' performance, as shown in Figure 2.41.

Hypothesis 8:

Figure 2.41 Relationship Model for human self-efficacy and user satisfaction

2.16.9 The relationship between system quality and ERP use

In literature focusing on the individual level, there needs to be more support regarding the relationship between system quality and system usage. Many studies measure system quality as perceived ease of use and find a positive relationship between perceived ease of use and various operational uses of different systems. Perceived ease of use has been linked to system dependency(Rai et al., n.d.-b,2002), behavioral intentions to use the system(Venkatesh & Davis, 2000), extent of system usage(Po-An Hsieh & Wang, 2007). However, other studies have found a weaker correlation between perceived ease of use and actual usage (Karahanna & Straub, 1999). Additionally, it hasn't shown significant correlations with usage intentions (Kamble et al., 2023), self-reported usage(Karahanna & Straub, 1999), or system dependency(Goodhue & Thompson, 1995).

Apart from perceived ease of use, research on system quality has yielded different results. For instance, Iivari (Iivari, 2005) found a positive relationship between system quality and usage. Goodhue and Thompson(Goodhue & Thompson, 1995) discovered a significant relationship between reliability and system dependency. Another study identified a significant relationship between perceived ease of use and system usage at the organizational level, measured through different application numbers, computer-supported business task numbers, usage duration, and frequency (Igbaria & Tan, 1997). Ali (Ali et al., 2022)reported significant correlations between information system performance (perceived ease of use, accuracy, etc.) and usage frequency and system dependency. In a study determining the impact of different aspects of system quality (like relative advantage and compatibility) on usage intentions and actual usage, Agarwal and Prasad(Agarwal & Prasad, 1997) obtained different results. Venkatesh et al. (Venkatesh et al., 2003) found a significant relationship between effort expectations and voluntary and mandatory usage intentions one month after implementing a new information system. However, this relationship ceased to be substantial three and six months after the system implementation. A case study reported qualitative (Markus and

Keil, 1994) and quantitative (Gefen & Keil, 1998)results suggesting that perceived system quality doesn't guarantee system usage. Kositanurit et al. (Kositanurit et al., 2006)determined that the reliability of ERP systems has limited influence on individual users' system utilization.

At the organizational level, examinations of the relationship between system quality and usage have garnered diverse support. Caldeira and Ward (Caldeira & Ward, 2002) discovered, in their study of small and medium-sized manufacturing enterprises in Portugal(Figure 2.42), that the quality of available software in the market is a factor associated with the adoption and success of information systems.

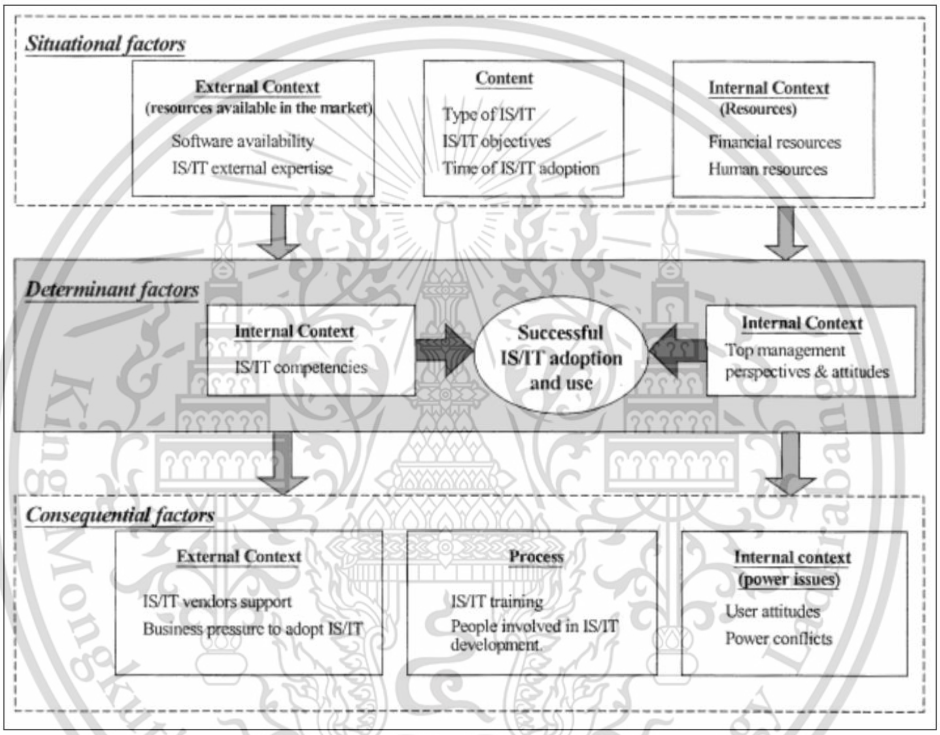


Figure 2.42 System Use Model

Source: (Caldeira, 2002)

A study found that the perceived ease of use of Manufacturing Resource Planning (MRP) systems did not significantly affect self-reported usage (Gefen, 2000). Another survey investigating factors related to the long-term use of expert systems indicated that technical aspects, such as system quality, were not the primary considerations for usage or discontinuation, further supporting the idea that system quality might not be a strong predictor of usage(Gill, 1996). However, a reversal in the case of the London Ambulance Service scheduling system showed improved system quality correlating positively with subsequent system usage (Fitzgerald & Russo, 2005). An examination of an information system at a single location, gathering responses from multiple users, revealed a negative correlation between the technical quality of the system and its usage(Weill & Vitale, 1999). Weill and Vitale suggested that this counterintuitive outcome might be due to frequently used systems being rapidly patched without adequate testing or integration with the current system, potentially influencing perceptions of the system's technical quality. Premkumar et al. (Premkumar & King, 1994) did not find that system complexity influenced the initial use and adoption of Electronic Data Interchange (EDI) systems. However, compatibility with existing hardware and software did indeed affect the initial use and adoption of EDI systems.

Based on the literature review, this study concludes a positive correlation between the quality of Enterprise Resource Planning (ERP) systems in small and medium-sized enterprises (SMEs) and the usage of these ERP systems, as shown in the following Figure 2.43.

Hypothesis 9：

Figure 2.43 Relationship Model for system quality and ERP use

2.16.10 The relationship between system quality and user satisfaction

At the individual level of analysis, a strong association exists between system quality and user satisfaction (Iivari, 2005). Various information systems have been studied, and the type of information system influences how researchers measure system quality. For instance, in Management Support Information Systems, functionality as a measure of system quality has been found to correlate with user satisfaction (Gelderman, 2002) significantly. In Knowledge Management Systems' case, system quality is closely associated with user satisfaction(Kulkarni et al., 2007). Regarding websites, system quality (reliability and download time) has significantly correlated with user satisfaction in two independent studies(Park & Kim, 2008). Perceived usability also exhibits a substantial relationship with user satisfaction (Po-An Hsieh & Wang, 2007). Researchers have further explored more general information systems and, using various measurement methods discovered a strong relationship between system quality and user satisfaction(Rai et al., n.d.-b,2002). A case study revealed a necessary but insufficient relationship between system quality and user satisfaction, along with the relationship between usability and user satisfaction(Leclercq, 2007).

Adnan Aldholay(Aldholay et al., 2018), through a survey questionnaire among public university students examining the impact of online learning software on academic performance, successfully illustrated the framework demonstrating the structural implications of online learning on student's academic achievements(as shown in figure2.44). The research also highlighted the significant roles played by user satisfaction and actual usage of online learning.

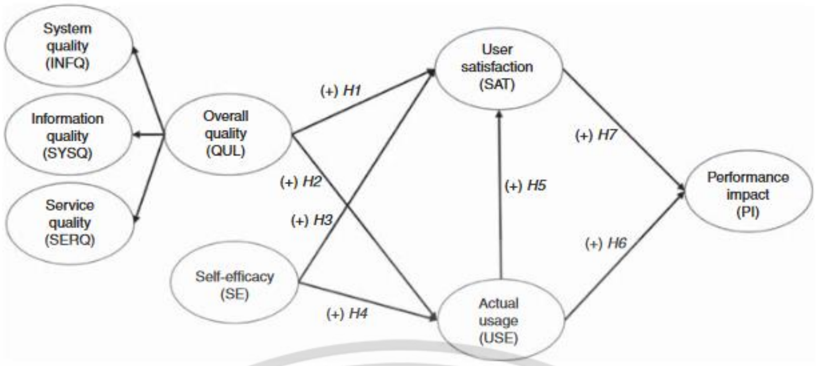


Figure 2.44 The impact of system quality on the IS success model

Source：(Adnan Aldholay， 2018)

At the organizational level, more research is needed on the relationship between system quality and user satisfaction. Therefore, drawing any conclusions about this relationship at this level is challenging. One study found a significant correlation between the functionality of advanced information systems and user satisfaction(Bénard & Şatir, 1993). In two long-term case studies, Scheepers et al. (Scheepers et al., 2006) identified a relationship between the usability of mobile computing information systems and user satisfaction. Premkumar et al. (Premkumar & King, 1994) did not find a relationship between system complexity and user satisfaction.

In reviewing the literature above, this study concludes that there is a positive correlation between the quality of ERP systems and user satisfaction in small and medium-sized enterprises, as shown in Figure 2.45.

Hypothesis 10：

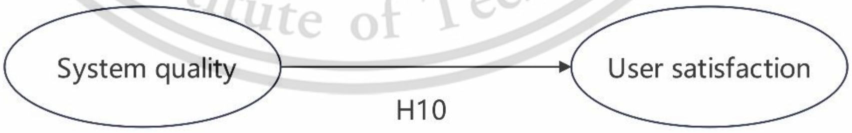


Figure 2.45. Relationship Model for system quality and user satisfaction

2.16.11 The relationship between information quality and ERP use

Until now, research on the relationship between information quality and usage at both individual and organizational levels has been relatively limited. One reason is that information quality is often seen as a component of user satisfaction rather than separately assessed as an independent construct. Most studies focus on the overall information systems success model and explore the relationship between information quality and usage (Rai et al., n.d.-b,2002).

They found a significant relationship between information quality and usage when using system dependency. A study on knowledge management systems found a significant correlation between information (or knowledge) quality and usage intention (Lotfy & Halawi, 2015). However, two studies found no significant relationship between information quality and usage intention (Iivari, 2005; McGill et al., 2003).

At the organizational level, Fitzgerald and Russo (Fitzgerald & Russo, 2005) discovered a positive correlation between information quality and system usage in their study on the London Ambulance Service scheduling system. This literature recognizes the importance of identifying failure and success factors due to the high costs associated with information system failures. The paper outlines the collapse of the LASCAD system in 1992. Subsequently, it describes and analyzes the improved system developed in 1996 using a framework derived from the literature (Sauer,1993) (as shown in Figure 2.46)to explore issues of failure and success within information systems(Beynon-Davies, 1995).

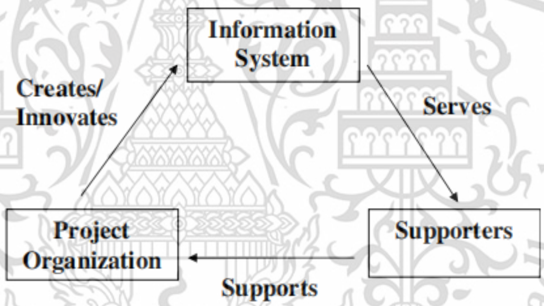


Figure 2.46 Sauer's exchange framework

Source: (Sauer,1993)

After reviewing the literature review, this study concludes a positive correlation between ERP information quality and system usage in small and medium-sized enterprises (SMEs), as shown in Figure 2.47.

Hypothesis 11:

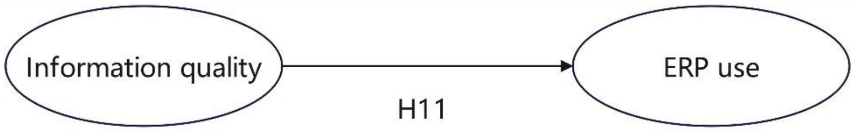


Figure 2.47 Relationship Model for information quality and ERP use

2.16.12 The relationship between information quality and user satisfaction

The literature strongly supports the relationship between information quality and user satisfaction(Iivari, 2005; Wu & Wang, 2007). Consistent findings indicate a correlation between information quality and user satisfaction at the individual level (Kamble et al., 2023; McGill et al., 2003; Rai et al., n.d.-b; P. Seddon & Kiew, 1996). Research formation quality reveals significant relationships between content, layout, and user satisfaction (Park & Kim, 2008). However, Marble(Marble, 2003) found no significant relationship between information quality measurements and user satisfaction in the ms.

At the organizational level of analysis, evidence supports the impact of information quality on user satisfaction. However, the quantity of research investigating this relationship still needs to be increased to draw strong conclusions. A qualitative study focusing on system success, data quality, and user satisfaction (assessed through user attitudes) found that data quality is directly associated with user satisfaction (Bénard & Şatir, 1993). Another qualitative case study involving multiple respondents highlighted the association between information quality (content, accuracy, timeliness, and format) and user satisfaction (Scheepers et al., 2006). A quantitative study also found significant correlations between information quality and user satisfaction with the hardware, software, and support from management in information systems (Gorla et al., 2010).

Shih-Wen Chien(Chien & Tsaur, 2007) proposed a partial extension and re-specification of the DeLone and MacLean IS Success Model for ERP systems in the paper(as shown in Figure 2.48). This research aimed to re-examine the updated DeLone and McLean model W. DeLone, E. McLean, "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update," Information Systems Journal. Data was collected from 204 ERP system users across three high-tech companies in Taiwan using the updated DeLone and McLean model. Ultimately, this study revealed that system, service, and information quality are the most critical success factors.

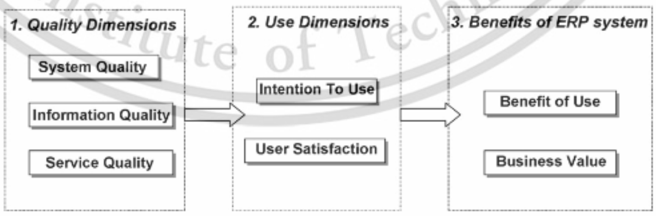


Figure 2.48 Revised ERP success model

Source: (Chien & Tsaur, 2007)

After reviewing the literature reviewed above, this study concludes a positive correlation between ERP information quality and user satisfaction in small and medium-sized enterprises (SMEs), as shown in Figure 2.49.

Hypothesis 12:

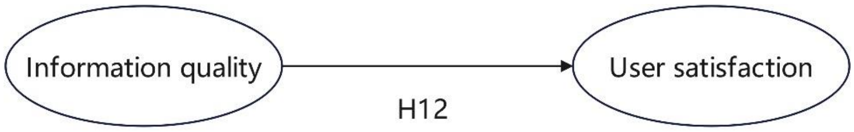


Figure 2.41 Relationship Model for information quality and user satisfaction

2.16.13 The relationship between service quality and ERP use

Limited literature has explored the relationship between service quality and individual or organizational-level usage. One study investigated the accounting information systems of South Korean businesses (Choe, 1996). In this study, it was found that there was a weak correlation between the work experience of information systems support personnel and usage frequency and willingness ($P > 0.1$). Further analysis using Nolan's (Nolan, 1973)stage model to measure the maturity of information systems revealed a significant correlation between the work experience of information systems support personnel and usage in earlier stages. However, a negative correlation between work experience and usage was observed in the later stages of system maturity, though it was insignificant. Similarly, the study explored the relationship between user training, education, and usage, finding no significant relationship between usage frequency and willingness. Using Nolan's stage model again for additional data analysis to determine system maturity, it was observed that user training and education had a significant relationship with information system usage in the early stages but not later. Another study discovered that system documentation was not a predictive factor for system utilization in investigating enterprise resource planning (ERP) system users (Kositanurit et al., 2006). Similarly, a study on knowledge management systems indicated that service quality did not predict willingness to use (Lotfy & Halawi, 2015).

At the organizational level, a study on the London Ambulance Service found a positive correlation between the effective role of technical personnel (i.e., service quality) and the eventual usage of the system (Fitzgerald & Russo, 2005). In studies related to expert systems, retaining service personnel (along with related funding) was identified as a crucial factor for the long-term maintenance of expert systems. Caldeira & Ward (Caldeira & Ward, 2002) discovered in their research on small Portuguese enterprises that the capabilities of support personnel, supplier support, and the availability of training influenced the adoption and usage of information systems, as shown in Figure 2.32.

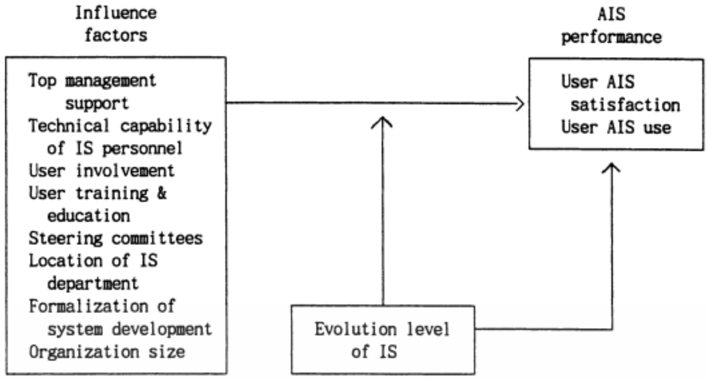


Figure 2.50 AIS performance model

Source: (Caldeira & Ward, 2002)

Looking back at the literature review, this study concludes a positive correlation between system service quality and system usage in small and medium-sized enterprises, as shown in Figure 2.51.

Hypothesis 13:

Figure 2.51. Relationship Model for service quality and ERP use

2.16.14 The relationship between service quality and user satisfaction

Several studies have explored the relationship between service quality and user satisfaction. However, these studies have shown varying degrees of support for this relationship. Researchers have used various methods to measure service quality, leading to inconsistent results. Some studies have examined the relationship between support staff characteristics and user satisfaction, but results regarding employee characteristics and user satisfaction have not been consistent.

For instance, Choe (Choe, 1996) found that the experience of information system personnel did not significantly impact user satisfaction with the accounting information system in Korean enterprises. Additional data analysis suggested a slight correlation between the experience of information system support staff and user satisfaction if the system was recently implemented. However, in the later stages of the information system, there was no significant relationship between employee experience and user satisfaction with the support team.

Another study discovered a positive correlation between the technical performance of developers (based on their responsiveness in problem-solving) and user satisfaction (Leonard-

Barton & Sinha, 1993). Similar research by Guimaraes (Guimaraes, 1995) indicated that developers' skills significantly influenced user satisfaction with expert systems. Leclercq's (Leclercq, 2007) case study found that the relationship between the functional department of the information system and users, as well as the support provided by these departments, affected user satisfaction. During project implementation, mutual understanding between the information system team and users did not significantly impact the final system's satisfaction (Marble, 2003). Choe (Choe, 1996) also investigated the impact of training on user satisfaction with information systems, finding no significant relationship at any system implementation stage.

Chiu et al.(Chiu et al., n.d.,2007) examined the role of support in e-learning environments and found no significant relationship with user satisfaction, as shown in Figure 2.52. The establishment of a model theorized the impact of four components of subjective task value (i.e., achievement, utility, intrinsic, and cost) and three dimensions of fairness (i.e., allocation, procedure, and interaction) on learner satisfaction. It was also suggested that satisfaction and the four components of subjective task value would influence learners' willingness to continue using web-based learning.

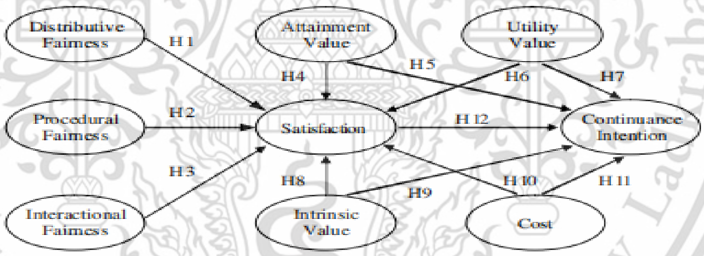


Figure 2.52 Research model for Web-based learning continuance intention

Source:(Chiu,2007)

From a broader perspective, beyond personnel and training, there are still inconsistent findings regarding the impact of service quality on user satisfaction. When using the SERVQUAL tool to assess users' expectations and perceptions of service quality, Kettinger & Lee(Kettinger & Lee,1994) found a significant positive correlation between user satisfaction and service quality in the information services of a university computing department. Another study on university support services identified software upgrades, employee response times, and the documentation of training materials as the most crucial service quality factors affecting user satisfaction (Shaw et al., 2010). A study on websites revealed no correlation between website response feedback, help, and frequently asked questions with user satisfaction (Palmer, 2002). In another investigation using SERVQUAL to measure website environments, empathy and assurance aspects of service quality were associated with user satisfaction, while reliability and responsiveness were not (Devaraj et al., 2002). Halawi et al. (Lotfy & Halawi, 2015) found a significant relationship between service quality measured using SERVQUAL and user satisfaction within knowledge management, indicating the sensitivity in measuring service quality concepts.

At the organizational level, further research is needed. A qualitative study on system success discovered that higher-quality training and a friendly informational systems support team led to a more positive attitude toward the system (Coombs,2001). Other researchers investigated service quality from the perspective of supplier support. Results regarding the role of external support in user satisfaction could have been more consistent. One study found that higher levels of consultant efficiency and supplier support led to increased user satisfaction (Thong & Yap, 1996).

In conclusion, based on the literature review above, this study suggests a positive correlation between system service quality and user satisfaction in small and medium-sized enterprises, as shown in Figure 2.53.

Hypothesis 14：

Figure 2.53. Relationship Model for service quality and user satisfaction

2.16.15 The relationship between ERP use and user satisfaction

Surprisingly, this study involves fewer examinations of the relationship between usage and user satisfaction. More research explores the reverse relationship, particularly the correlation between user satisfaction and usage. Therefore, additional studies are needed to assess this connection. In a survey of DuPont Company's expert systems, there was a significant positive correlation between system usage (measured by frequency of use) and user satisfaction (evaluated using nine items from the Bailey and Pearson tool)(Guimaraes, 1995).

Within knowledge management, Halawi et al. (Lotfy & Halawi, 2015) established a significant relationship between usage intention and user satisfaction. Seddon and Kiew (P. Seddon & Kiew, 1996) found no correlation between usage (measured by system importance) and user satisfaction in a mandatory setting. Chiu et al. (Chiu et al., n.d.,2007) confirmed a significant relationship between usage and user satisfaction in an e-learning environment. However, in research on medical information systems, Iivari (Iivari, 2005) found significant correlations between daily usage volume and frequency with user satisfaction even in mandatory usage situations. While some researchers suggest that usage might not be crucial in mandatory system usage, Iivari (Iivari, 2005) demonstrated that sufficient variability within the usage construct can significantly relate to other constructs in the D&M model, such as user satisfaction. However, at the organizational level, Gelderman (Gelderman, 2002) found inconsistent results regarding the significance of the relationship between different measures of system usage (such as frequency and duration) and user satisfaction.

Abdalwali Lutfi(Lutfi et al., 2022) evaluated the DeLone and McLean Information System (D&M IS) success model in the context of AIS (Accounting Information Systems) in Jordanian organizations(as shown in Figure 2.54). The study aimed to determine the impact of system quality, service quality, information quality, system usage, and user satisfaction on AIS usage, claiming it would ultimately enhance the quality and sustainability of decisions. By developing and evaluating the proposed model through empirical methods, the research aimed to explain how AIS information quality, system quality, and service quality influence user perspectives, thereby affecting system usage and user satisfaction, ultimately impacting the quality of user decisions.

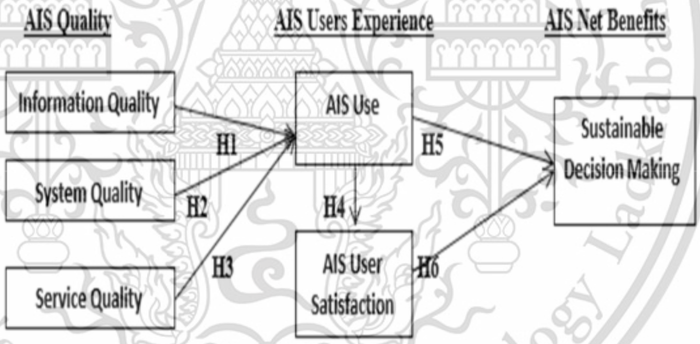


Figure 2.54 Research Framework

Source: (Abdalwali Lutfi, 2022)

After reviewing the literature, this study concludes a positive correlation between system service quality and user satisfaction in small and medium-sized enterprises, as shown in Figure 2.55.

Hypothesis 15:

Figure 2.55. Relationship Model for ERP use and user satisfaction

2.16.16 The relationship between ERP use and SMEs performance

Research at the individual level has provided a certain degree of support for the relationship between system usage and benefits. Multiple studies have found a positive correlation between information system usage and enhanced decision-making abilities. Yuthas & Young (Yuthas & Young,1998) identified a correlation between system usage time and decision performance. Burton-Jones & Straub (Burton-Jones & Straub, 2006) discovered a strong correlation between system usage and task performance. Halawi et al. (Lotfy & Halawi, 2015) established a significant relationship between usage intent and net benefits, measured through improvements in work performance. Numerous studies have confirmed these findings, establishing an important relationship and correlation between system usage and net benefits (Goodhue & Thompson, 1995).

However, some studies present differing perspectives. One study found no significant relationship between expected usage and individual impact (task technology fit and performance) (McGill et al., 2003). Other studies also found no relationship between usage and net benefits (Iivari, 2005; Wu & Wang, 2007). In three different Asian companies, there was no significant relationship between usage frequency and job satisfaction (Ang & Soh, 1997). In another series of studies, managers' self-reported hours of information system usage in German companies showed a positive correlation with decision-making. Still, this correlation needed to be apparent in Greece.

There's a certain level of support for the relationship between system usage and organizational benefits. Teng and Calhoun's (Teng & Calhoun, 1996) research discovered that the intensity of information technology usage significantly impacted job complexity, procedural decisions, and decision outcomes. Results from a study on hospital information system usage confirmed a positive correlation between system usage (measured through DSS report access and disk accesses) and profits and healthcare quality, particularly evident in reduced mortality rates(Devaraj et al., 2002). Indeed, using information systems has positively impacted productivity, decision-making, and internal costs (Teng & Calhoun, 1996) (Belcher & Watson, 1993). Gelderman (Gelderman, 2002) also found no significant correlation between system usage (measured by duration) and improved income and profits. Zhu and Kraemer (K. Zhu et al., 2004) found that online information system usage in e-commerce significantly contributed to value creation, a phenomenon observed in developed and developing countries, as shown in Figure 2.56. They created a comprehensive research model to evaluate the diffusion and consequences of enterprise-level e-commerce, focusing on actual usage and value creation, diverging from the typical literature focus.

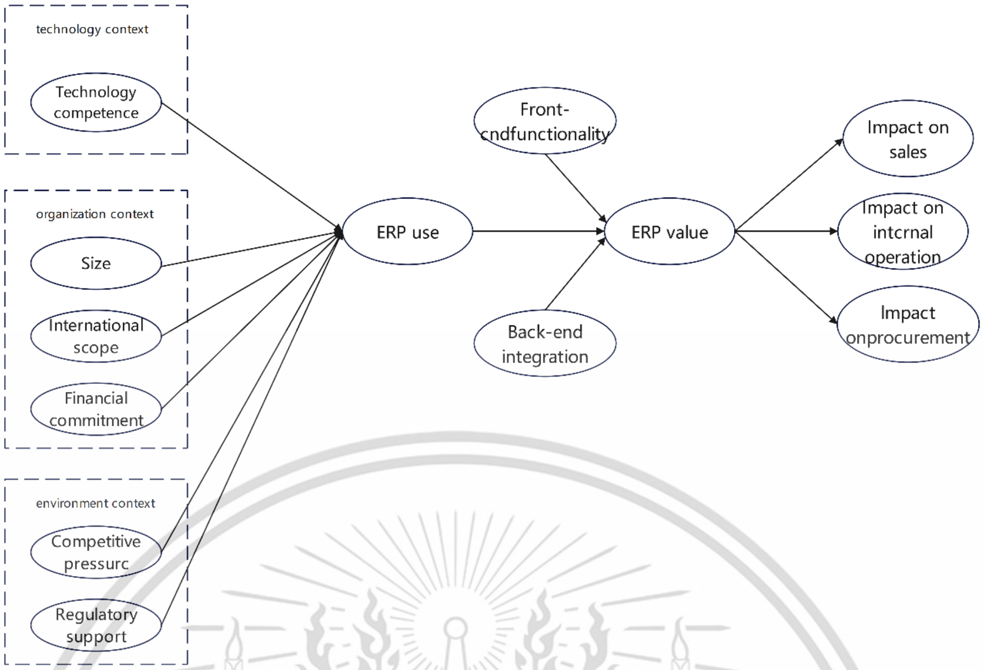


Figure 2.56 An Integrated Model of E-Business (EB)

Source: （Zhu & Kraemer，2004)

Reviewing the literature, this study concludes a positive correlation between ERP use and SMEs performance, as shown in Figure 2.57.

Hypothesis 16:

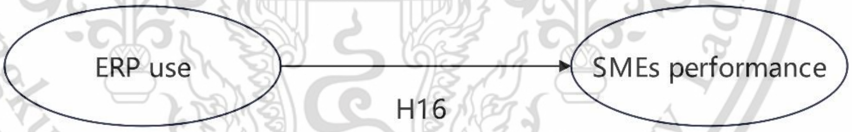


Figure 2.57. Relationship Model for ERP use and SMEs performance

2.16.17 The Relationship between user satisfaction and SMEs performance

Much empirical evidence indicates a close association between user satisfaction and system benefits(Iivari, 2005). Studies have shown that user satisfaction positively impacts job performance (Guimaraes, 1995; Guimaraes & Igbaria, 1997; Torkzadeh & Doll, 1999), enhances task performance(McGill et al., 2003), increases productivity and work efficiency(Igbaria & Tan, 1997; Lotfy & Halawi, 2015; McGill et al., 2003; Rai et al., n.d.-b), improves decision-making abilities (Vlahos & Ferratt, 1995), and elevates job satisfaction (Ang & Soh, 1997; Venkatesh et al., 2003). However, Yuthas & Young (Yuthas & Young, 1998) found only a weak correlation between user satisfaction and decision performance. One study investigated the relationship between user satisfaction and organizational impact, revealing a correlation between satisfaction and performance based on profitability and income(Gelderman, 2002). Another study evaluating the relationship between user satisfaction with Enterprise Resource Planning (ERP) systems and organizational performance yielded similar results (Law & Ngai, 2007).

Hua-Yang Lin(H.-Y. Lin et al., 2006) proposed a redefinition of the DeLone and McLean information system success model, conducting empirical research within the Enterprise Resource Planning (ERP) context, as shown in Figure 2.58. Five constructs of information system success and a balanced scorecard were employed to predict ERP system success. The theoretical model was validated through a survey of 257 companies in Taiwan that had implemented ERP systems, showing consistent alignment with factors contributing to information system success, linking system usage and user satisfaction to individual impacts.

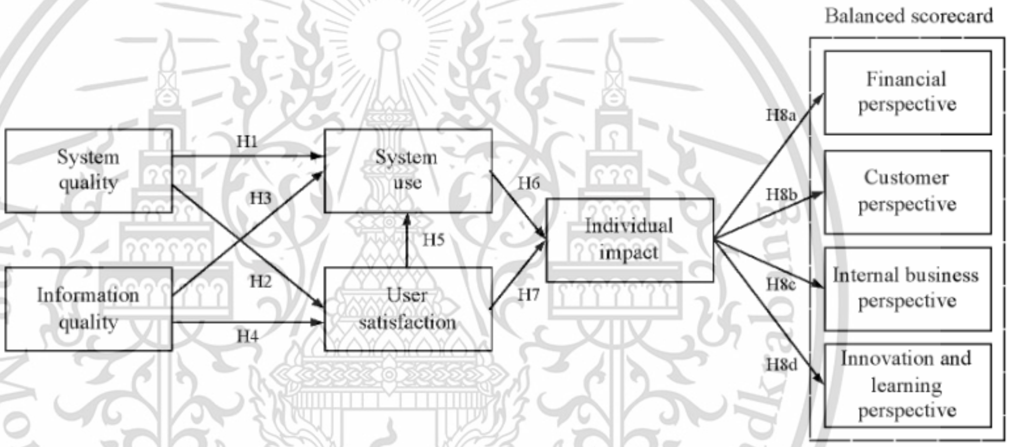


Figure 2.58 Research model for ERP systems success

Source: (Hua-Yang Lin, 2006)

Looking back at the literature review, this study concludes that there is a positive correlation between user satisfaction and SME performance, as shown in Figure 2.59.

Hypothesis 17:

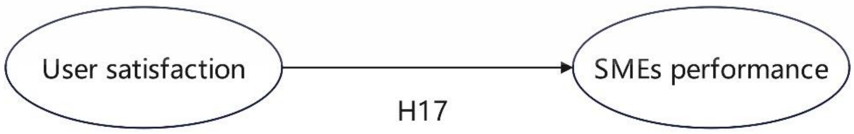


Figure 2.59. Relationship Model for user satisfaction and SMEs performance

The literature review summary on the relationships between various variables can be found in Table 2.24 below.

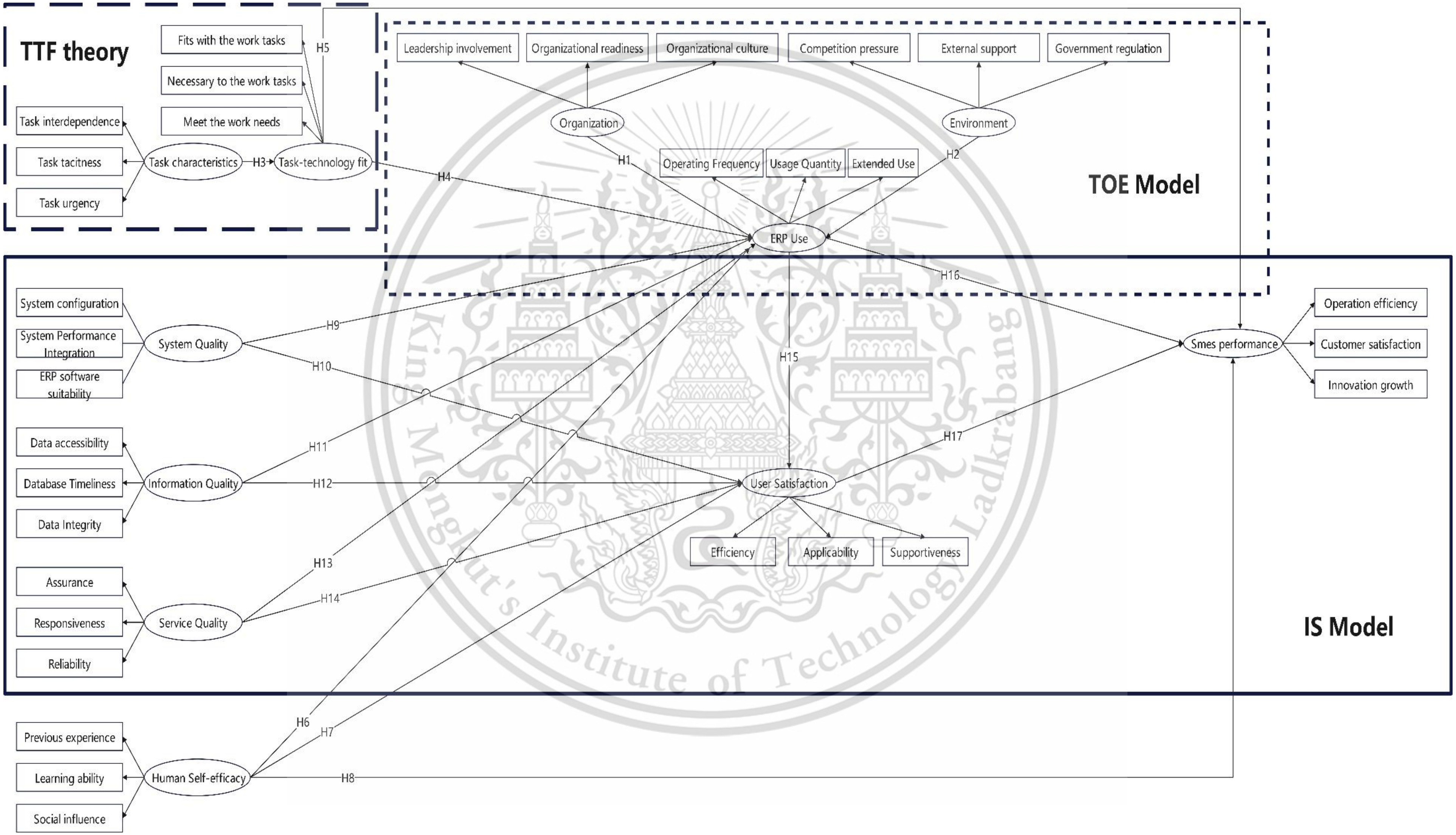
Table 2.24. Review the Relationship Between the Variables

Hypothesis	Relationship	Author/Relationship
H1	Organization→ERP use	(Vuckovic et al., 2023); (Bany Mohammad et al., 2022); (Gangwar et al., 2014); (Ruivo et al., 2014); (Valdebenito & Quelopana, 2019);
H2	Environment→ERP use	(Vuckovic et al., 2023); (Bany Mohammad et al., 2022); (Gangwar et al., 2014); (Ruivo et al., 2014); (Valdebenito & Quelopana, 2019);
H3	Task characteristic→Task-technology fit	(Cheng, 2019); (Carlos Tam, 2016)
H4	Task-technology fit→ERP use	(Isaac et al., 2019);(W.-S. Lin & Wang, 2012)
H5	Task-technology fit→SMEs performance	(Carlos Tam, 2016);
H6	Human self-efficacy→ERP use	(Fagan et al., n.d.; Hong, Eunyoung, 2014; Wen & Chen, 2010) (Shiau et al., 2020)
H7	Human self-efficacy→ user satisfaction	(Alshibly, 2014);(Hong, Eunyoung, 2014)
H8	Human self-efficacy→ SMEs performance	(Duan et al., 2015; Y. Hwang, 2005)
H9	System quality→use	(Lutfi et al., 2022); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H10	System quality→user satisfaction	(Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);

Hypothesis	Relationship	Author/Relationship
H11	Information quality→use	(Lutfi, 2023); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H12	Information quality→user satisfaction	(Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H13	Service quality→use	(Lutfi, 2023); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H14	Service quality→user satisfaction	(Saudi et al., 2019); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H15	ERP Use→user satisfaction	(Lutfi, 2023); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H16	ERP Use→SMEs performance	(Lutfi, 2023); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);
H17	User satisfaction→ SME performance	(Lutfi, 2023); (Saudi et al., 2019); (Roky & Meriouh, 2015); (Hakkun Elmunsyah,2023);

2.17 Conceptual Framework

The following conceptual framework has been formulated through analyzing the literature review and consulting relevant concepts, theories, and models regarding the relationships between the variables.



TTF theory
Fits with the work tasks
Necessary to the work tasks
Meet the work needs
Task interdependence
Task tacitness
Task urgency
Task characteristics
H3
Task-technology fit
H5
H4
Leadership involvement
Organizational readiness
Organizational culture
Competition pressure
External support
Government regulation
Organization
Environment
H1
H2
Operating Frequency
Usage Quantity
Extended Use
TOE Model
ERP Use
H16
H15
System configuration
System Performance Integration
ERP software suitability
System Quality
H9
H10
Data accessibility
Database Timeliness
Data Integrity
Information Quality
H11
H12
Assurance
Responsiveness
Reliability
Service Quality
H13
H14
User Satisfaction
H17
Efficiency
Applicability
Supportiveness
Smes performance
Operation efficiency
Customer satisfaction
Innovation growth
IS Model
Previous experience
Learning ability
Social influence
Human Self-efficacy
H6
H7
H8

2.18 Research Hypothesis

From the conceptual framework above, it's evident that the dependent variable is the performance of small and medium-sized enterprises. Conversely, the independent variables encompass market, organizational, environmental factors, system quality, information quality, and service quality. Meanwhile, the mediating variables include system usage and user satisfaction. Based on this conceptual framework, the following hypotheses have been formulated.

H1： Organization has a positive effect on ERP use.

H2： Environment has a positive effect on ERP use.

H3： Task characteristic has a positive effect on task-technology fit.

H4: Task-technology fit has a positive effect on ERP use.

H5: Task-technology fit has a positive effect on SMEs performance.

H6: Human self-efficacy has a positive effect on ERP use.

H7: Human self-efficacy has a positive effect on user satisfaction.

H8: Human self-efficacy has a positive effect on SMEs performance.

H9: System quality has a positive effect on ERP use.

H10: System quality has a positive effect on user satisfaction.

H11: Information quality has a positive effect on ERP use.

H12: Information quality has a positive effect on user satisfaction.

H13: Service quality has a positive effect on ERP use.

H14: Service quality has a positive effect on user satisfaction.

H15: ERP usage is positively correlated with user satisfaction.

H16: There is a positive relationship between ERP use and SME’s performance

H17: User satisfaction has a positive effect on SMEs performance.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This study uses the Information Systems Success Model to explore the factors influencing adopting ERP systems in Chinese small and medium-sized enterprises (SMEs). It particularly focuses on the technical capabilities of the ERP system itself, along with the capabilities within the enterprise and the external environmental capabilities. By considering technical, organizational, and environmental capabilities as latent variables, ERP system usage and user satisfaction as mediating variables, and SMEs performance as the dependent variable, the study seeks to refine the information technology success approach.

A quantitative research method was employed to conduct this investigation. The primary data from 540 respondents was collected through a questionnaire survey. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used for data analysis. Secondary data sources were utilized for the literature review, employing quantitative research methods. The secondary data sources were peer-reviewed journals, papers, books, and related articles. These materials were used to comprehend each identified research variable and the proposed hypotheses. The research is outlined as follows:

1. Population and samples
2. Sampling and sample size
3. Variables in the study
4. Research instruments and the scale
5. Quality of the instruments
6. Data collection methods
7. Data analysis

This research on factors influencing the use of ERP systems in Chinese SMEs and their impact on enterprise performance utilized a quantitative research approach. Two primary methods were employed. The first involved surveying respondents using questionnaires to collect data and analyzing the research questions using PLS-SEM technology. The second strategy involved a review of previous research materials, particularly reputable works on the same subject. This chapter introduces the methods used to conduct the study to achieve the goals mentioned in Chapter One and addresses the research questions. The following steps outline the research process, as shown in Figure 3.1:

Step 1: This step involved reviewing relevant academic papers, publications, internet statistics, and theories contributing to developing the research stance. It was a comprehensive study aiding in identifying the research topic, assessing and selecting research factors, and defining the gaps in the research. This study led to the formulation of research objectives and questions, followed by answering these questions, aiding in resolving the research problem and filling research gaps. As a result, a conceptual framework was formed, consisting of 6 latent variables, two mediating variables, and 1 dependent variable, along with 27 observed variables.

Step 2: In this phase, a quantitative research method was employed. The data collected from respondents underwent cleaning and screening, followed by a reliability assessment. If deemed acceptable, analysis was conducted. The study used Partial Least Squares (PLS) and Structural Equation Modeling (SEM) methods.

Step 3: This phase commenced with a secondary data review, collecting data from reputable academic journals, articles, books, reliable online sources, and other references to support the quantitative approach. The outcome of the literature review was to identify research challenges and gaps. Subsequently, research objectives, questions, and hypotheses were formulated. The establishment of the research framework and specification of research tools followed. Data was collected using a sample size designed for the target audience. After analyzing the data, the research findings were presented. Conclusions were drawn using both qualitative and quantitative research results.

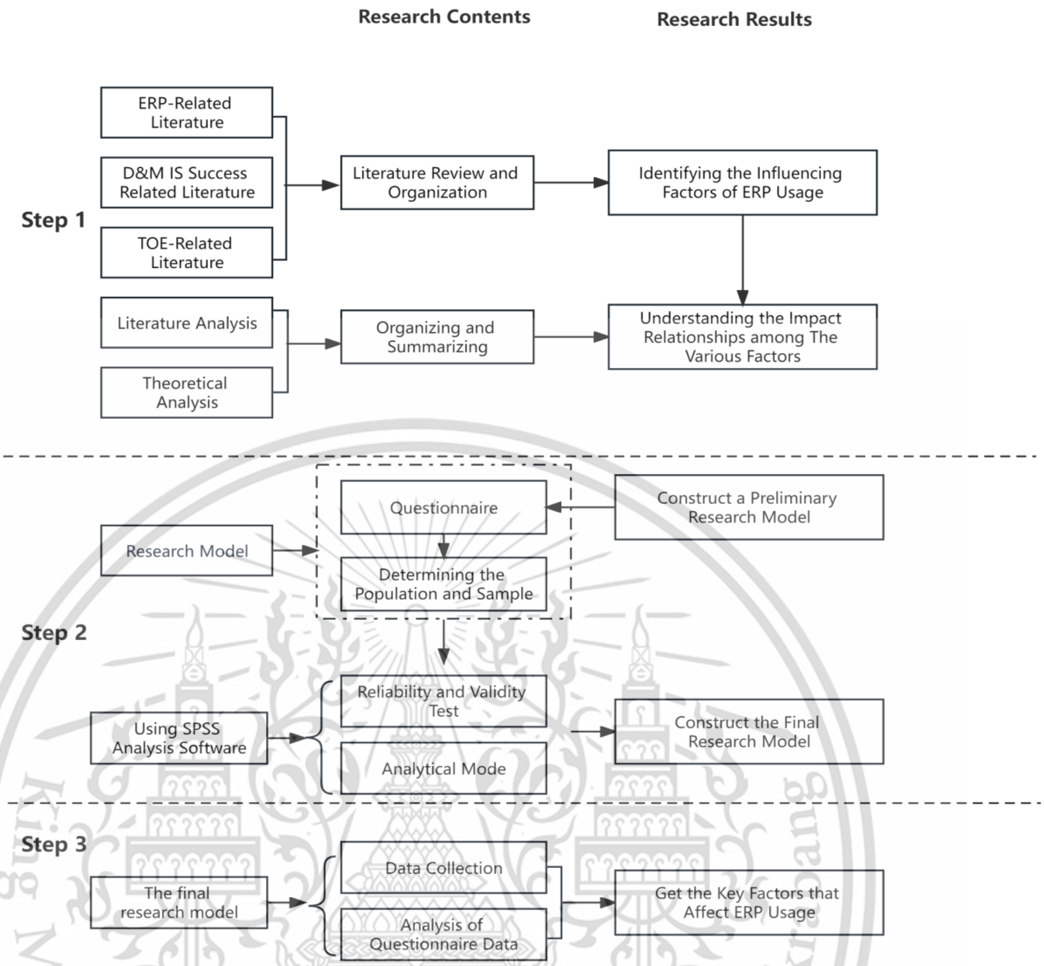


Figure 3.1 Process of Research Methodology

3.2 Quantitative Research

3.2.1 Population and Samples

Population

This study aims to investigate the factors influencing the adoption of Enterprise Resource Planning (ERP) systems among small and medium-sized enterprises (SMEs) in China, utilizing models such as TOE (Technology-Organization-Environment) and IS (Information Systems). Therefore, the study targeted employees of SMEs intending to use ERP systems in China. According to statistics from the National Bureau of Statistics of the People's Republic of China, as of the end of 2022, there were a total of 2.631 million legal entities of small and micro-enterprises, among which medium-sized enterprises accounted for 239,000 (9.1%), and small enterprises accounted for 2.392 million (90.9%). Due to the large scale of the study, the Ministry of Industry and Information Technology of the People's Republic of China's National SME

Public Service Demonstration Platform was selected as the research base. A representative sample was developed from which data was collected.

3.2.2 Sample and Sampling Design and Technique

This study investigates the factors influencing using enterprise resource planning (ERP) systems among small and medium-sized enterprises (SMEs) in China. The sample consists of employees from SMEs in China who use ERP systems.

Sampling Design: This study adopts a probability design using random sampling to select samples from the population. The main reason for using probability sampling design is that it provides an equal chance for individuals in the population to be included in the study sample. Therefore, developing the research sample helps avoid bias(Syed Muhammad Sajjad Kabir, 2016).

Sampling technique: The sampling technique refers to the procedure of obtaining sample subjects from the target population(Syed Muhammad Sajjad Kabir, 2016). This study employed a stratified random sampling technique. The following steps were taken:

Step 1: Determine Sample Size

The sample size was selected based on the college offering social sciences and information technology courses. Hair et al.(Hair et al., 2011)suggested that a minimum of five respondents per analyzed variable is necessary. Still, the most acceptable approach to determining sample size is a ratio of 20:1 (one sample for every 20 variables). Therefore, since this study had 33 observed variables, an appropriate sample size was 660 (33 * 20 observed variables). However, upon data collection and cleaning, the sample sizes for each region in this study were larger than expected. Table 3.1 below displays the expected and actual sample sizes used for each region in the study.

Table 3.1. Sample Size and Regions

Region	Number of Respondents	Actual Sample Size Used
China	660	700

Step 2: According to the above determination, the sample size was 660, but the collected sample size exceeded this amount.

Step 3: Please search for registered enterprises on the National Small and Medium-sized Enterprises Public Service Demonstration Platform of the Ministry of Industry and Information Technology of the People's Republic of China. According to China's economic division into four major regions: East, Central, West, and Northeast, select mature cities within these regions where SMEs are more concentrated. Randomly select SMEs from these cities, with an even distribution of sample sizes across each region. Then, distribute the sample size evenly among the SMEs in the relevant areas within each region:

Table 3.2. Sample Table of Small and Medium-sized Enterprises in Different Regions of China

Areas	Provinces	SMEs number
Eastern Region	Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan	339
Central Region	Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan	136
Western Region	Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang	158
Northeastern Region	Liaoning, Jilin, and Heilongjiang	67
Total		700

This study utilized primary data collected through structured questionnaires. The relationships between variables were analyzed using AMOS, which involved various analyses such as correlation and descriptive statistics. The primary analysis of this study was conducted using Structural Equation Modeling (SEM). SEM will help evaluate the relationships between latent and observed variables and how these variables influence the behavioral intention to use ERP systems.

3.2.3 Variables in the Research

This study established the latent and observable variables presented below after conducting, analyzing, and reviewing relevant theories, literature, and concepts.

1. Latent Variables

1.1 Organization: consisted of 3 observed variables

- Leadership involvement
- Organizational readiness
- Organizational culture

1.2 Environment: consisted of 3 observed variables

- Competition pressure
- External support
- Government regulation

1.3 Task characteristics: consisted of 3 observed variables

- Task interdependence
- Task tacitness

- Task urgency

1.4 Task-technology fit: consisted of 3 observed variables

- Fits with the work tasks
- Necessary to the work tasks
- Meet the work needs

1.5 Human self-efficacy: consisted of 3 observed variables

- Previous experience
- Learning ability
- Social influence

1.6 System Quality: consisted of 3 observed variables

- System configuration
- System Performance Integration
- ERP software suitability

1.7 Information Quality: consisted of 3 observed variables

- Data accessibility
- Database Timeliness
- Data Integrity

1.8 Service Quality: consisted of 3 observed variables

- Assurance
- Reliability
- Responsiveness

2. The Mediating/Intervening Variables

2.1 ERP use: consisted of 3 observed variables

- Usage Frequency
- Usage Quantity
- Extended Use

2.2 User satisfaction: consisted of 3 observed variables

- Efficiency
- Applicability
- Supportiveness

3. Endogenous Latent Variables

3.1 SMEs performance

- Operation efficiency
- Customer satisfaction
- Innovation growth

3.3 Research Instruments Development

The survey questionnaire, the research tool, aims to validate and discover variables associated with an effective ERP system usage model in enterprise management. The research tool involves the following steps:

1. The development of the research questionnaire is based on previous literature, theories, and studies conducted in similar or most appropriate environments.

2. The relationships between endogenous, exogenous, mediator, and observable variables are established by examining models, theories, and concepts.

3. The questionnaire used for data collection follows the recommended format. IOC helps evaluate the alignment of questionnaire items with research objectives and their ability to address these objectives. The results are based on the scores from three experts. For each question, if the score exceeds 0.5, it means the question can be used (score from Expert 1 + score from Expert 2 + score from Expert 3) / 3. If the score is below 0.5, the question must be deleted or rewritten because it is not well understood (Tongprasert et al., 2014).

4. The questionnaire/tool is provided in both Chinese and English for data collection, as Chinese is the official language in China. However, only a small number of business managers are proficient in English. After the questionnaire was translated, it was scored by three professors from KMITL (Professor Paneepan Sombat, Professor Vasu, and Professor Manoj).

5. The internal consistency or reliability of the collected data, especially in surveys involving Likert-scale questions, is evaluated using Cronbach's alpha coefficient. This study aims to determine the reliability and consistency of the scales.

6. The leaked questionnaire is refined, improvements are made, and the final questionnaire is modified according to the research objectives.

3.3.1 The Structure of the Questionnaire and Instruments

The questionnaire serves as the research tool used in this study. It was constructed based on the research questions and a review of previous literature, concepts, theories, and models. The questions are designed to assess all variables in the study, including organizational factors, environmental factors, system capabilities, information capabilities, service capabilities, system usage, user satisfaction, and enterprise performance.

The questionnaire is divided into three parts:

Part 1: Organizational Characteristics - Gathering information about the respondents' companies, including their industry type, company size, organizational structure, etc. This is aimed at obtaining statistical details about the respondents' companies.

Part 2: Demographics of the respondents- In this section, information regarding their details is collected, including their age, educational level, position, years of experience using ERP systems, etc. This is aimed at obtaining the respondents' demographic information.

Part 3: Latent Variable Questions - The questions in this section assess the relationship between latent variables. This section was constructed based on previous literature as a guiding framework.

Part Three: Sample Questions of the Questionnaire

1. organization

The measurement items regarding the organization in the questionnaire were referenced from several scholars' research outcomes, including (Parisa Maroufkhani, 2020) (Alzoubi & Snider, 2020; Zhu et al., 2010).

Table 3.3 is a sample questionnaire related to the organization.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.3. Organization Issues

Question (Organization)	Source	Least →Most				
		1	2	3	4	5
Leadership involvement						
Our top management promotes the use of ERP systems in the organization. 我们的高层管理人员在组织内推广 ERP 系统的使用。						
Our senior management provides support for ERP system implementation within the organization. 我们的高级管理层在组织内部为 ERP 系统实施提供支持。	(Parisa Maroufkhani, 2020)					
Our senior management sees ERP systems as a strategic priority for the organization. 我们的高级管理层将 ERP 系统视为组织的战略重点推动。						
Organizational readiness	(Parisa Maroufkhani, 2020)					
The lack of capital/financial resources						

Question (Organization)	Source	Least →Most				
		1	2	3	4	5
prevents my company from fully using the ERP system. 资金/财务资源的缺乏阻碍了我的公司充分利用 ERP 系统。						
The lack of IT infrastructure prevented my company from using the ERP system. 缺乏必要的 IT 基础设施阻碍了我的公司利用 ERP 系统。						
The lack of skilled human resources prevents firms from taking full advantage of ERP systems. 缺乏熟练的人力资源阻止了企业充分利用 ERP 系统。						
Organizational culture	(Alzoubi & Snider, 2020; Y. Zhu et al., 2010)					
ERP systems support corporate culture. ERP 系统支持企业文化。						
ERP systems play an important role in meeting the degree of demand due to the influence of organizational culture. ERP 系统在满足需求度方面起着重要作用，这是由于组织文化的影响。						

2.Environment

The measurement items for the Environment-related questions in the questionnaire were referenced from several scholars' research outcomes, including(Maroufkhani et al., 2020).

Table 3.4 is a sample questionnaire related to the environment.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.4. Environmental Issues

Question (Environment)	Source	Least →Most				
		1	2	3	4	5
Competition pressure	(Maroufkhani et al., 2020)					
Our choice to adopt a large ERP system will be strongly influenced by what industry competitors are doing. 我们采用大 ERP 系统的选择将受到行业竞争对手正在做的事情的强烈影响。						
Our company is under pressure from competitors to adopt ERP systems for business management. 我们公司面临着来自竞争对手的压力，要求我们采用 ERP 系统进行。						
Our company will adopt an ERP system to deal with competitors' practices. 我们公司将采用 ERP 系统进行企业李来应对竞争对手的做法。						
External support	(Maroufkhani et al., 2020)					
Community agencies/vendors can provide the necessary training for adopting ERP systems. 社区机构/供应商可以为采用 ERP 系统提供必要的培训。						
Community agencies/vendors can provide effective technical support for adopting ERP systems. 社区机构/供应商可以为 ERP 系统的采用提供有效的技术支持。						
Government regulation	(Maroufkhani et al., 2020)					
Government policies encourage the adoption of new information technologies (such as ERP systems). 政府政策鼓励我们采用新的信息技术(如						

Question (Environment)	Source	Least →Most				
		1	2	3	4	5
ERP 系统)。						
Several business laws can deal with security and privacy issues arising from ERP system management technology. 有一些商业法律可以处理 ERP 系统管理技术带来的安全和隐私问题。						
The government provides incentives for using big data management in government procurement and contracting, such as technical support, training, and funding for ERP systems. 政府为在政府采购和合同中使用大数据管理提供激励，例如为 ERP 系统的使用提供技术支持、培训和资金。						

3. Task characteristics

The measurement items for the task characteristics-related questions in the questionnaire were referenced from several scholars' research outcomes, including(Baharuddin, 2020) (Jeyaraj, 2022) (University of South Alabama et al., 2023).

Table 3.5 is a sample questionnaire related to the task characteristics.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.5. Task characteristics Issues

Question (task characteristics)	Source	Least →Most				
		1	2	3	4	5
Task interdependence	(Baharuddin, 2020)					
The implementation of an ERP system depends on the cooperation of various departments of the enterprise. ERP 系统实施依赖企业各个部门配合。						

Question (task characteristics)	Source	Least →Most				
		1	2	3	4	5
The ERP system depends on other units outside the enterprise. ERP 系统依赖本企业以外的其他单位。						
Task tacitness	(Jeyaraj, 2022)					
ERP system can design code according to the needs of the enterprise. ERP 系统可以根据本企业需要设计编码。						
The knowledge required for ERP systems is complex. ERP 系统所需知识是复杂的。						
Task urgency	(University of South Alabama et al., 2023)					
I must use my ERP account anytime and anywhere in my corporate work. 企业工作中需要随时随地使用到我的 ERP 账户。						
I must obtain real-time data from the ERP system to complete enterprise tasks. 我需要实时获取 ERP 系统中的数据完成企业任务。						

4. Task-technology fit

The measurement items for the task-technology fit-related questions in the questionnaire were referenced from several scholars' research outcomes, including(Jeyaraj, 2022) (Matt C. Howard, 2023).

Below table 3.6 is a sample questionnaire related to the task-technology fit.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.6. task-technology fit Issues

Question (task-technology fit)	Source	Least →Most				
		1	2	3	4	5
Fits with the work tasks	(Jeyaraj, 2022)					
The ERP system has the exact functions required for the enterprise's management tasks. ERP 系统具有企业管理任务所需的确切功能。						
Using ERP is very suitable for me to work in all aspects of the enterprise. 使用 ERP 非常适合我在企业所有方面工作。						
Necessary to the work tasks	(Jeyaraj, 2022)					
Using ERP fits well with how I like to enhance the efficiency of my work. 使用 ERP 很适合我喜欢的方式提高我的工作效率。						
ERP is suitable for my preferred way of working in the enterprise to strengthen my professional skills and operational practice. 使用 ERP 很适合我喜欢的方式在企业工作中加强自己的专业技能我现有的操作实践。						
Meet the work needs.	(Matt C. Howard，2023)					
The use of ERP is very consistent with my work goals and needs in the enterprise. 使用 ERP 非常符合我在企业中的工作目标和需要。						
The ERP system matches our enterprise's current tasks. ERP 系统与我们企业目前任务相匹配。						

5. Human self-efficacy

The item measurement of the human self-efficacy (human quality) questions is based on the research findings of several scholars, including(Hakkun Elmunsyah,2023), (H.-Y. Lin et al., 2006b; Roky & Meriouh, 2015).

Table 3.7 is a sample questionnaire related to human self-efficacy.

Instructions: Please mark the checkbox (√) in front of the option that best represents your viewpoint for the following questions. This scale is divided into the following five levels:

Table 3.7. Human Self-efficacy

Question (Human Self-efficacy)	Source	Least →Most				
		1	2	3	4	5
Previous experience	(Hakkun Elmunsyah,2023), (H.-Y. Lin et al., 2006; Roky & Meriouh, 2015)					
ERP user interface can be easily adapted to one's approach. 我们在公司采用 ERP 系统之前就了解了它的一般概念和功能。						
We knew the specificities of our current module before our company adopted the ERP system. 在公司采用 ERP 系统之前，我们了解了我们当前使用的模块的具体特点。						
We knew the deliverables the ERP consulting firm would provide before our company adopted the ERP system. 我们在公司采用 ERP 系统之前了解了 ERP 咨询公司将提供的可交付成果。						
Learning ability						
I can Recognize the value of the ERP knowledge I learned. 我们可以将从 ERP 中获得的知识应用于我们的任务。						
I can Assimilate the ERP knowledge I learned and turn it into my knowledge base.						

Question (Human Self-efficacy)	Source	Least →Most				
		1	2	3	4	5
我能够吸收我学到的 ERP 知识，并将其转化为我的知识库。						
I can Learn important ERP know-how. 我能够学习重要的 ERP 专业技能。						
Social influence						
We can apply the advanced processes derived from ERP to our tasks. 我们可以将从 ERP 中获得的先进流程应用于我们的任务。						
We can share knowledge derived from ERP across departments. 我们可以在不同部门之间分享从 ERP 中获得的知识。						
We can share my knowledge with others through the ERP network. 我们可以通过 ERP 网络与其他人分享我的知识。						

6. System Quality

The measurement items for the System Quality-related questions in the questionnaire were referenced from several scholars' research outcomes, including(Almajali et al., 2022; Ifinedo & Nahar, n.d.; Vuckovic et al., 2023; Y. Zhu et al., 2010).

Table 3.8 is a sample questionnaire related to system quality.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.8. System Quality Issues

Question(System Quality)	Source	Least →Most				
		1	2	3	4	5
System configuration	(Almajali et al., 2022; Ifinedo & Nahar, n.d.; Vuckovic et al., 2023; Y. Zhu et al., 2010)					
The overall ERP architecture is already well configured according to the						

Question(System Quality)	Source	Least →Most				
		1	2	3	4	5
enterprise structure. 整体 ERP 架构已经根据企业结构配置得很好。						
Rigorous and sufficient testing was conducted immediately after the ERP implementation. ERP 实施后立即进行了严格而充分的测试。						
The data inputted into the ERP system were accurate and precise. 输入到 ERP 系统中的数据准确而精确。						
System Performance Integration						
ERP system allows for integration with other ICT systems ERP 系统允许与其他信息和通信技术系统集成。						
Our ERP allows for integration with other IT systems. 我们的 ERP 系统允许与其他信息技术系统集成。						
Our ERP has good features. 我们的 ERP 系统具备良好的功能。						
ERP software suitability						
The user interface of our ERP system can easily be adjusted to fit one's needs. 我们的 ERP 系统的用户界面可以很容易地调整，以适应自己的需要。						
Our ERP system is sufficiently fast in responding.						

Question(System Quality)	Source	Least →Most				
		1	2	3	4	5
我们的 ERP 系统的响应速度足够快。						
Using our ERP system is easy. 使用我们的 ERP 系统很容易。						

7. Information Quality

The measurement items for the Information Quality-related questions in the questionnaire were referenced from several scholars' research outcomes, including (Almajali et al., 2022 Ifinedo et al., 2010 Vuckovic et al., 2023).

Table 3.9 is a sample questionnaire related to information quality.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.9. Information Quality Issues

Question (Information Quality)	Source	Least →Most				
		1	2	3	4	5
Data accessibility						
ERP system provides important information. ERP 系统提供重要信息。						
The ERP system provides valuable data. ERP 系统提供了有价值的数据。						
The information presented by ERP is efficient (it contributes to the outcome of your business processes at the lowest cost). ERP 提供的信息非常高效（它有助于以最低的成本实现业务流程的结果）。	(Almajali et al., 2022; Ifinedo et al., 2010; Vuckovic et al., 2023)					
Database Timeliness						
Our ERP database content is up-to-date. 我们的 ERP 数据库内容是最新的。						
Our ERP system has timely information.						

Question (Information Quality)	Source	Least →Most				
		1	2	3	4	5
我们的 ERP 有及时的信息。						
The information provided by ERP is timely and up-to-date. ERP 提供的信息是及时且最新的。						
Data Integrity						
The output options of the ERP system (print types, page sizes allowed, etc.) are sufficient for use. ERP 系统的输出选项(打印类型，允许的页面大小等)足够使用。						
Our ERP system provides concise information. 我们的 ERP 的信息是简短的。						

8. Service Quality

The measurement items for the Service Quality-related questions in the questionnaire were referenced from several scholars' research outcomes, including(Alzoubi & Snider, 2020 P.-F. Hsu et al., 2015 Petter et al., 2008 Roky & Meriouh, 2015 Mahmoud Hany M. Dalloul,2023).

Table 3.10 is a sample questionnaire related to service quality.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.10. Service Quality Issues

Question (Service Quality)	Source	Least →Most				
		1	2	3	4	5
Assurance	(Alzoubi & Snider, 2020; P.-F. Hsu et al., 2015; Petter et al., 2008; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul,2023)					
I feel secure when communicating with ERP technical personnel. 在与 ERP 技术人员进行交流时，我感到安全。						
The staff in the ERP service department possesses excellent job knowledge.						

Question (Service Quality)	Source	Least →Most				
		1	2	3	4	5
ERP 服务部门的工作人员具备良好的工作知识。						
The overall infrastructure in place is adequate to support the ERP. 现有的整体基础设施足以支持 ERP 系统。						
Responsiveness						
The ERP service department informs users when the service will be executed. ERP 服务部门告诉用户服务将在何时执行。						
The staff in the ERP service department promptly provides services to users. ERP 服务部门的工作人员迅速为用户提供服务。						
The staff in the ERP system department is never too busy to respond to user requests. ERP 系统部门的工作人员从不太忙以致无法回应用户的请求。						
Reliability						
When the ERP service department commits to completing something by a certain time, they fulfill their commitment. 当 ERP 服务部门承诺在某个时间完成某事时，他们会履行承诺。						
When users encounter issues, the ERP service department shows genuine						

Question (Service Quality)	Source	Least →Most				
		1	2	3	4	5
interest in resolving the problems. 当用户遇到问题时，ERP 服务部门表现出真诚的兴趣解决问题。						
The ERP service department provides services within the promised timeframe. ERP 服务部门按照承诺的时间提供服务。ERP 工作人员提供 ERP 硬件和软件的更新。						

9. ERP Use

The measurement items for ERP Use-related questions in the questionnaire were referenced from several scholars' research outcomes, including(Hakkun Elmunsyah, 2023) (Ganeshkumar & Nambirajan, 2013; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul,2023).

Table 3.11 is a sample questionnaire related to ERP Use.

Instructions: Please check (√) the box that best represents your viewpoint for each question below. The scale is divided into the following five levels:

Table 3.11. ERP Use Issues

Question (ERP Use)	Source	Least →Most				
		1	2	3	4	5
Operating Frequency	(Hakkun Elmunsyah,2023) (Ganeshkumar & Nambirajan, 2013; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul,2023)					
I depend highly on ERP use. 我高度依赖 ERP 的使用。						
I use the ERP system frequently to accomplish my work. 我经常使用 ERP 系统来完成我的工作。						
The ERP is used frequently and extensively. ERP 的使用频繁且广泛。						
Usage Quantity						

Question (ERP Use)	Source	Least →Most				
		1	2	3	4	5
I use the ERP system intensively to complete my work. 我大量使用 ERP 系统来完成我的工作。						
I use the ERP system intensively (many hours daily at work). 我非常频繁地使用 ERP 系统（每天在工作中使用很多小时）。						
The use of ERP is greater than originally expected. ERP 的使用量超出了最初的预期。						
Extended Use						
I intend to continue using ERP at my job. 我打算继续在我的工作中使用 ERP。						
I intend to use more ERP functions. 我打算使用 ERP 的更多功能。						
I intend to continue using ERP to process more tasks. 我打算继续使用 ERP 处理更多的任务。						

10. User Satisfaction

The measurement items for the use of Satisfaction-related questions in the questionnaire were based on the research findings of several scholars, including(Maroufkhani et al., 2020).

Table 3.12 is a sample questionnaire related to Use Satisfaction.

Instructions: Please mark (√) the box that best represents your viewpoint for each question below. The scale consists of the following five levels:

Table 3.12. Use Satisfaction Questions

Question (User Satisfaction)	Source	Least →Most				
		1	2	3	4	5
Efficiency	(Maroufkhani et al., 2020).					
Our ERP improves work-group productivity。						

Question (User Satisfaction)	Source	Least →Most				
		1	2	3	4	5
我们的企业资源规划 (ERP) 系统提高了工作小组的生产力。						
Our ERP enhances solution effectiveness. 我们的企业资源规划 (ERP) 系统提高了解决方案的效果。						
Applicability						
Our ERP improves organizational-wide communication. 我们的企业资源规划 (ERP) 系统改善了整个组织的沟通。						
Our ERP improves inter-departmental coordination. 我们的企业资源规划 (ERP) 系统提高了部门间的协调。						
Supportiveness						
Our ERP helps to improve workers' participation in the organization. 我们的企业资源规划 (ERP) 系统有助于提高员工在组织中的参与度。						
Our ERP creates a sense of responsibility. 我们的企业资源规划 (ERP) 系统培养了一种责任感。						

11.SMEs performance

The measurement items for Net Benefit-related questions in the questionnaire were based on the research findings of several scholars, including (Al-Okaily et al., 2021; Vuckovic et al., 2023).

Below table 3.13 is a sample questionnaire related to SMEs performance.

Instructions: Please mark (√) the box that best represents your viewpoint for each question below. The scale consists of the following five levels:

Table 3.13. SMEs Performance Questions

Question(SMEs performance)	Source	Least →Most				
		1	2	3	4	5
Operation efficiency	(Al-Okaily et al., 2021; Vuckovic et al., 2023)					
The ERP system saves me time. ERP 系统节省了我的时间						
Our ERP improves overall productivity. 我们的 ERP 系统提高了整体生产力。						
The ERP system improved productivity. ERP 系统提高了生产力。						
Customer satisfaction						
The ERP system increased customer satisfaction. ERP 系统提高了客户满意度。						
Be perceived as the preferred supplier of ERP system products and services. Establish and maintain a good image and reputation with end-users. 被视为 ERP 系统产品和服务的首选供应商，在最终用户中建立并维护良好的形象和声誉。						
Innovation growth						
Enhance competitiveness or create strategic advantage 增强竞争力或创造战略优势。						
The extent to which an application helps the user create value for the firm's internal or external customers. 应用程序帮助用户为公司内部或外部创造价值的程度。						

3.3.2 Scale Development

The research questions and the conceptual framework were considered during the questionnaire's development. The design of each item for the observed variables was also based on information gathered from the literature review. Table 3.14 below illustrates the progress of scale development for latent and observed variables.

Table 3.14. Scale development table

Latent Variables	Observed Variables	Development of Research Variables	Number of Questions
Organization	-Leadership involvement -Organizational readiness -Organizational culture	(Christiansen et al., 2022; S. H. Chung et al., 2022; Deelert et al., 2020; Jo & Bang, 2023a; Usman et al., 2019)	8
Environment	-Competition pressure -External support -Government regulation	(Cheung et al., 2023; Damali et al., 2021; Abdalwali Lutfi ,2022; Zamzeer et al., 2020)	8
Task characteristics	-Task interdependence -Task tacitness -Task urgency	(Baharuddin, 2020; Jeyaraj, 2022)	6
Task-technology fit	-Fits with the work tasks -Necessary to the work tasks -Meet the work needs	(Jeyaraj, 2022)	6
Human self-efficacy	-Previous experience -learning ability -Social influence	(Hakkun Elmunsyah,2023), (H.-Y. Lin et al., 2006; Roky & Meriouh, 2015)	9
System quality	-System configuration -System Performance Integration	(Al-Okaily et al., 2021; Elmunsyah et al., 2023; Hancerliogullari Koksalmis & Damar, 2022; Jo & Bang, 2023a; Khand & Kalhoro, 2020; Kirmizi & Kocaoglu, 2021)	8

Latent Variables	Observed Variables	Development of Research Variables	Number of Questions
	-ERP software suitability		
Information quality	-Data accessibility - Database Timeliness -Timeliness	(Bamufleh et al., 2021; Elmunsyah et al., 2023; Kala et al., 2020; Rizkiana et al., 2021; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul Sustainability,2023; Xulu et al., 2020)	8
Service quality	-Assurance -Reliability -Responsiveness	(Bamufleh et al., 2021; Elmunsyah et al., 2023; Kala et al., 2020; Rizkiana et al., 2021; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul Sustainability,2023; Xulu et al., 2020)	9
ERP use	-Usage Frequency -Usage Quantity -Extended Use	(Bamufleh et al., 2021; Elmunsyah et al., 2023; Kala et al., 2020; Rizkiana et al., 2021; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul Sustainability,2023; Xulu et al., 2020)	9
User satisfaction	-Efficiency -Applicability -Supportiveness	(Bamufleh et al., 2021; Kala et al., 2020; Rizkiana et al., 2021; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul Sustainability,2023; Xulu et al., 2020)	6
SMEs performance	-operation efficiency -customer satisfaction -innovation growth	(Bamufleh et al., 2021; Elmunsyah et al., 2023; Kala et al., 2020; Rizkiana et al., 2021; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul Sustainability,2023; Xulu et al., 2020)	7

Data analysis was conducted based on the information collected from the questions, with each response rated using the Likert scale. These surveys were devised according to previous research and the opinions of other scholars. The 5-point Likert scale comprised the following components in Table 3.15:

Table3.15. 5-point scoring criteria

Point	Evaluation criteria			
	Agreement	Frequency	Importance	Quality
5	Strong Agree	Always	Very Important	Excellent
4	Agree	Often	Important	Good
3	Undecided	Sometime	Moderately important	Fair
2	Disagree	Rarely	Slightly important	Poor
1	Strong Disagree	Never	Unimportant	Very Poor

These question sets were designated to be excluded. As a result, the way the scores were organized differed from the previously mentioned method. Below is the technique of creating and using class intervals to interpret high scores. Specifically:

Class Interval = (Maximum - minimum) / (Number of Classes)

= (5-1)/5 = 0.80

The computed distance between them was 0.80, used to establish the evaluation criteria, as shown in Table 3.16 below.

Table 3.16. The Variable Explanation Criteria

Scale Interval (mean)	evaluation criteria			
	Agreement	Frequency	Importance	Quality
4.24-5.00	Strong Agree	Always	Very Important	Excellent
3.43-4.23	Agree	Often	Important	Good
2.62-3.42	Undecided	Sometime	Moderately imppointortant	Fair
1.81-2.61	Disagree	Rarely	Slightly important	Poor
1.00-1.80	Strong Disagree	Never	Unimportant	Very Poor

Source of Information: Gözde and Emel (2016)

3.4 Quality of Instruments

It is crucial to assess the data collection tools used for the study's research to ensure they meet quality standards. Evaluation of their validity and reliability has been conducted to ensure they meet quality requirements, as described in the following section.

a.Validity of the Instruments

Using Item-Objective Consistency (IOC) to assess the effectiveness of these tools is crucial. Three experts—a combination of scholars and industry professionals well-versed in consumer behavior—evaluated the appropriateness of questions and the significance of any necessary improvements. In addition to the evaluation, IOC calculations were performed between each question and variable. Questions with IOC scores exceeding 0.5 were deemed appropriate. The calculation method is illustrated in the diagram below.

IOC = $\frac{(\Sigma R)}{N}$

Where:

IOC: A summary of all viewpoints from experts and professionals.

N: The number of experts and professionals.

1: The measurement of the questions above is objective.

0: There needs to be more certainty about whether the questions above were objectively measured.

-1: The experts unanimously agree that these questions do not align with the content.

The Item-Objective Consistency (IOC) range is from -1 to +1. Therefore, questions closer to +1 are considered better. Questions with an IOC below 0.6 were revised. Questions with an IOC below 0.5 were not included in the questionnaire (Tongprasert et al., 2014).

The range of IOC includes:

+1 = Indicates the question is consistent with the content.

0 = Uncertainty regarding the question's consistency with the content.

-1 = Indicates the question is inconsistent with the content.

The criteria considering IOC are as follows:

1. Questions with an IOC between 0.5 and 1.00 = Effective and can be used.

2. Questions with an IOC below 0.5 = need revision.

Two professors and an expert with extensive professional knowledge and experience in big data enterprise management evaluated the questionnaire to ensure its consistency and effectiveness. They reviewed every detail, examining its comprehensibility and adherence to standards.

b. Reliability of the Instruments

Cronbach's alpha is computed to assess the overall questionnaire for the instrument's reliability. An acceptable Cronbach's alpha value should be greater than 0.7. The following Table 3.17 criteria are used to evaluate Cronbach's alpha:

Table 3.17. Cronbach's Alpha Criteria

Cronbach's Alpha	External Consistency
$\alpha \geq 0.9$	Excellent
$09 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable

Cronbach's Alpha	External Consistency
0.7 > α ≥ 0.6	Questionable
06 > α ≥ 0.5	Poor
0.5 > α	Unacceptable

Source: (Taber, 2018)

Taber (2018) provides the formula for calculating Cronbach's alpha (Taber, 2018). According to the listed standards, the alpha coefficient ranges from 0 to 1, where a higher Cronbach's alpha indicates higher reliability of the items. Here is the calculation process.

$$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum S_i^2}{S_t^2}\right]$$

Where:

α = Reliability coefficient

K = the number of questionsinstrument$\int_i^2$= Variance of scare in each question

$\int_t^2$= Variance of total score of all respondents

The interpretation of the results suggests that it can be considered acceptable if Cronbach's alpha coefficient is above 0.70. However, if it falls below 0.7, a reassessment of the questions within the questionnaire is needed. Two tests will be conducted, one for validity and another for reliability, to determine the internal consistency and accuracy of the tool. A pilot study will involve a sample of 30 participants, while the actual research will utilize data from China with a sample size of 480.

For the Cronbach's test, this study will use SPSS software.

3.5 Data Collection

3.5.1 Quantitative Data Collection

The following methods will be used to collect data.

a. Primary data

1. Provide and request a cooperation letter authorized by personnel from the Doctor of Business Administration program at King Mongkut's Institute of Technology Ladkrabang (KMITL). The requested letter is intended to collect user information from 700 respondents for this research.

2. The second step after getting the relevant permission to collect data was sending the link of questionnaires to the chosen sample. All the respondents were asked to complete

their responses using the online questionnaire.

3. The third section involved the examination and evaluation of the completeness of the questionnaire, followed by the actual data collection and its later analysis.

b. Secondary Data

The data collection consistsof concepts, literature, principles, and studies from various sources, e.g., books, papers, documents, the Internet, government-and private-sector statistical evidence, and reporting, often using the evidence for interpretation and review.

Book: "ERP Theory and Practice," Wei Ling; "ERP: Making it Happen," Thomas F. Wallace and Michael H. Kremzar.

Policy Documents: "Enterprise Informatization and E-Government Preferential Policies"; "Several Policy Measures for Accelerating Technological Innovation and Promoting High-Quality Development of the Industrial Economy."

Government Websites: China Small and Medium-sized Enterprises Information Network (http://www.sme.gov.cn/); National Enterprise Credit Information Publicity System (https://www.gsxt.gov.cn/index.htm); National Small and Medium-sized Enterprises Public Service Demonstration Platform Information Database (https://wap.miit.gov.cn/datainfo/gbptsj/index.html).

3.6 Data Analysis

3.6.1 Quantitative Data Analysis

After receiving completed questionnaires from each participant, they were examined to ascertain their accuracy, validity, and reliability. This involved filling in any missing data, identifying and eliminating outliers, and removing any values that appeared inconsistent with the rest of the data. A significance level of $\alpha = 0.05$, indicating a 5% level of significance, was used in this study. The analysis process adopted was as follows:

1. Descriptive statistics were obtained as the initial step in the research. To determine descriptive statistics, variables used in the data need to exhibit features such as mean, mode, median, standard deviation, percentiles, skewness, kurtosis, and maximum and minimum values. Conducting descriptive analysis before delving into detailed statistical analysis aids in understanding the behavioral characteristics of the data.

2. The second phase of data analysis involved diagnostic testing. This diagnostic testing aimed to determine if the data exhibited statistical accuracy. Some of the diagnostic tests conducted included:

Normality Test - As per Greene(Greene, n.d.,2008), the error terms of a linear regression should exhibit a normal distribution. Normality testing involves using skewness and kurtosis, following the approach outlined by Holland (Thorpe & Holland, 2000).

3. The third analysis conducted was correlation analysis. Pearson correlation analysis was utilized to assess the relationships between research variables. This analysis is a fundamental step in the factor discovery process within the Structural Equation Model (SEM) and influences the impact of using ERP systems on a company's net profit. The following Table 3.18 considerations were taken into account for the correlation analysis.

Table 3.18. Levels of the Correlation coefficient

Correlation Coefficient (r)	Levels of relationships
$r > 0.8$	Very high
$0.6 < r < 0.8$	Quite high
$0.4 < r < 0.6$	Moderate
$0.2 < r < 0.4$	Quite low
$r < 0.2$	Low

Source: Akram, Ajmal & Munir (Akram et al., n.d.,2008)

4. Another segment of the analysis aimed to evaluate the impact of the conceptual framework applied in the empirical investigation of net profit post the use of ERP in Chinese small and medium-sized enterprises on organizational, environmental, system capability, information capability, and service capability. Partial Least Squares Structural Equation Modeling (PLS-SEM) will be employed for this analysis.

3.6.2 Statistics for Analysis

Objectives Analysis

This section outlines the statistical techniques employed to analyze each research objective.

For Objective 1, which investigates the impact of organizational, environmental, system, information, and service capability on the use of ERP in Chinese small and medium-sized enterprises, Structural Equation Modeling (SEM) will be used for analysis.

For Objective 2, aiming to empirically determine the mediating effect of ERP system use and ERP system users on organizational, environmental, system capability, service capability, information capability, and performance of Chinese small and medium-sized enterprises, SEM analysis with ERP system use as a mediating variable will be conducted.

For Objective 3, aiming to develop an Information System Success model that enhances net profits through ERP systems in small and medium-sized enterprises, a combination of Structural Equation Modeling and moderated effects will be applied to develop and analyze this model.

Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) will be employed to test the model's adequacy and the scales' accuracy concerning the relationships among latent, observed, mediator, and endogenous variables. The statistical analysis involves a covariance analysis of variances for all variables used throughout the study, aligned with SEM, to confirm their accuracy and integrity. The covariance analysis will be applied to observed, latent, endogenous, and mediator variables. Additionally, consistency between empirical data and the conceptual framework will be assessed. Details of the fit indices are provided in Table 3.19 below.

Table 3.19. Congruence Evaluation Table between the conceptual framework and empirical data

Statistic	Symbol	Objective	Statistics for the conceptual framework with empirical data
Chi-square	λ^2	To test the null hypothesis, the conceptual framework is consistent with the empirical data.	P>0.05
Relative Chi-square	λ^2 /df	To prove the conceptual framework is consistent with empirical data.	λ^2 /df < 2.00
Goodness of Fit Index	GFI	To measure the level of harmonious harmony between 0-1.00.	≥0.9
Comparative Fit Index	CFI	To measure harmonious harmony, perfect values should be compared between 0-1.00.	≥0.9
Adjusted Goodness of Fit Index	AGFI	To measure the level of harmonious harmony between 0-1.00.	≥0.9
Root Mean Square Residual	RMR	To measure the error of the conceptual framework in the form of the mean square with a value between 0-100.	< 0.05

Statistic	Symbol	Objective	Statistics for the conceptual framework with empirical data
Root Mean Square Error of Approximation	RMSEA	To inform the tolerance of the conceptual framework, the root form of the mean square of the estimated error between 0-100.	< 0.05

Source: Hair et al.(Hair et al., 2011), Schumacker & Lomax(Lomax, 2013)

Structural Equation Modeling (SEM)

The research hypotheses will be tested using the Partial Least Squares (PLS) approach within the Structural Equation Modeling (SEM) framework. PLS is a form of Structural Equation Modeling based on components or variants. SEM is a statistical research methodology that tests a range of relationships that might be relatively hard to measure simultaneously. PLS-SEM is a soft analytical method within SEM that offers good predictive accuracy without the constraints of data distribution or sample size (Haenlein & Kaplan, 2004). It involves Partial Least Squares data analysis, typically used for theory building, focusing on the variability of dependent variables for model testing (F. et al., 2014). According to Wong(Wong, 2013), it can test theoretically supported linear and additive causal models and visually assess correlations between relevant variables.

SEM, as stated by F. Hair Jr et al. (F. et al., 2014), is a multivariate analysis technique that combines factor analysis and regression analysis (correlation) to test relationships between variables present in the model, whether between indicators and their constructs or between constructs. The acquired data will be tested and analyzed using PLS-SEM. This study conducted several statistical investigations to evaluate the proposed hypotheses. According to Latan & Ghozali (Ghozali & Latan, 2012), PLS is an alternative method that shifts from covariance-based SEM approaches to variance-based methods. While covariance-based SEM typically tests causal relationships or theories, PLS is more of a predictive model. However, the difference between covariance-based SEM and component-based PLS lies in using structural equation modeling to test or develop theories for predictive purposes.

PLS is a robust analytical method because it doesn't rely on many assumptions (Ghozali & Latan, 2012). The data don’t have to follow a normal distribution in multivariate space (theoretical scales, ordinal, interval, and ratio within the same model), and the sample size doesn't need to be large. Besides verifying theories, PLS can also explain relationships between latent variables. It's more data-focused, and with limited estimation processes, the model error has a smaller impact on parameter estimation. PLS can analyze structures composed of reflective and formative indicators, something impossible in covariance-based SEM, resulting in an indeterminate model (Ghozali & Latan, 2012).

Some reasons for using PLS in this study include:

1. The PLS algorithm is not limited to relationships between reflective indicators and their latent constructs; it's also applicable to formative relationships.

2. PLS can be employed to estimate path models.

3. PLS can handle highly complex models composed of numerous latent and manifest variables without encountering issues in data estimation.

4. PLS can also be used when data distribution is highly skewed or not distributed around the mean.

Descriptive statistics were employed to analyze the basic information provided by respondents in the first section of the questionnaire. Descriptive statistics like frequency and percentage were used for nominal scale items (industry, organization type, company size, position, education level, etc.). Similarly, ordinal variables were analyzed and assessed using frequency and percentage, as employing measures such as mean, standard deviation, and other parameter statistics would be inappropriate.

The analytical technique used in this study is the PLS (Partial Least Squares) methodology, divided into two stages:

1. The first stage involves testing the measurement model and evaluating each indicator's effectiveness and the constructs' reliability.

2. The second stage entails conducting a structural model test to ascertain the presence of relationships between variables/constructs by utilizing t-tests inherent to PLS for measurement.

A. Measurement (Outer) Model

Measurement of external models demonstrates the relationship between each block of indicators and their latent variables. The measurement model is evaluated using the MTMM (Multitrait-Multimethod) method through confirmatory factor analysis, assessing convergent and discriminant validity. Reliability tests use Cronbach's Alpha and composite reliability (Ghozali & Latan, 2012).

a. Validity test

The validity of the questionnaire is assessed through validity testing. A questionnaire is considered valid if its questions can reveal the subject it intends to measure. Validity testing is conducted for all questions within each variable. The testing occurs at different stages, including convergent validity, average variance extracted (AVE), and discriminant validity.

1. Content Validity

The validity of the questionnaire is obtained by using extensively used questionnaires within research. The questionnaire used in this study is derived from literature research results, with necessary modifications to avoid respondent bias towards specific preferences.

2. Convergent Validity

Convergence measures how closely each response captures the dimensions of a variable. Evidence of the validity of the measurement model is provided through the relationship between item scores/indicators and construct scores, derived from the correlation between item scores (component scores) and construct scores. Therefore, only items significantly more than two times the standard error in measurement of the research variables have high significance. It is considered high when the correlation between reflective measures and the tested construct exceeds 0.70. Loadings between 0.50 and 0.60 are still appropriate during the scale development phase but are suitable for the research phase (Ghozali & Latan, 2012). Additionally, if the AVE value for each variable is greater than 0.5 and the loading of each item is also above 0.5, convergent validity can be achieved. However, in the early stages of research development, loadings between 0.5 and 0.6 are considered sufficient(Ghozali & Latan, 2012).

3. Average Variance Extracted (AVE)

This validity test assesses the effectiveness of the items in the problem by looking at the Average Variance Extracted (AVE) value. AVE is the average percentage of variance extracted between the problem items or indicators of the variable, and it summarizes convergence indicators. For good criteria, the AVE of each item should be greater than 0.5 (Ghozali & Latan, 2012).

4. Discriminant Validity

This validity test explains whether two variables are significantly different from each other. Cross-loadings between indicators and their constructs demonstrate the discriminant validity indicators. Suppose the correlation between a construct and its indicators is greater than that of other constructs. In that case, the latent construct more accurately predicts its indicators within the block than the indicators from other blocks. If the correlation of a variable with itself is higher than the correlation with all other variables, the discriminant validity test can be met. Additionally, suppose the cross-loading of each statement item to its variable is higher than the cross-loadings with other variables. In that case, it provides another way to pass the discriminant validity test. Comparing the square root of each construct's average variance extracted (√ AVE) to the correlations between constructs and other constructs in the model is another way to assess discriminant validity. If the square root of the AVE of each construct is greater than the correlation between that construct and other constructs, it can be said that the model has good discriminant validity (Ghozali & Latan, 2012).

b. Reliability Test

Model measurement is also employed to examine the reliability of constructs, in addition to undergoing validity testing. Reliability is typically described as a series of tests used to assess the consistency of statements. Reliability testing demonstrates a tool's precision, consistency, and accuracy in measuring constructs. It assesses the consistency of respondents' responses to statements within a measurement tool or survey used to measure a concept in research. Reliability represents the degree to which results or measurements can be trusted or relied upon, providing relatively consistent results after multiple measurements. When the composite reliability value of a variable reaches 0.7, it is considered reliable, representing one way to test reliability(Taherdoost, 2016).

Two methods are employed in testing the reliability of constructs with reflective indicators using the SmartPLS 3.0 program: Cronbach's Alpha and composite reliability. If the values of composite reliability and Cronbach's Alpha are higher than 0.70, the construct is considered reliable(Ghozali & Latan, 2012). The alpha coefficient or Cronbach's Alpha and composite reliability are utilized to measure the reliability level of research variables. If the alpha coefficient value of measurement items is greater than 0.6, it is considered reliable (Ghozali & Latan, 2012).

B. Structural Model (Inner Model)

The structural model, also known as the internal model (internal relationships, structural model, and substantive theory), describes the estimated links or strengths between latent variables or constructs based on substantive theory. Structural model testing aims to observe the correlations between measured constructs, i.e., the t-tests of the partial least squares method itself. Methods used to assess the structural model include R-squared tests for dependent variables, Stone-Geisser Q-square tests for predicting elevations, t-tests, and the significance of coefficients of structural path parameters.

1. R-Square

When examining the structural model, the first step involves checking the R-squared of each endogenous latent variable, serving as an indicator of the predictive capacity of the structural model. The R-squared values, which signify the model's goodness-of-fit test, are utilized to test the structural model. In evaluating PLS models, the R-squared of each dependent latent variable is of primary concern. Its interpretation is similar to regression interpretation. The variation in R-squared values helps determine whether specific exogenous latent factors significantly influence endogenous latent variables. R-squared values of 0.75, 0.50, and 0.25 represent strong, moderate, and weak models(Ghozali & Latan, 2012). Changes in R-squared values can be used to assess whether certain independent latent variables substantively impact dependent latent variables (Ghozali & Latan, 2012). Besides observing R-squared values, predictive Q-square can also be used to evaluate the Partial Least Squares (PLS) model by assessing how well the observed values match the values generated by the model and the estimated parameters.

The structural or internal model can be gauged by observing R-squared model values, demonstrating the degree of influence between variables within the model.

2. F-Square

F-square testing is employed to assess the robustness of the model. When the f-square values are 0.02, 0.15, and 0.35, they can indicate weak, moderate, or strong degrees of influence of latent variable predictor factors at the structural level (Ghozali & Latan, 2012).

3. Estimate For Path Coefficients

Bootstrapping is the next test used to determine the statistical significance of effects between variables by examining the values of parameter coefficients and the T-statistics (Ghozali & Latan, 2012). Estimates of path coefficients in the structural model, representing the estimated values of path relationships, are obtained through bootstrapping. It is considered significant if the statistical t-value is greater than 1.96 (at a significance level of 5%) or greater than 1.65 (at a significance level of 10%).

C. Hypothesis test

To test hypotheses, this study utilizes smartPLS for Structural Equation Modeling (SEM) analysis. SEM supports theories and elucidates whether there are relationships between latent variables(Ghozali & Latan, 2012). Throughout the model, hypotheses are evaluated based on examining the estimated path coefficients during internal model testing. If the T-statistic for a hypothesis exceeds 1.96 (α 5%) from the T-table, it is considered accepted or confirmed. This criterion requires each hypothesis's T-statistic value to be greater than the T-table value to be accepted or confirmed.

Furthermore, a test determines the significance of indirect relationships between variables. This test is performed using bootstrapping in SmartPLS 3.0. The mediating variables in this study include trust and attitude. Suppose the P-value is below the 5% significance level, and the T-statistic exceeds the T-table value. In that case, it indicates that the mediating variables can mediate the impact of exogenous (independent) on endogenous (dependent) variables.

3.7 Secondary Research

After conducting quantitative data analysis, conducting secondary research analysis is equally important as a way to validate the findings of quantitative analysis. Qualitative analysis relies solely on secondary data from previous research related to the study subject. These sources include books, peer-reviewed journal articles, academic publications, statistical data, and other resources. These materials are used to establish research goals, research questions, and research hypotheses.

3.8 Ethical Consideration

These ethical considerations include data collection solely for this research, refraining from asking questions and sharing personal information with others. Efforts are made to prevent harm to participants and to respect their dignity in all aspects. Lastly, full consent was obtained from all participants and approved by a Human Research Ethics Committee before any survey questionnaire inquiries were made.

CHAPTER 4
RESEARCH RESULTS

This study adopts a comprehensive model that includes the TOE framework, IS model, and TTF theory. The objective of this model is to establish a model for the willingness of Chinese SMEs to use ERP systems and to examine the direct, indirect, and overall effects on the organization, environment, system quality, information quality, service quality, task characteristics, task technology fit, and the use of ERP.

This study employs a quantitative survey research design targeting the usage of ERP systems by Chinese SMEs. The primary data was collected through questionnaires from July to September 2023, with a sample size of 660. The questionnaire is divided into three parts: the first part gathers information about the SME organizations, such as industry type, company type, and company size; the second part gathers demographic data of the respondents, such as age and position; the third part addresses questions related to potential variables.

These constructs were developed from previous literature and discussed within the conceptual framework. Data was collected through the Questionnaire Star platform. The survey link was distributed to SME groups in different regions of China, and these groups' representatives sent the survey to various SME representatives via email. The survey respondents mainly included SMEs from Eastern, Western, Central, Southern, and Northern China, which have gradually used ERP systems to manage their businesses.

This study examined the reliability and validity of constructs and observed variables. Out of 700 distributed samples, 660 valid responses were received. These responses were rated using a five-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Additionally, this study utilized empirical data to establish 17 hypotheses, 11 dimensions, and 33 observed variables.

4.1 Socio-demographic information

The data characteristics of the research sample reveal the socio-demographic information of the 660 respondents.

Table 4.1 Organizational Characteristics

		Count	Column N %
Industry	Agriculture and food	26	3.9%

		Count	Column N %
	Manufacturing	94	14.2%
	Construction	244	37.0%
	Transportation	196	29.7%
	Services	93	14.1%
	Other	7	1.1%
Type of organization	Public	240	36.4%
	Private	420	63.6%
Implemented ERP system	International ERP products	263	39.8%
	Local ERP products	397	60.2%

The subjects of this study are Chinese SMEs, and Table 4.1 shows some basic information about these SMEs. In the sample, there are 26 (3.9%) SMEs in the agriculture and food industry, 94 (14.2%) in manufacturing, 244 (37%) in construction, which is the largest proportion, 196 (29.7%) in transportation, 97 (14.1%) in the service industry, and 7 (1.1%) in other sectors. Regarding enterprise types, private enterprises account for a large proportion, with 420 (63.6%), while state-owned enterprises are fewer, with only 240 (36.4%). In analyzing ERP systems, 263 SMEs (39.8%) use international ERP products, while 397 SMEs (60.2%) use Chinese ERP products.

Table 4.2 Demographics of the respondents.

		Count	Column N %
position	President, Managing Director, CEO	3	0.5%
	Information Systems (IS) manager	21	3.2%
	COO;（Business Operation manager,）	27	4.1%
	Clerk	69	10.5%
	Assistant Manager	96	14.5%
	Department Manager	116	17.6%
	Financial staff	131	19.8%
	production personnel	197	29.8%
Age	21-30 years	198	30.0%
	31-40 years	154	23.3%
	41-50 years	133	20.2%
	51- 60 years	115	17.4%
	60 or older	60	9.1%
Educational Qualification	Junior College	202	30.6%
	Bachelor	415	62.9%

		Count	Column N %
	Masters）	33	5.0%
	Doctoral	10	1.5%
ERP Usage experience	Less than 6 months	99	15.0%
	6 months-1 year	155	23.5%
	1 year-2years	294	44.5%
	2 years-5years	78	11.8%
	more than 5years	34	5.2%
Modules	Design	278	42.1%
	Sales/business management	164	24.8%
	Quality management	70	10.6%
	Human resource	91	13.8%
	Financial Accounting	38	5.8%
	Other	19	2.9%

In the questionnaire, most respondents are production staff, totaling 197 (29.8%)—only 3 (0.5%) top executives, such as presidents, managing directors, or CEOs. Financial staff is the second largest group, with 131 (19.8%) respondents, followed by department managers, with 116 (17.6%). Most respondents hold a bachelor's degree, accounting for 415 (62.9%). There are 202 (30.6%) respondents with an associate degree, 33 (5%) with a master's degree, and only 10 (1.5%) with a doctoral degree. Regarding age distribution, the 21-30 age group is the largest, with 198 (30%) respondents. The smallest age group is those over 60, with 60 (9.1%) respondents. There are 154 (23.3%) respondents aged 31-40, 133 (20.2%) aged 41-50, and 115 (17.4%) aged 51-60. Regarding ERP usage experience, the largest group has used ERP for 1-2 years, with 294 (44.5%) respondents. This is followed by those with 6 months to 1 year of experience, totaling 155 (23.5%). The smallest group is those with over 5 years of experience, with only 34 (5.2%) respondents. Additionally, 78 (11.8%) respondents have 2-5 years of experience. Regarding the ERP system modules used, the most frequently used module is the planning management module, with 278 (42.1%) respondents. This is followed by the sales management module, used by 164 (24.8%) respondents. 70 (10.6%) respondents use the quality management module, the human resources management module by 91 (13.8%), and the financial accounting module by 38 (5.8%).

4.2 Reliability Analysis

Reliability analysis verifies the internal consistency of the scale, that is, whether different items can independently measure the same content or concept. This paper mainly uses

Cronbach's coefficient test to examine the internal consistency of the scale. The value of Cronbach α coefficient is between 0 and 1. If the α coefficient does not exceed 0.6, it is generally considered that the internal consistency reliability is insufficient; when it reaches 0.7-0.8, it means that the scale has considerable reliability; when it reaches 0.8-0.9, it means that the reliability of the scale is very good.

Table 4.3 Table of Variable Reliability Analysis

Variables		Item-Total Statistics				
Latent Variables	Observed Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
TTCCA	Task interdependence	7.189	4.889	0.774	0.854	0.890
	Task tacitness	7.177	4.959	0.789	0.840	
	Task urgency	7.194	5.023	0.792	0.838	
TTFITA	Fits with the work tasks	7.167	4.830	0.796	0.837	0.891
	Necessary to the work tasks	7.208	5.167	0.772	0.857	
	Meet the work needs	7.189	5.098	0.792	0.840	
ORGANA	Leadership involvement	7.175	4.904	0.846	0.865	0.916
	Organizational readiness	7.154	4.927	0.833	0.876	
	Organizational culture	7.153	4.918	0.811	0.894	
ENVIRA	Competition pressure	7.178	4.981	0.840	0.873	0.916
	External support	7.169	4.869	0.816	0.893	
	Government regulation	7.176	5.035	0.839	0.873	

Variables		Item-Total Statistics				
Latent Variables	Observed Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
ERPUSA	Operating Frequency	7.179	2.865	0.835	0.901	0.925
	Usage Quantity	7.204	2.740	0.836	0.899	
	Extended Use	7.195	2.560	0.871	0.871	
USATIA	Efficiency	7.139	2.827	0.755	0.828	0.875
	Applicability	7.181	2.778	0.776	0.809	
	Supportiveness	7.175	2.817	0.749	0.834	
SYSQA	System configuration	6.889	5.383	0.931	0.943	0.964
	System Performance Integration	7.011	6.016	0.922	0.948	
	ERP software suitability	7.029	5.840	0.920	0.949	
INFOQA	Data accessibility	7.192	5.846	0.893	0.930	0.951
	Database Timeliness	7.072	5.551	0.912	0.917	
	Data Integrity	7.118	6.185	0.888	0.935	
SERQA	Assurance	7.083	2.546	0.879	0.850	0.920
	Responsiveness	7.062	2.915	0.817	0.900	
	Reliability	7.057	2.908	0.820	0.898	
HSEFFA	Previous experience	7.186	4.795	0.861	0.900	0.932
	Learning ability	7.204	4.702	0.864	0.897	
	Social influence	7.228	4.739	0.853	0.906	
SMESPA	Operation efficiency	7.142	2.709	0.837	0.823	0.899
	Customer	7.109	2.950	0.778	0.874	

Variables		Item-Total Statistics				Cronbach's Alpha
Latent Variables	Observed Variables	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	
	satisfaction					
	Innovation growth	7.106	2.945	0.786	0.867	

The dimensional reliability of this study ranges from 0.875 to 0.964(see Table 4.3), indicating that the research scale and dimensions have high reliability, good stability, and consistency; The correlation value of the deleted township total is between 0.749 and 0.931(see Table 4.3), indicating a strong correlation between the items.

4.3 Opinion Level of the User

In the research framework, eleven variables are described. The eight independent variables are: (1) Task Characteristics, (2) Task-Technology Fit, (3) Organization, (4) Environment, (5) Human Self-Efficacy, (6) System Quality, (7) Information Quality, and (8) Service Quality. The dependent variables are ERP Use, User Satisfaction, and SMEs Performance. All observed variables were measured using a five-point Likert scale with the following average values:

A mean value between 1.00 -1.80 is “Strongly Disagree.”

A mean value between 1.81 -2.60 is “Disagree.”

A mean value between 2.61 -3.40 is “Neutral.”

A mean value between 3.41 -4.20 is “Agree.”

A mean value between 4.21 -5.00 is “Strongly Agree.”

The descriptive analysis of these variables is then presented as follows:

4.3.1 Task characteristics

Among these latent variables are three observed variables: Task Interdependence, Task Tacitness, and Task Urgency. Table 4.4 shows Task Characteristics's descriptive analysis, mean, and standard deviation. The analysis results are based on data from 660 respondents.

Table 4.4 The Mean and Standard Deviation of Task Characteristics

Task characteristics	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Task interdependence						3.591	1.224	Agree
The implementation of an ERP system depends on the cooperation of various departments of the enterprise.	74 11.2	89 13.5	78 11.8	211 32	208 31.5	3.591	1.348	Agree
The ERP system depends on other units outside the enterprise.	77 11.7	78 11.8	92 13.9	204 30.9	209 31.7	3.591	1.347	Agree
Task tacitness						3.603	1.193	Agree
ERP system can design code according to the needs of the enterprise.	70 10.6	92 13.9	89 13.5	204 30.9	205 31.1	3.579	1.335	Agree
The knowledge required for ERP systems is complex.	68 10.3	83 12.6	99 15	187 28.3	223 33.8	3.627	1.335	Agree
Task urgency						3.586	1.174	Agree
I must use my ERP account anytime and anywhere in my corporate work.	78 11.8	82 12.4	92 13.9	229 34.7	179 27.1	3.529	1.324	Agree

Task characteristics	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
I need to obtain real-time data from the ERP system to complete enterprise tasks.	68 10.3	85 12.9	94 14.2	181 27.4	232 35.2	3.642	1.346	Agree
Overall						3.595	1.083	Agree

Regarding Task Interdependence, the results indicate that Task Interdependence falls within the range of "The implementation of ERP system depends on the cooperation of various departments of the enterprise" (mean = 3.591) and "The ERP system depends on other units outside the enterprise" (mean = 3.591). Overall, the respondents' average attitude towards Task Interdependence is at the "agree" level (mean = 3.591)(see Table 4.4).

The results for task tacitness show that It falls within the range of "ERP system can design code according to the needs of the enterprise" (mean = 3.579) and "The knowledge required for ERP systems is complex" (mean = 3.627). Overall, the respondents' average attitude towards Task Tacitness is at the "agree" level (mean = 3.603) (see Table 4.4).

Regarding Task Urgency, the results indicate that Task Urgency falls within the range of "I need to use my ERP account anytime and anywhere in my corporate work" (mean = 3.529) and "I need to obtain data from ERP system in real-time to complete enterprise tasks" (mean = 3.642). The respondents' average attitude towards Task Urgency is at the "agree" level (mean = 3.586) (see Table 4.4).

Overall, the mean value for Task Interdependence is 3.595 with a standard deviation of 1.083(see Table 4.4), which can be interpreted as the users' willingness to use ERP.

4.3.2 Task-technology fit

Among the latent variables, there are three observed variables: Fits with the work tasks, Fits with the work tasks, and Meet the work needs. Table 4.5 presents the descriptive analysis, mean, and standard deviation of the Convenience Conditions. The analysis results are based on data from 660 respondents.

Table 4.5 The Mean and Standard Deviation of Task-technology fit

Task-technology fit	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Fits with the work tasks						3.615	1.245	Agree
The ERP system has the exact functions required for the enterprise's management tasks.	80 12.1	74 11.2	83 12.6	204 30.9	219 33.2	3.618	1.362	Agree
Using ERP is very suitable for me to work in all aspects of the enterprise.	77 11.7	84 12.7	80 12.1	196 29.7	223 33.8	3.612	1.368	Agree
Necessary to the work tasks						3.573	1.186	Agree
Using ERP fits well with how I like to enhance the efficiency of my work.	76 11.5	81 12.3	93 14.1	204 30.9	206 31.2	3.580	1.344	Agree
ERP is suitable for my preferred way of working in the enterprise to strengthen my professional skills and operational practice.	66 10	92 13.9	98 14.8	210 31.8	194 29.4	3.567	1.310	Agree
Meet the work needs.						3.593	1.184	Agree

Task-technology fit	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
The use of ERP is very consistent with my work goals and needs in the enterprise.	72 10.9	90 13.6	86 13	210 31.8	202 30.6	3.576	1.337	Agree
The ERP system matches our enterprise's current tasks.	74 11.2	73 11.1	102 15.5	198 30	213 32.3	3.611	1.334	Agree
Overall						3.593	1.088	Agree

In terms of Fit with the work tasks, the results indicate that Fit with the work tasks is reflected in the following two items: "The ERP system has the exact functions required for the management tasks of the enterprise." (mean = 3.618) and "Using ERP is very suitable for me to work in all aspects of the enterprise." (mean = 3.612). Respondents' attitudes towards fitting in with the work tasks are at the "agree" level (mean = 3.615) (see Table 4.5).

Regarding Necessary to the work tasks, the results indicate that Necessary to the work tasks is reflected in the following two items: "Using ERP fits well with the way I like to enhance the efficiency of my work." (mean = 3.580) and "The use of ERP is very suitable for my preferred way of working in the enterprise to strengthen my professional skills and my existing operational practice." (mean = 3.567). Overall, respondents' attitudes towards Necessary to the work tasks are at the "agree" level (mean = 3.573) (see Table 4.5).

In terms of Meet the work needs, the results indicate that Meet the work needs is reflected in the following two items: "The use of ERP is very consistent with my work goals and needs in the enterprise." (mean = 3.576) and "The ERP system matches the current tasks of our enterprise." (mean = 3.611). Respondents' attitudes towards meeting the work needs are at the "agree" level (mean = 3.593) (see Table 4.5).

Overall, the mean value for Task-technology fit is 3.593 with a standard deviation of 1.088(see Table 4.5), which can be interpreted as the users' willingness to use ERP.

4.3.3 Organization

This latent variable includes three observed variables: Leadership Involvement, Organizational Readiness, and Organizational Culture. Table 4.6 presents the descriptive analysis, mean, and standard deviation of Price Value. The analysis results are based on data from 660 respondents.

Table 4.6 The Mean and Standard Deviation of Organization

Organization	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Leadership involvement						3.566	1.163	Agree
Our top management promotes the use of ERP systems in the organization.	83 12.6	88 13.3	85 12.9	186 28.2	218 33	3.558	1.390	Agree
Our senior management provides support for ERP system implementation within the organization.	73 11.1	93 14.1	87 13.2	206 31.2	201 30.5	3.559	1.343	Agree
Our senior management sees ERP systems as a strategic priority for the organization.	69 10.5	89 13.5	92 13.9	210 31.8	200 30.3	3.580	1.323	Agree
Organizational readiness						3.587	1.169	Agree
The lack of capital/financial resources	67	83	87	202	221	3.647	1.327	Agree

Organization	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
prevents my company from fully using the ERP system.	10.2	12.6	13.2	30.6	33.5			
The lack of IT infrastructure prevented my company from using the ERP system.	84 12.7	80 12.1	86 13	202 30.6	208 31.5	3.561	1.373	Agree
The lack of skilled human resources prevents firms from taking full advantage of ERP systems.	79 12	90 13.6	80 12.1	208 31.5	203 30.8	3.555	1.362	Agree
Organizational culture						3.588	1.190	Agree
ERP systems support corporate culture.	72 10.9	81 12.3	89 13.5	203 30.8	215 32.6	3.618	1.338	Agree
ERP systems play an important role in meeting the degree of demand due to the influence of organizational culture.	79 12	69 10.5	108 16.4	213 32.3	191 28.9	3.558	1.325	Agree

Organization	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Overall						3.581	1.087	Agree

Regarding Leadership Involvement, the results indicate that Leadership Involvement is reflected in the following three items: "Our top management promotes the use of ERP system in the organization" (mean = 3.558), "Our senior management provides support for ERP system implementation within the organization" (mean = 3.559), and "Our senior management sees ERP systems as a strategic priority for the organization to drive" (mean = 3.508). Respondents' attitudes towards Leadership Involvement are at the "agree" level (mean = 3.566) (see Table 4.6).

Regarding Organizational Readiness, the results indicate that Organizational Readiness is reflected in the following three items: "The lack of capital/financial resources prevents my company from making full use of the ERP system" (mean = 3.647), "The lack of the necessary IT infrastructure prevented my company from taking advantage of the ERP system" (mean = 3.561), and "The lack of skilled human resources prevents firms from taking full advantage of ERP systems" (mean = 3.555). Respondents' attitudes towards Organizational Readiness are at the "agree" level (mean = 3.587) (see Table 4.6).

Regarding Organizational Culture, the results indicate that Organizational Culture is reflected in the following two items: "ERP systems support corporate culture" (mean = 3.618) and "ERP systems play an important role in meeting the degree of demand, which is due to the influence of organizational culture" (mean = 3.558). Respondents' attitudes towards Organizational Culture are at the "agree" level (mean = 3.588) (see Table 4.6).

Overall, the mean value for Organization is 3.581 with a standard deviation of 1.087(see Table 4.6), which can be interpreted as the users' willingness to use ERP.

4.3.4 Environment

This latent variable includes three observed variables: Competition Pressure, External Support, and Government Regulation. Table 4.7 presents the descriptive analysis, mean, and standard deviation of Perceived Usefulness. The analysis results are based on data from 660 respondents.

Table 4.7 The Mean and Standard Deviation of Environment

Environment	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Competition pressure						3.583	1.167	Agree
Our choice to adopt a large ERP system will be strongly influenced by what industry competitors are doing.	68 10.3	102 15.5	89 13.5	183 27.7	218 33	3.577	1.355	Agree
Our company is under pressure from competitors to adopt ERP systems for business management.	83 12.6	78 11.8	77 11.7	209 31.7	213 32.3	3.592	1.371	Agree
Our company will adopt an ERP system to deal with competitors' practices.	76 11.5	77 11.7	100 15.2	202 30.6	205 31.1	3.580	1.339	Agree
External support						3.592	1.214	Agree
Community agencies/vendors can provide the necessary training for adopting ERP systems.	75 11.4	88 13.3	85 12.9	212 32.1	200 30.3	3.567	1.343	Agree
Community agencies/vendors can provide	77	80	79	206	218	3.618	1.357	Agree

Environment	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
effective technical support for adopting ERP systems.	11.7	12.1	12	31.2	33			
Government regulation						3.585	1.155	Agree
Government policies encourage the adoption of new information technologies (such as ERP systems).	62 9.4	89 13.5	92 13.9	190 28.8	227 34.4	3.653	1.323	Agree
Several business laws can deal with security and privacy issues arising from ERP system management technology.	69 10.5	99 15	82 12.4	224 33.9	186 28.2	3.544	1.320	Agree
The government provides incentives for using big data management in government procurement and contracting, such as technical support, training, and funding for ERP systems.	89 13.5	80 12.1	81 12.3	193 29.2	217 32.9	3.559	1.399	Agree

Environment	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Overall						3.587	1.090	Agree

Regarding Competition Pressure, the results indicate that Competition Pressure is reflected in the following three items: "Our choice to adopt a large ERP system will be strongly influenced by what industry competitors are doing" (mean = 3.577), "Our company is under pressure from our competitors to adopt ERP systems for business management" (mean = 3.592), and "Our company will adopt ERP system to deal with the practice of competitors" (mean = 3.580). Respondents' attitudes towards Competition Pressure are at the "agree" level (mean = 3.583) (see Table 4.7).

Regarding External Support, the results indicate that External Support is reflected in the following two items: "Community agencies/vendors can provide the necessary training for the adoption of ERP systems" (mean = 3.567) and "Community agencies/vendors can provide effective technical support for the adoption of ERP systems" (mean = 3.618). Respondents' attitudes towards External Support are at the "agree" level (mean = 3.592) (see Table 4.7).

Regarding Government Regulation, the results indicate that Government Regulation is reflected in the following three items: "Government policies encourage us to adopt new information technologies (such as ERP systems)" (mean = 3.653), "There are several business laws that can deal with security and privacy issues arising from ERP system management technology" (mean = 3.544), and "The government provides incentives for the use of big data management in government procurement and contracting, such as technical support, training, and funding for the use of ERP systems" (mean = 3.559). Respondents' attitudes towards Government Regulation are at the "agree" level (mean = 3.585) (see Table 4.7).

Overall, the mean value for Environment is 3.587 with a standard deviation of 1.090(see Table 4.7), which can be interpreted as the users' willingness to use ERP.

4.3.5 System quality

This latent variable includes three observed variables: System Configuration, System Performance Integration, and ERP Software Suitability. Table 4.8 presents the descriptive analysis, mean, and standard deviation of Expectation Confirmation. The analysis results are based on data from 660 respondents.

Table 4.8 The Mean and Standard Deviation of system quality

System quality	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
System configuration						3.575	1.301	Agree
The overall ERP architecture is already well configured according to the enterprise structure.	51 7.7	112 17	75 11.4	150 22.7	272 41.2	3.727	1.352	Agree
Rigorous and sufficient testing was conducted immediately after the ERP implementation.	100 15.2	68 10.3	92 13.9	241 36.5	159 24.1	3.441	1.359	Agree
The data inputted into the ERP system were accurate and precise.	121 18.3	64 9.7	62 9.4	152 23	261 39.5	3.558	1.528	Agree
System Performance Integration						3.453	1.173	Agree
ERP system allows for integration with other ICT systems.	58 8.8	105 15.9	110 16.7	258 39.1	129 19.5	3.447	1.219	Agree
Our ERP allows for integration with other IT systems.	97 14.7	79 12	110 16.7	145 22	229 34.7	3.500	1.438	Agree
Our ERP has good	64	111	101	257	127	3.412	1.244	Agree

System quality	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
features.	9.7	16.8	15.3	38.9	19.2			
ERP software suitability						3.436	1.213	Agree
The user interface of our ERP system can easily be adjusted to fit one's needs.	58 8.8	109 16.5	113 17.1	263 39.8	117 17.7	3.412	1.207	Agree
Our ERP system is sufficiently fast in responding.	80 12.1	93 14.1	92 13.9	139 21.1	256 38.8	3.603	1.424	Agree
Using our ERP system is easy.	121 18.3	56 8.5	110 16.7	255 38.6	118 17.9	3.292	1.355	Agree
Overall						3.480	1.180	Agree

Regarding System Configuration, the results indicate that System Configuration is reflected in the following three items: "The overall ERP architecture is already well configured according to the enterprise structure" (mean = 3.727), "Rigorous and sufficient testing was conducted immediately after the ERP implementation" (mean = 3.441), and "The data inputted into the ERP system were accurate and precise" (mean = 3.558). Respondents' attitudes towards System Configuration are at the "agree" level (mean = 3.575) (see Table 4.8).

Regarding System Performance Integration, the results indicate that System Performance Integration is reflected in the following three items: "ERP system allows for integration with other ICT systems" (mean = 3.447), "Our ERP allows for integration with other IT systems" (mean = 3.500), and "Our ERP has good features" (mean = 3.412). Respondents' attitudes towards System Performance Integration are at the "agree" level (mean = 3.453) (see Table 4.8).

Regarding ERP Software Suitability, the results indicate that ERP Software Suitability is reflected in the following three items: "The user interface of our ERP system can easily be adjusted to fit one's needs" (mean = 3.412), "Our ERP system is sufficiently fast in responding" (mean = 3.603), and "Using our ERP system is easy" (mean = 3.292). Respondents' attitudes towards ERP Software Suitability are at the "agree" level (mean = 3.436(see Table 4.8)).

Overall, the mean value for System Quality is 3.480 with a standard deviation of 1.180(see

Table 4.8), which can be interpreted as the users' willingness to use the ERP system.

4.3.6 Information Quality

This latent variable includes three observed variables: Data Accessibility, Database Timeliness, and Data Integrity. Table 4.9 presents Personal Innovativeness's descriptive analysis, mean, and standard deviation. The analysis results are based on data from 660 respondents.

Table 4.9 The Mean and Standard Deviation of information quality

Information quality	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Data accessibility						3.499	1.259	Agree
ERP system provides important information.	115 17.4	49 7.4	86 13	247 37.4	163 24.7	3.445	1.392	Agree
The ERP system provides valuable data.	71 10.8	91 13.8	84 12.7	160 24.2	254 38.5	3.659	1.385	Agree
The information presented by ERP is efficient (it contributes to the outcome of your business processes at the lowest cost).	105 15.9	68 10.3	95 14.4	246 37.3	146 22.1	3.394	1.358	Agree
Database Timeliness						3.619	1.306	Agree
Our ERP database content is up-to-date.	46 7	118 17.9	74 11.2	189 28.6	233 35.3	3.674	1.305	Agree
The information provided by ERP is timely and up-to-date.	108 16.4	63 9.5	81 12.3	165 25	243 36.8	3.564	1.469	Agree
Data Integrity						3.573	1.192	Agree

Information quality	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
The output options of the ERP system (print types, page sizes allowed, etc.) are sufficient for use.	59 8.9	107 16.2	93 14.1	260 39.4	141 21.4	3.480	1.241	Agree
Our ERP system provides concise information.	49 7.4	118 17.9	87 13.2	157 23.8	249 37.7	3.665	1.335	Agree
Overall						3.342	0.957	Agree

Regarding Data Accessibility, the results indicate that Data Accessibility is reflected in the following three items: "ERP system provides important information" (mean = 3.445), "The ERP system provides valuable data" (mean = 3.659), and "The information presented by ERP is efficient (it contributes to the outcome of your business processes at the lowest cost)" (mean = 3.394). Respondents' attitudes towards Data Accessibility are at the "agree" level (mean = 3.499) (see Table 4.9).

Regarding Database Timeliness, the results indicate that Database Timeliness is reflected in the following two items: "Our ERP database content is up-to-date" (mean = 3.674) and "The information provided by ERP is timely and up-to-date" (mean = 3.564). Respondents' attitudes towards Database Timeliness are at the "agree" level (mean = 3.619) (see Table 4.9).

Regarding Data Integrity, the results indicate that Data Integrity is reflected in the following two items: "The output options of ERP system (print types, page sizes allowed for, etc.) are sufficient for use" (mean = 3.480) and "Our ERP system provides concise information" (mean = 3.665). Respondents' attitudes towards Data Integrity are at the "agree" level (mean = 3.573) (see Table 4.9).

Overall, the mean value for Information Quality is 3.342 with a standard deviation of 0.957(see Table 4.9), which can be interpreted as the users' willingness to use ERP.

4.3.7 Service Quality

This latent variable includes three observed variables: Assurance, Responsiveness, and Reliability. Table 4.10 presents Service Quality's descriptive analysis, mean, and standard deviation. The analysis results are based on data from 660 respondents.

Table 4.10 The Mean and Standard Deviation of Service Quality

Service quality	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Assurance						3.518	0.933	Agree
I feel secure when communicating with ERP technical personnel.	29 4.4	108 16.4	156 23.6	269 40.8	98 14.8	3.453	1.066	Agree
The staff in the ERP service department possesses excellent job knowledge.	18 2.7	101 15.3	170 25.8	251 38	120 18.2	3.536	1.041	Agree
The overall infrastructure in place is adequate to support the ERP.	26 3.9	82 12.4	166 25.2	266 40.3	120 18.2	3.564	1.047	Agree
Responsiveness						3.539	0.856	Agree
The ERP service department informs users when the service will be executed.	19 2.9	89 13.5	185 28	244 37	123 18.6	3.550	1.032	Agree
The staff in the ERP service department promptly provides services to users.	22 3.3	83 12.6	185 28	255 38.6	115 17.4	3.542	1.025	Agree
The staff in the ERP system	24	92	181	240	123	3.524	1.059	Agree

Service quality	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
department is never too busy to respond to user requests.	3.6	13.9	27.4	36.4	18.6			
Reliability						3.544	0.856	Agree
When the ERP service department commits to completing something by a certain time, they fulfill their commitment.	20 3	84 12.7	183 27.7	256 38.8	117 17.7	3.555	1.020	Agree
When users encounter issues, the ERP service department shows genuine interest in resolving the problems.	22 3.3	92 13.9	179 27.1	260 39.4	107 16.2	3.512	1.027	Agree
The ERP service department provides services within the promised timeframe.	18 2.7	98 14.8	166 25.2	248 37.6	130 19.7	3.567	1.050	Agree
Overall						3.535	0.813	Agree

Regarding Assurance, the results indicate that Assurance is reflected in the following three items: "I feel secure when communicating with ERP technical personnel" (mean = 3.453), "The staff in the ERP service department possesses excellent job knowledge" (mean = 3.536), and "The overall infrastructure in place is adequate to support the ERP" (mean = 3.564).

Respondents' attitudes towards Assurance are at the "agree" level (mean = 3.518)(see Table 4.10).

Regarding Responsiveness, the results indicate that Responsiveness is reflected in the following three items: "When the ERP service department commits to completing something by a certain time, they fulfill their commitment" (mean = 3.550), "When users encounter issues, the ERP service department shows genuine interest in resolving the problems" (mean = 3.542), and "The staff in the ERP system department is never too busy to respond to user requests" (mean = 3.524). Respondents' attitudes towards Responsiveness are at the "agree" level (mean = 3.539) (see Table 4.10).

Regarding Reliability, the results indicate that Reliability is reflected in the following three items: "When the ERP service department commits to completing something by a certain time, they fulfill their commitment" (mean = 3.555), "When users encounter issues, the ERP service department shows genuine interest in resolving the problems" (mean = 3.512), and "The ERP service department provides services within the promised timeframe" (mean = 3.567). Respondents' attitudes towards Reliability are at the "agree" level (mean = 3.544) (see Table 4.10).

Overall, the mean value for Service Quality is 3.535 with a standard deviation of 0.813(see Table 4.10), which can be interpreted as the users' willingness to use the ERP system.

4.3.8 Human Self-efficacy

This latent variable includes three observed variables: Previous Experience, Learning Ability, and Social Influence. Table 4.11 presents Human Self-efficacy's descriptive analysis, mean, and standard deviation. The analysis results are based on data from 660 respondents.

Table 4.11 The Mean and Standard Deviation of Human Self-efficacy

Human Self-efficacy	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Previous experience						3.623	1.129	Agree
ERP user interface can be easily adapted to one's approach.	75 11.4	82 12.4	77 11.7	212 32.1	214 32.4	3.618	1.348	Agree

Human Self-efficacy	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
We knew the specificities of our current module before our company adopted the ERP system.	76 11.5	73 11.1	97 14.7	198 30	216 32.7	3.614	1.344	Agree
We knew the deliverables the ERP consulting firm would provide before our company adopted the ERP system.	59 8.9	93 14.1	95 14.4	195 29.5	218 33	3.636	1.309	Agree
Learning ability						3.605	1.148	Agree
I can Recognize the value of the ERP knowledge I learned.	74 11.2	80 12.1	78 11.8	225 34.1	203 30.8	3.611	1.331	Agree
I can Assimilate the ERP knowledge I learned and turn it into my knowledge base.	76 11.5	83 12.6	84 12.7	206 31.2	211 32	3.595	1.351	Agree
I can Learn important ERP know-how.	77 11.7	85 12.9	87 13.2	181 27.4	230 34.8	3.609	1.377	Agree
Social influence						3.581	1.149	Agree
We can apply the advanced processes derived from ERP to our	69 10.5	86 13	97 14.7	206 31.2	202 30.6	3.585	1.321	Agree

Human Self-efficacy tasks.	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
We can share knowledge derived from ERP across departments.	82 12.4	85 12.9	84 12.7	190 28.8	219 33.2	3.574	1.383	Agree
We can share my knowledge with others through the ERP network.	67 10.2	99 15	81 12.3	207 31.4	206 31.2	3.585	1.334	Agree
Overall						3.603	1.071	Agree

Regarding Previous Experience, the results indicate that Previous Experience is reflected in the following three items: "ERP user interface can be easily adapted to one's approach" (mean = 3.618), "We knew the specificities of the module that we currently use before our company adopted the ERP system" (mean = 3.614), and "We knew the deliverables the ERP consulting firm would provide before our company adopted the ERP system" (mean = 3.636). Respondents' attitudes towards Previous Experience are at the "agree" level (mean = 3.623) (see Table 4.11).

Regarding Learning Ability, the results indicate that Learning Ability is reflected in the following three items: "I can recognize the value of ERP knowledge I learned" (mean = 3.611), "I can assimilate the ERP knowledge I learned and turn it into my knowledge base" (mean = 3.595), and "I can learn important ERP know-how" (mean = 3.609). Respondents' attitudes towards Learning Ability are at the "agree" level (mean = 3.605) (see Table 4.11).

Regarding Social Influence, the results indicate that Social Influence is reflected in the following three items: "We can apply the advanced processes derived from ERP to our tasks" (mean = 3.585), "We can share knowledge derived from ERP across departments" (mean = 3.574), and "We can share our knowledge with others through the ERP network" (mean = 3.585). Respondents' attitudes towards Social Influence are at the "agree" level (mean = 3.581) (see Table 4.11).

Overall, the mean value for Human Self-efficacy is 3.603 with a standard deviation of

1.071(see Table 4.11), which can be interpreted as the users' willingness to use ERP.

4.3.9 ERP Use

This latent variable includes three observed variables: Operating Frequency, Usage Quantity, and Extended Use. Table 4.12 presents the descriptive analysis, mean, and standard deviation of ERP Use. The analysis results are based on data from 660 respondents.

Table 4.12 The Mean and Standard Deviation of ERP Use

ERP Use	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Operating Frequency						3.610	0.830	Agree
I depend highly on ERP use.	18 2.7	84 12.7	167 25.3	271 41.1	120 18.2	3.592	1.012	Agree
I use the ERP system frequently to accomplish my work.	19 2.9	85 12.9	154 23.3	284 43	118 17.9	3.602	1.014	Agree
The ERP is used frequently and extensively.	16 2.4	75 11.4	162 24.5	288 43.6	119 18	3.635	0.983	Agree
Usage Quantity						3.585	0.869	Agree
I use the ERP system intensively to complete my work.	23 3.5	85 12.9	162 24.5	261 39.5	129 19.5	3.588	1.050	Agree
I use the ERP system intensively (many hours daily at work).	20 3	98 14.8	154 23.3	276 41.8	112 17	3.548	1.033	Agree
The use of ERP is greater than originally expected.	14 2.1	102 15.5	148 22.4	253 38.3	143 21.7	3.620	1.052	Agree

ERP Use	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Extended Use						3.594	0.905	Agree
I intend to continue using ERP at my job.	12 1.8	87 13.2	164 24.8	274 41.5	123 18.6	3.620	0.991	Agree
I intend to use more ERP functions.	21 3.2	83 12.6	165 25	258 39.1	133 20.2	3.605	1.042	Agree
I intend to continue using ERP to process more tasks.	26 3.9	95 14.4	148 22.4	267 40.5	124 18.8	3.558	1.072	Agree
Overall						3.595	0.814	Agree

Regarding Operating Frequency, the results indicate that Operating Frequency is reflected in the following three items: "I depend highly on ERP use" (mean = 3.592), "I use the ERP system frequently to accomplish my work" (mean = 3.602), and "The ERP is used frequently and extensively" (mean = 3.635). Respondents' attitudes towards Operating Frequency are at the "agree" level (mean = 3.610) (see Table 4.12).

Regarding Usage Quantity, the results indicate that Usage Quantity is reflected in the following three items: "I use the ERP system intensively to complete my work" (mean = 3.588), "I use the ERP system very intensively (many hours per day, at work)" (mean = 3.548), and "The use of ERP is greater than originally expected" (mean = 3.620). Respondents' attitudes towards Usage Quantity are at the "agree" level (mean = 3.585) (see Table 4.12).

Regarding Extended Use, the results indicate that Extended Use is reflected in the following three items: "I intend to continue using the ERP on my job" (mean = 3.620), "I intend to use more functions of the ERP" (mean = 3.605), and "I intend to continue using the ERP for processing more tasks" (mean = 3.558). Respondents' attitudes towards Extended Use are at the "agree" level (mean = 3.594) (see Table 4.12).

Overall, the mean value for Expectation Confirmation is 3.597, with a standard deviation of 1.015(see Table 4.12), which can be interpreted as the users' willingness to use ERP systems.

4.3.10 User Satisfaction

The latent variable includes three observed variables: Efficiency, Applicability, and Supportiveness. Table 4.13 presents the descriptive analysis, mean, and standard deviation of User Satisfaction. The analysis results are based on data from 660 respondents.

Table 4.13 The Mean and Standard Deviation of User Satisfaction

User Satisfaction	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Efficiency						3.608	0.906	Agree
Our ERP improves work-group productivity.	21 3.2	82 12.4	151 22.9	277 42	129 19.5	3.623	1.033	Agree
Our ERP enhances solution effectiveness.	22 3.3	81 12.3	170 25.8	257 38.9	130 19.7	3.594	1.040	Agree
Applicability						3.567	0.907	Agree
Our ERP improves organizational-wide communication.	25 3.8	90 13.6	149 22.6	281 42.6	115 17.4	3.562	1.047	Agree
Our ERP improves inter-departmental coordination.	21 3.2	87 13.2	161 24.4	276 41.8	115 17.4	3.571	1.024	Agree
Supportiveness						3.573	0.913	Agree
Our ERP helps to improve workers' participation in the organization.	20 3	94 14.2	167 25.3	268 40.6	111 16.8	3.539	1.026	Agree
Our ERP creates a sense of responsibility.	24 3.6	78 11.8	169 25.6	252 38.2	137 20.8	3.606	1.054	Agree
Overall						3.581	0.815	Agree

In terms of Efficiency, the results indicate that Efficiency is reflected in the following two items: "Our ERP improves work-groups productivity" (mean = 3.623) and "Our ERP enhances solution effectiveness" (mean = 3.594). Respondents' attitudes towards Efficiency are at the "agree" level (mean = 3.608) (see Table 4.13).

Regarding Applicability, the results indicate that Applicability is reflected in the following two items: "Our ERP improves organizational-wide communication" (mean = 3.562) and "Our ERP improves inter-departmental coordination" (mean = 3.571). Respondents' attitudes towards Applicability are at the "agree" level (mean = 3.567) (see Table 4.13).

Regarding Supportiveness, the results indicate that Supportiveness is reflected in the following two items: "Our ERP helps to improve workers' participation in the organization" (mean = 3.539) and "Our ERP creates a sense of responsibility" (mean = 3.606). Respondents' attitudes towards Supportiveness are at the "agree" level (mean = 3.573) (see Table 4.13).

Overall, the mean value for User Satisfaction is 3.581 with a standard deviation of 0.815(see Table 4.13), which can be interpreted as the users' willingness to use the ERP system.

4.3.12 SMEs performance

The latent variable includes three observed variables: Operation Efficiency, Customer Satisfaction, and Innovation Growth. Table 4.14 presents the descriptive analysis, mean, and standard deviation of SME performance. The analysis results are based on data from 660 respondents.

Table 4.14 The Mean and Standard Deviation of SME Performance

SMEs performance	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Operation efficiency						3.536	0.931	Agree
The ERP system saves me time.	35 5.3	93 14.1	169 25.6	245 37.1	118 17.9	3.482	1.100	Agree
Our ERP improves overall productivity.	23 3.5	82 12.4	177 26.8	254 38.5	124 18.8	3.567	1.039	Agree
The ERP system improved productivity.	19 2.9	100 15.2	160 24.2	255 38.6	126 19.1	3.559	1.052	Agree

SMEs performance	Level of Opinion					Mean	S.D.	Level
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
	Frequency Percentage							
Customer satisfaction						3.570	0.895	Agree
The ERP system increased customer satisfaction.	19 2.9	77 11.7	158 23.9	297 45	109 16.5	3.606	0.988	Agree
Be perceived as the preferred supplier of ERP system products and services. Establish and maintain a good image and reputation with end-users.	18 2.7	102 15.5	159 24.1	272 41.2	109 16.5	3.533	1.026	Agree
Innovation growth						3.573	0.891	Agree
Enhance competitiveness or create strategic advantage.	17 2.6	93 14.1	156 23.6	283 42.9	111 16.8	3.573	1.009	Agree
The extent to which an application helps the user create value for the firm's internal or external customers.	18 2.7	85 12.9	177 26.8	261 39.5	119 18	3.573	1.014	Agree
Overall						3.560	0.826	Agree

Regarding Operation Efficiency, the results indicate that Operation Efficiency is reflected in the following three items: "The ERP system saves me time" (mean = 3.482), "Our ERP improves overall productivity" (mean = 3.567), and "The ERP system improved productivity" (mean = 3.559). Respondents' attitudes towards Operation Efficiency are at the "agree" level (mean = 3.536) (see Table 4.14).

Regarding Customer Satisfaction, the results indicate that Customer Satisfaction is reflected in the following two items: "The ERP system increased customer satisfaction" (mean = 3.606) and "Be perceived as the preferred supplier of ERP system products and services. Establish and maintain a good image and reputation with end-users" (mean = 3.533). Respondents' attitudes towards Customer Satisfaction are at the "agree" level (mean = 3.570) (see Table 4.14).

Regarding Innovation Growth, the results indicate that Innovation Growth is reflected in the following two items: "Enhance competitiveness or create a strategic advantage" (mean = 3.573) and "The extent to which an application helps the user create value for the firm's internal or external customers" (mean = 3.573). Respondents' attitudes towards Innovation Growth are at the "agree" level (mean = 3.573) (see Table 4.14).

Overall, the mean value for SMEs' performance is 3.560, with a standard deviation of 0.826(see Table 4.14), which can be interpreted as the users' willingness to use ERP systems.

4.4 Data analysis

The statistical analysis of the sample distribution was conducted using descriptive statistics, including percentages, means, and basic model analysis. This analysis covers latent and observed variables (33) to identify the distribution and variation in the structural equation model. Descriptive study statistics include standard deviation (SD), mean, coefficient of variation, AMOS, kurtosis, and skewness. Researchers must consider the core data from completed questionnaires for the analysis. The significance level and acceptable error (α) are set for statistical tests at 0.05. The following are the procedures and statistical analysis methods used.

4.4.1 Basic Statistical Values of Task Characteristics

Model 1: Task Characteristics includes six questions and three observed variables: (1) Task Interdependence, which includes two questions, has a mean of 3.591 and a standard deviation of 1.224, with low skewness and a left-skewed curve; (2) Task Tacitness, which includes two questions, has a mean of 3.603 and a standard deviation of 1.193, with low skewness and a left-skewed curve; (3) Task Urgency, which includes two questions, has a mean of 3.586 and a standard deviation of 1.174, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.776, -0.702, and -0.640, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.15.

Table 4.15 Task Characteristics Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Task characteristics	Task interdependence	3.591	1.224	-0.754	-0.776
	Task tacitness	3.603	1.193	-0.763	-0.702
	Task urgency	3.586	1.174	-0.779	-0.640

4.4.2 Basic Statistical Values of Task-technology Fit

Model 2: Task-Technology Fit includes six questions and three observed variables: (1) Fits with the Work Tasks, which includes two questions, has a mean of 3.615 and a standard deviation of 1.245, with low skewness and a left-skewed curve; (2) Necessary to the Work Tasks, which includes two questions, has a mean of 3.573 and a standard deviation of 1.186, with low skewness and a left-skewed curve; (3) Meet the Work Needs, which includes two questions, has a mean of 3.593 and a standard deviation of 1.184, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.674, -0.807, and -0.716, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.16.

Table 4.16 Task-technology fit Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Task-technology fit	Fits with the work tasks	3.615	1.245	-0.807	-0.674
	Necessary to the work tasks	3.573	1.186	-0.702	-0.807
	Meet the work needs	3.593	1.184	-0.755	-0.716

4.4.3 Basic Statistical Values of Organization

Model 3: Organization includes eight questions and three observed variables: (1) Leadership Involvement, which includes three questions, has a mean of 3.566 and a standard deviation of 1.163, with low skewness and a left-skewed curve; (2) Organizational Readiness, which includes three questions, has a mean of 3.587 and a standard deviation of 1.169, with low skewness and a left-skewed curve; (3) Organizational Culture, which includes two questions, has a mean of 3.588 and a standard deviation of 1.172, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.782, -0.764, and -0.604, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.17.

Table 4.17 Organization Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Organization	Leadership involvement	3.566	1.163	-0.789	-0.782
	Organizational readiness	3.587	1.169	-0.811	-0.764
	Organizational culture	3.588	1.190	-0.803	-0.604

4.4.4 Basic Statistical Values of Environment

Model 4: Environment includes eight questions and three observed variables: (1) Competition Pressure, which includes three questions, has a mean of 3.583 and a standard deviation of 1.167, with low skewness and a left-skewed curve; (2) External Support, which includes two questions, has a mean of 3.592 and a standard deviation of 1.214, with low skewness and a left-skewed curve; (3) Government Regulation, which includes three questions, has a mean of 3.585 and a standard deviation of 1.155, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.723, -0.783, and -0.804, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.18.

Table 4.18 Environment Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Environment	Competition pressure	3.583	1.167	-0.809	-0.723
	External support	3.592	1.214	-0.747	-0.783
	Government	3.585	1.155	-0.783	-0.804

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
	regulation				

4.4.5 Basic Statistical Values of System Quality

Model 5: System Quality includes nine questions and three observed variables: (1) System Configuration, which includes three questions, has a mean of 3.575 and a standard deviation of 1.301, with low skewness and a left-skewed curve; (2) System Performance Integration, which includes three questions, has a mean of 3.453 and a standard deviation of 1.173, with low skewness and a left-skewed curve; (3) ERP Software Suitability, which includes three questions, has a mean of 3.436 and a standard deviation of 1.213, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -1.088, -1.037, and -1.038, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.19.

Table 4.19 System Quality Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
System Quality	System configuration	3.575	1.301	-0.761	-1.088
	System Performance Integration	3.453	1.173	-0.709	-1.037
	ERP software suitability	3.436	1.213	-0.720	-1.038

4.4.6 Basic Statistical Values of Information Quality

Model 6: Information Quality includes seven questions and three observed variables: (1) Data Accessibility, which includes three questions, has a mean of 3.499 and a standard deviation of 1.259, with low skewness and a left-skewed curve; (2) Database Timeliness, which includes two questions, has a mean of 3.619 and a standard deviation of 1.306, with low skewness and a left-skewed curve; (3) Data Integrity, which includes two questions, has a mean of 3.573 and a standard deviation of 1.192, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -1.027, -0.963, and -0.650, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.20.

Table 4.20 Information Quality Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Information Quality	Data accessibility	3.499	1.259	-0.774	-1.027
	Database Timeliness	3.619	1.306	-0.736	-0.963
	Data Integrity	3.573	1.192	-0.649	-0.650

4.4.7 Basic Statistical Values of Service Quality

Model 7: Service Quality includes nine questions and three observed variables: (1) Assurance, which includes three questions, has a mean of 3.518 and a standard deviation of 0.933, with low skewness and a left-skewed curve; (2) Responsiveness, which includes three questions, has a mean of 3.539 and a standard deviation of 0.856, with low skewness and a left-skewed curve; (3) Reliability, which includes three questions, has a mean of 3.544 and a standard deviation of 0.856, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.488, -0.531, and -0.349, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.21.

Table 4.21 Service Quality Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Service Quality	Assurance	3.518	0.933	-0.613	-0.488
	Responsiveness	3.539	0.856	-0.564	-0.531
	Reliability	3.544	0.856	-0.626	-0.349

4.4.8 Basic Statistical Values of Human Self-efficacy

Model 8: Human Self-efficacy includes nine questions and three observed variables: (1) Previous Experience, which includes three questions, has a mean of 3.623 and a standard deviation of 1.129, with low skewness and a left-skewed curve; (2) Learning Ability, which includes three questions, has a mean of 3.605 and a standard deviation of 1.148, with low skewness and a left-skewed curve; (3) Social Influence, which includes three questions, has a mean of 3.581 and a standard deviation of 1.149, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.601, -0.799, and -0.750, respectively.

All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.22.

Table 4.22 Human Self-efficacy Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
Human Self-efficacy	Previous experience	3.623	1.129	-0.869	-0.601
	Learning ability	3.605	1.148	-0.790	-0.799
	Social influence	3.581	1.149	-0.771	-0.759

4.4.9 Basic Statistical Values of ERP Use

Model 9: ERP Use includes nine questions and three observed variables: (1) Operating Frequency, which includes three questions, has a mean of 3.610 and a standard deviation of 0.830, with low skewness and a left-skewed curve; (2) Usage Quantity, which includes three questions, has a mean of 3.585 and a standard deviation of 0.869, with low skewness and a left-skewed curve; (3) Extended Use, which includes three questions, has a mean of 3.594 and a standard deviation of 0.905, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.244, -0.566, and -0.498, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.23.

Table 4.23 ERP Use Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
ERP Use	Operating Frequency	3.610	0.830	-0.776	-0.244
	Usage Quantity	3.585	0.869	-0.620	-0.566
	Extended Use	3.594	0.905	-0.643	-0.498

4.4.10 Basic Statistical Values of User Satisfaction

Model 10: User Satisfaction includes six questions and three observed variables: (1) Efficiency, which includes two questions, has a mean of 3.608 and a standard deviation of 0.906, with low skewness and a left-skewed curve; (2) Applicability, which includes two questions, has a mean of 3.567 and a standard deviation of 0.907, with low skewness and a left-skewed curve; (3) Supportiveness, which includes two questions, has a mean of 3.573 and a standard deviation of 0.913, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.312, -0.405, and -0.388, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.24.

Table 4.24 User Satisfaction Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
User Satisfaction	Efficiency	3.608	0.906	-0.620	-0.312
	Applicability	3.567	0.907	-0.621	-0.405
	Supportiveness	3.573	0.913	-0.621	-0.388

4.4.11 Basic Statistical Values of SME Performance

Model 11: SME performance includes seven questions and three observed variables: (1) Operation Efficiency, which includes three questions, has a mean of 3.536 and a standard deviation of 0.931, with low skewness and a left-skewed curve; (2) Customer Satisfaction, which includes two questions, has a mean of 3.570 and a standard deviation of 0.895, with low skewness and a left-skewed curve; (3) Innovation Growth, which includes two questions, has a mean of 3.573 and a standard deviation of 0.891, with low skewness and a left-skewed curve. The kurtosis values for these three sub-variables are -0.612, -0.410, and -0.438, respectively. All three variables exhibit low kurtosis, indicating that the distribution of the dataset is less peaked than a normal distribution, as shown in Table 4.25.

Table 4.25 SMEs Performance Statistical Values

Latent Variables	Observed Variables	Mean	SD	Skewness	Kurtosis
SMEs performance	Operation efficiency	3.536	0.931	-0.581	-0.612
	Customer satisfaction	3.570	0.895	-0.620	-0.410
	Innovation growth	3.573	0.891	-0.558	-0.438

4.5 Correlation Coefficient

The main procedure analyzes relationships between variables, AMOS, and Pearson correlation coefficients. The structural equation modeling factors are the basic data. The correlation coefficients measure the strength of the relationship between the relative movements of two variables. The standards for correlation coefficients are shown in Table 4.26, and the results are presented in Table 4.27.

Table 4.26 5-Point Scoring Criteria

Correlation coefficient	The relationship level
r > 0.8	Very high
0.6 < r < 0.8	Quite high
0.4 < r < 0.6	Moderate
0.2 < r < 0.4	Quite low
r<0.2	low

Table 4.27 The Result of Correlation Coefficient

	1	2	3	4	5	6	7	8	9	10	11
ttccA	1										
ttfitA	.629**	1									
organA	.506**	.511**	1								
enviro	.393**	.374**	.563**	1							
system	.419**	.466**	.530**	.462**	1						
InfoqA	.330**	.510**	.444**	.340**	.591**	1					
serqA	.450**	.468**	.539**	.399**	.547**	.491**	1				
hseffA	.461**	.664**	.523**	.388**	.563**	.564**	.510**	1			
ERPUsA	.529**	.622**	.771**	.703**	.682**	.620**	.680**	.670**	1		
usatiA	.326**	.508**	.463**	.389**	.594**	.582**	.552**	.667**	.666**	1	
smespA	.549**	.671**	.525**	.397**	.566**	.498**	.540**	.696**	.699**	.608**	1

Note： **. Correlation is significant at the 0.01 level (2-tailed).

From the table 4.27, it can be observed that:

1.Task Characteristics has a significant correlation with Task-Technology Fit, Organization, Environment, System Quality, Information Quality, Service Quality, Human

Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.629, 0.506, 0.393, 0.419, 0.330, 0.450, 0.461, 0.529, 0.326, and 0.549, respectively(see Table 4.27).

2.Task-Technology Fit has a significant correlation with Organization, Environment, System Quality, Information Quality, Service Quality, Human Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.511, 0.374, 0.466, 0.510, 0.468, 0.664, 0.622, 0.508, and 0.671, respectively(see Table 4.27).

3.Organization has a significant correlation with Environment, System Quality, Information Quality, Service Quality, Human Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.563, 0.530, 0.444, 0.539, 0.523, 0.771, 0.463, and 0.525, respectively(see Table 4.27).

4.Environment has a significant correlation with System Quality, Information Quality, Service Quality, Human Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.462, 0.340, 0.399, 0.388, 0.703, 0.389, and 0.397, respectively(see Table 4.27).

5.System Quality has a significant correlation with Information Quality, Service Quality, Human Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.591, 0.547, 0.563, 0.682, 0.594, and 0.566, respectively(see Table 4.27).

6.Information Quality has a significant correlation with Service Quality, Human Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.491, 0.564, 0.620, 0.582, and 0.498, respectively(see Table 4.27).

7.Service Quality has a significant correlation with Human Self-efficacy, ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.510, 0.680, 0.552, and 0.540, respectively(see Table 4.27).

8.Human Self-efficacy has a significant correlation with ERP Use, User Satisfaction, and SME Performance ($p<0.05$), with correlation coefficients of 0.670, 0.667, and 0.696, respectively(see Table 4.27).

10.ERP Use has a significant correlation with User Satisfaction and SME Performance ($p<0.05$), with correlation coefficients of 0.666 and 0.699, respectively(see Table 4.27).

11.User Satisfaction has a significant correlation with SME Performance ($p<0.05$), with a correlation coefficient of 0.608(see Table 4.27).

4.6 The Kaiser-Meyer-Olkin (KMO)

The Kaiser-Meyer-Olkin (KMO) test is used to examine the compatibility between empirical data and the conceptual framework, measuring the suitability of the data. The data validation using the KMO statistic determines whether the correlation matrix is a unit or variable matrix. Table 4.28 shows the results of the Bartlett's test of sphericity. Considering the statistical values of Bartlett's test of sphericity from the table, the chi-square value is 42967.821, indicating that the correlation matrix among the variables is different. The statistically significant unit matrix (P<.001) corresponds to the KMO analysis, with a value close to 1 (0.979), indicating a good relationship among the items, making them suitable for factor analysis.

Table 4.28 KMO and Bartlett’s Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.979
Bartlett's Test of Sphericity	Approx. Chi-Square	42967.821
	df	3486
	Sig.	.000

4.7 Confirmatory Factor Analysis (CFA)

When testing measurement quality, the AMOS procedure of Confirmatory Factor Analysis (CFA) is used to increase the analysis of variance and covariance to examine the opportunities for constructing harmony, precision, or consistency. This technique assesses the relationships between observer-level or theoretically latent variables through hypothesis testing(Hair et al., 2011).

4.7.1 Confirmatory Factor Analysis (CFA): Task characteristics variable

For Model 1: Task Characteristics, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (Task Interdependence, Task Tacitness, and Task Urgency). The analysis results in Figure 4.1 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 0.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Task Urgency has the highest factor weight value at 0.87, followed by Task Tacitness and Task Interdependence, with factor weight values of 0.86 and 0.84, respectively.

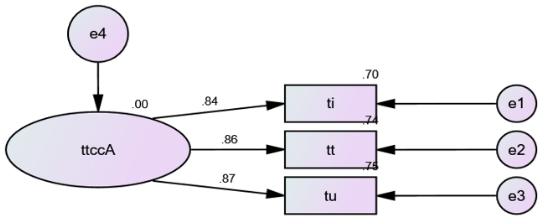


Figure 4.1 CFA of Task characteristics variable

4.7.2 Confirmatory Factor Analysis (CFA): Task-technology fit

For Model 2: Task-technology fit, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (Fits with the work tasks, Necessary to the work tasks, and Meets the work needs). The analysis results in Figure 4.2 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Fits with the work tasks has the highest factor weight value at 0.870, followed by Meet the work needs and Necessary to the work tasks, with factor weight values of 0.86 and 0.83, respectively.

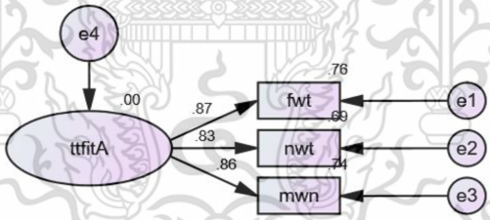


Figure 4.2 CFA of Task-technology fit variable

4.7.3 Confirmatory Factor Analysis (CFA): Organization

For Model 3: Organization, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (Leadership involvement, Organizational readiness, and Organizational culture). The analysis results in Figure 4.3 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Leadership involvement has the highest factor weight value at 0.91, followed by Organizational readiness and Organizational culture, with factor weight values of 0.89 and 0.86, respectively.

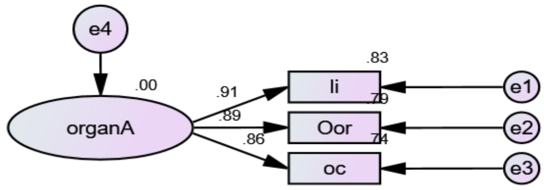


Figure 4.3 CFA of Organization

4.7.4 Confirmatory Factor Analysis (CFA): Environment

For Model 4: Environment, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (Competition pressure, External support, and Government regulation). The analysis results in Figure 4.4 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.00, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Competition pressure has the highest factor weight value at 0.90, followed by External support, with factor weight values of 0.86, respectively.

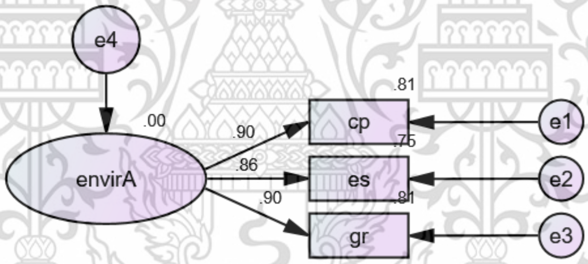


Figure 4.4 CFA of Environment

4.7.5 Confirmatory Factor Analysis (CFA): ERP USE

For Model 5: ERP Use, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the variables (Operating Frequency, Usage Quantity, and Extended Use). The analysis results in Figure 4.5 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Extended Use has the highest factor weight value at 0.93, followed by Operating Frequency and Usage Quantity, with a factor weight value of 0.88.

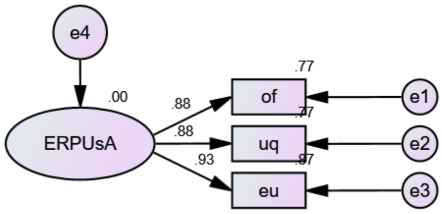


Figure 4.5 CFA of ERP USE

4.7.6 Confirmatory Factor Analysis (CFA): User Satisfaction

For Model 6: User Satisfaction, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (Efficiency, Applicability, and Supportiveness). The analysis results in Figure 4.6 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Applicability has the highest factor weight value at 0.86, followed by Efficiency and Supportiveness, with factor weight values of 0.83 and 0.82, respectively.

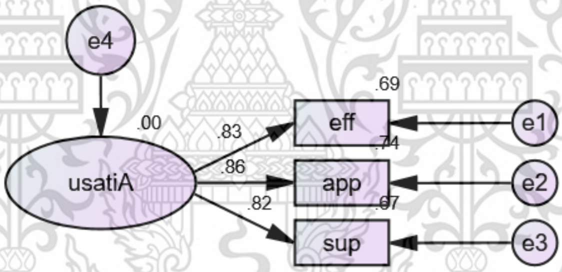


Figure 4.6 CFA of User Satisfaction

4.7.7 Confirmatory Factor Analysis (CFA): System Quality

For Model 7: System Quality, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (System configuration, System Performance Integration, and ERP software suitability). The analysis results in Figure 4.7 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, System configuration has the highest factor weight value at 0.96, followed by System Performance Integration and ERP software suitability, with factor weight values of 0.95 and 0.94, respectively.

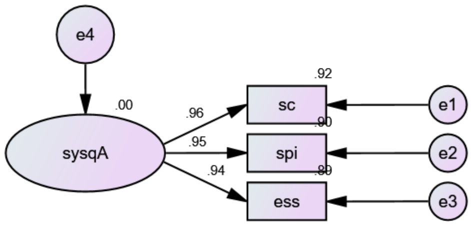


Figure 4.7 CFA of System Quality

4.7.8 Confirmatory Factor Analysis (CFA): Information Quality

For Model 8: Information Quality, the hypothesis validity analysis results used Confirmatory Factor Analysis (CFA) to analyze the three variables (Data accessibility, Database Timeliness, and Data Integrity). The analysis results in Figure 4.8 indicate that the structure is consistent with the empirical data. This is a saturated model because the chi-square value is 1.000, and the degrees of freedom are 0. The Goodness of Fit Index (GFI) is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Database Timeliness has the highest factor weight value at 0.95, followed by Data accessibility and Data Integrity, with factor weight values of 0.92.

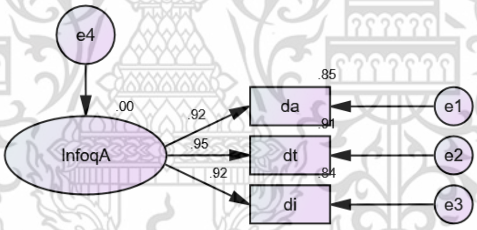


Figure 4.8 CFA of Information Quality

4.7.9 Confirmatory Factor Analysis (CFA): Service Quality

For Model 9: Assumption Validity Analysis Results of Service Quality, we used Confirmatory Factor Analysis (CFA) to analyze three variables (assurance, responsiveness, and reliability). The analysis results, shown in Figure 4.9, indicate consistency between the structure and empirical data. Considering that the chi-square value is 1.000 with 0 degrees of freedom, this is a saturated model, and the GFI is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, the factor weight of assurance is the highest at 0.95, followed by reliability and responsiveness, with factor weights of 0.86 and 0.85, respectively.

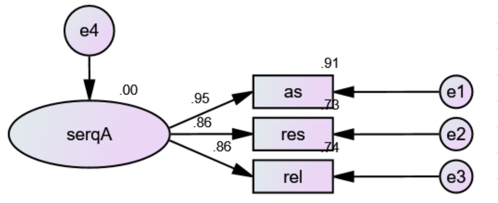


Figure 4.9 CFA of Service Quality

4.7.10 Confirmatory Factor Analysis (CFA): Human Self-efficacy

For Model 10: Assumption Validity Analysis Results of Human Self-efficacy, Confirmatory Factor Analysis (CFA) was used to analyze three variables (Previous Experience, Learning Ability, and Social Influence). The analysis results shown in Figure 4.10 indicate consistency between the structure and empirical data. Considering that the chi-square value is 1.000 with 0 degrees of freedom, this is a saturated model, and the GFI is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, learning ability has the highest factor weight at 0.91, followed by previous experience and social influence, which are 0.91 and 0.90, respectively.

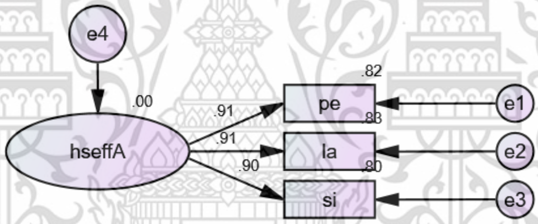


Figure 4.10 CFA of Human Self-efficacy

4.7.11 Confirmatory Factor Analysis (CFA): SME performance

For Model 11: Assumption Validity Analysis Results of SMEs Performance, Confirmatory Factor Analysis (CFA) was used to analyze three variables (Operation Efficiency, Customer Satisfaction, and Innovation Growth). The analysis results shown in Figure 4.11 indicate consistency between the structure and empirical data. Considering that the chi-square value is 1.000 with 0 degrees of freedom, this is a saturated model, and the GFI is 1.000. The factor weights are statistically significant at the 0.05 level regarding factor loadings. Therefore, Operation Efficiency has the highest factor weight at 0.92, followed by Innovation Growth and Customer Satisfaction, with factor weights of 0.84 and 0.83, respectively.

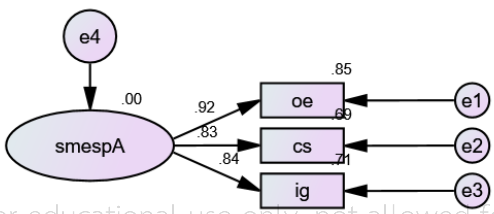


Figure 4.11 CFA of SME performance

According to this study, CFA (Confirmatory Factor Analysis) has eleven dimensions: Task Characteristics (ttccA), Task-Technology Fit (ttfitA), Organization (organA), Environment (envirA), System Quality (sysqA), Information Quality (InfoqA), Service Quality (serqA), Human Self-efficacy (hseffA), ERP Use (ERPUsA), User Satisfaction (usatiA), and SMEs Performance (smespA). According to Figure 4.12, these eleven dimensions represent the eleven latent variables in the model. The CFA results of the model show that in terms of overall model fit measurement, as shown in Table 4.29, the chi-square value is 488.358, with a probability level greater than 0.05, and Chi-Square/df is 1.110, which is less than 2.0, indicating it is within the acceptable range. Additionally, all indicators within the permissible range are greater than 0.9, including CFI = 0.998 and NNFI = 0.997, which both meet the standards. All indicators within the acceptable range are less than 0.05, including SRMR = 0.017 and RMSEA = 0.013, which also meet the standards (see Table 4.30).

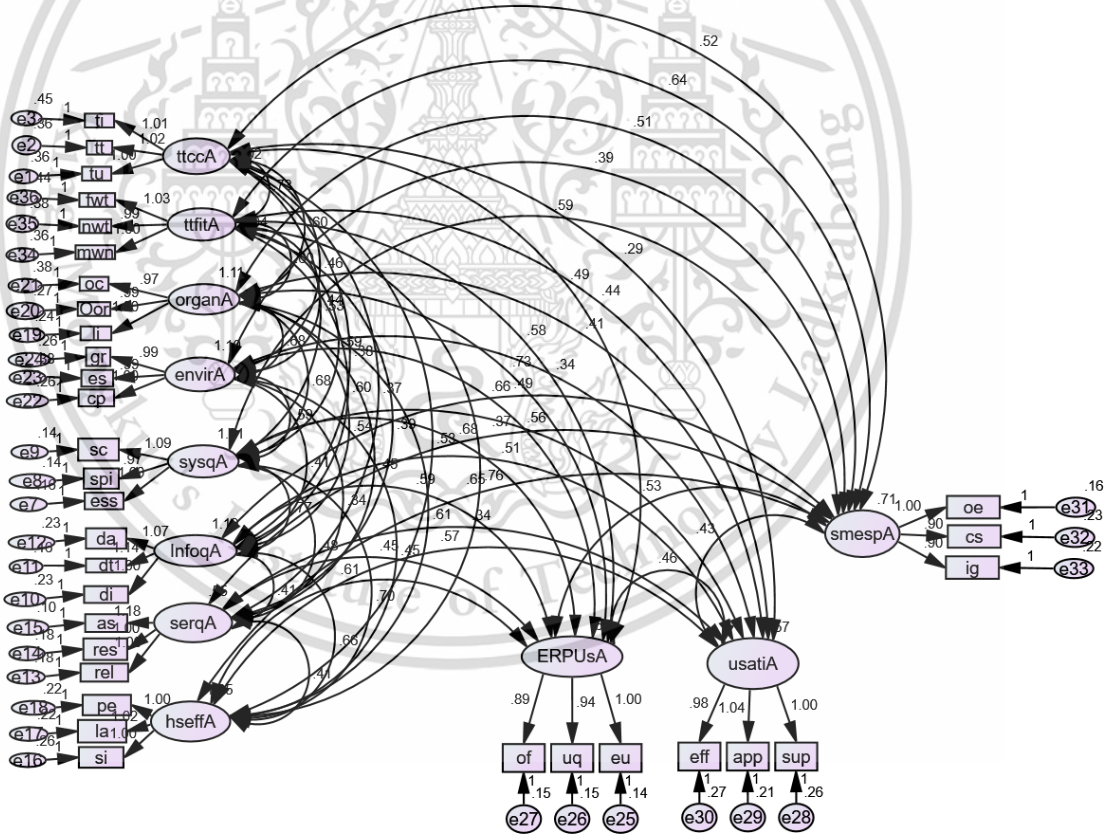


Figure 4.12 Analysis Results Measurement Model of Factors

Table 4.29 The Overall Measurement Model of Factors Fit Indices

	Chi-Square	df	Chi-Square/df	RMSEA	CFI	NNFI	SRMR
Value			<2	<0.08	<0.9	<0.9	<0.08

	Chi-Square	df	Chi-Square/df	RMSEA	CFI	NNFI	SRMR
standard	488.358	440	1.110	0.013	0.998	0.997	0.017

Table 4.30 CFA Factor Loading

Variables		Factor Loading			t	R Squared
Latent Variables	Observed Variables	Estimate	S.E.	BETA		
TTCCA	Task interdependence	1.000	0.000	0.837	999.000	0.701
	Task tacitness	1.009	0.038	0.861	25.240	0.750
	Task urgency	0.988	0.038	0.866	25.349	0.741
TTFITA	Fits with the work tasks	1.000	0.000	0.870	999.000	0.719
	Necessary to the work tasks	0.960	0.036	0.833	25.419	0.729
	Meet the work needs	0.969	0.035	0.863	26.281	0.746
ORGANA	Leadership involvement	1.000	0.000	0.909	999.000	0.821
	Organizational readiness	0.992	0.029	0.889	32.029	0.799
	Organizational culture	0.967	0.031	0.858	30.303	0.733
ENVIRA	Competition pressure	1.000	0.000	0.808	999.000	0.810
	External support	0.994	0.032	0.745	30.297	0.740
	Government regulation	0.988	0.029	0.806	32.062	0.808
ERPUSA	Operating Frequency	1.000	0.000	0.879	999.000	0.783
	Usage Quantity	1.059	0.031	0.879	31.254	0.801
	Extended Use	1.125	0.031	0.933	33.926	0.834
USATIA	Efficiency	1.000	0.000	0.825	999.000	0.671
	Applicability	1.056	0.041	0.859	23.050	0.746
	Supportiveness	1.018	0.042	0.815	22.356	0.684
SYSQA	System	1.000	0.000	0.958	999.000	0.916

Variables		Factor Loading			t	R Squared
Latent Variables	Observed Variables	Estimate	S.E.	BETA		
	configuration					
	System Performance Integration	0.891	0.017	0.943	52.164	0.895
	ERP software suitability	0.919	0.017	0.940	51.484	0.891
INFOQA	Data accessibility	1.000	0.000	0.924	999.000	0.857
	Database Timeliness	1.066	0.023	0.952	44.939	0.906
	Data Integrity	0.937	0.023	0.918	40.852	0.839
SERQA	Assurance	1.000	0.000	0.951	999.000	0.885
	Responsiveness	0.845	0.025	0.853	31.735	0.752
	Reliability	0.846	0.024	0.855	31.822	0.755
HSEFFA	Previous experience	1.000	0.000	0.908	999.000	0.826
	Learning ability	1.021	0.028	0.913	35.734	0.834
	Social influence	1.001	0.028	0.896	34.560	0.799
SMESPA	Operation efficiency	1.000	0.000	0.923	999.000	0.819
	Customer satisfaction	0.897	0.030	0.830	27.350	0.714
	Innovation growth	0.895	0.030	0.842	27.863	0.717

4.8 The Structural Equation Model of Eleven (11) Dimensions

The model for improving enterprise performance by using ERP systems in the management of Chinese SMEs aims to study the causal relationships influencing the willingness to use ERP(see Table 4.31). It focuses on the causal relationships between the following dimensions(see table 4.32): TTCCA includes Task Interdependence, Task Tacitness, and Task Urgency. TTFITA includes Fits with the Work Tasks, Necessary to the Work Tasks, and Meeting the Work Needs. ORGANA includes Leadership Involvement, Organizational

Readiness, and Organizational Culture. ENVIRA includes Competition Pressure, External Support, and Government Regulation. ERPUSA includes Operating Frequency, Usage Quantity, and Extended Use. USATIA includes Efficiency, Applicability, and Supportiveness. SYSQA includes System Configuration, System Performance Integration, and ERP Software Suitability. INFOQA includes Data Accessibility, Database Timeliness, and Data Integrity. SERQA includes Assurance, Responsiveness, and Reliability. HSEFFA includes Previous Experience, Learning Ability, and Social Influence. SMESPA includes Operation Efficiency, Customer Satisfaction, and Innovation Growth.

The model uses AMOS for Structural Equation Modeling (SEM) to test the fit between the hypothesized model and empirical data. The researchers integrated and tested the model with specific details as follows:

The model uses 33 observed variables, which have moderate positive correlations ($r < 0.80$) with each other, thus avoiding multicollinearity issues. Therefore, according to (Leahy, 2001), excluding these observed variables is unnecessary when using AMOS for analysis.

The hypothesis was tested using Structural Equation Modeling (SEM). The SEM method represents the causal relationships of the proposed model through a series of structural equations and simultaneously tests these equations to determine the model's fit with the data. This study used version 26 of AMOS.

Table 4.31 The symbol Used for the Structural Equation Model

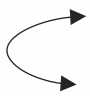
	= Latent Variable
	= Observed Variable
	= Casual Relationship
	= Non Causal Relationship

Table 4.32 The abbreviation of Variables Used for Statistical Analysis

Kind of Variables	Abbreviation	Meaning
Latent Variable	TTCCA	Task characteristics
Observed Variable	TI	Task interdependence
Observed Variable	TT	Task tacitness
Observed Variable	TU	Task urgency

Kind of Variables	Abbreviation	Meaning
Latent Variable	TTFITA	Task-technology fit
Observed Variable	FWT	Fits with the work tasks
Observed Variable	NWT	Necessary to the work tasks
Observed Variable	MWN	Meet the work needs
Latent Variable	ORGANA	Organization
Observed Variable	LI	Leadership involvement
Observed Variable	OR	Organizational readiness
Observed Variable	OC	Organizational culture
Latent Variable	ENVIRA	Environment
Observed Variable	CP	Competition pressure
Observed Variable	ES	External support
Observed Variable	GR	Government regulation
Latent Variable	ERPUSA	ERP Use
Observed Variable	OF	Operating Frequency
Observed Variable	UR	Usage Quantity
Observed Variable	EU	Extended Use
Latent Variable	USATIA	User Satisfaction
Observed Variable	EFF	Efficiency
Observed Variable	APP	Applicability
Observed Variable	SUP	Supportiveness
Latent Variable	SYSQA	System quality
Observed Variable	SC	System configuration
Observed Variable	SPI	System Performance Integration
Observed Variable	ESS	ERP software suitability
Latent Variable	INFOQA	Information quality
Observed Variable	DA	Data accessibility
Observed Variable	DT	Database Timeliness
Observed Variable	DI	Data Integrity
Latent Variable	SERQA	Service quality
Observed Variable	AS	Assurance
Observed Variable	RES	Responsiveness
Observed Variable	REL	Reliability
Latent Variable	HSEFFA	Human Self-efficacy
Observed Variable	PE	Previous experience

Kind of Variables	Abbreviation	Meaning
Observed Variable	LA	Learning ability
Observed Variable	SI	Social influence
Latent Variable	SMESPA	SMEs performance
Observed Variable	OE	Operation efficiency
Observed Variable	CS	Customer satisfaction
Observed Variable	IG	Innovation growth

In the research model, the required thresholds for the CFA fit indices should be as follows: RMSEA < 0.05; GFI/NFI/CFI/TLI > 0.9 (satisfactory fit) and < 0.8 (acceptable fit); X^2/df < 0.5. The CFA results using Structural Equation Modeling (SEM) analysis found that the hypothesized model did not match the empirical data, as indicated by the fit indices, specifically: TLI = 0.983, GFI = 0.937, AGFI = 0.922, CFI = 0.985, RMSEA = 0.032, RMR = 0.079, X^2/df = 1.681, These results are shown in Table 4.33.

The results indicate that the model performs well on these fit indices. Therefore, the model has reached an acceptable level and can be used to explain a set of hypotheses.

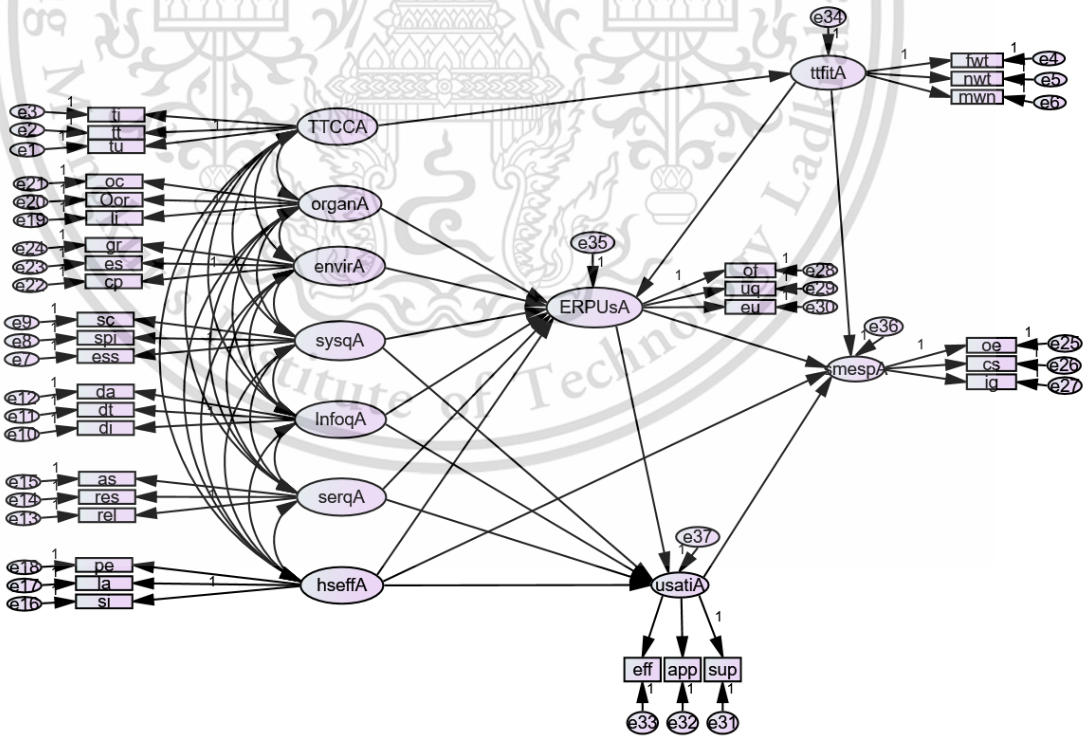


Figure 4.12 Model Framework Developed for SEM

Table 4.33 Goodness of Fit.

Indices	Threshold	value
TLI	⩾ 0.90	0.983
GFI	⩾ 0.90	0.937
AGFI	⩾ 0.90	0.922
CFI	⩾ 0.90	0.985
RMSEA	⩽0.05	0.032
RMR	< 0.08	0.079
X^2/df	⩽ 2.0	1.681
Conclusion		Model Fit

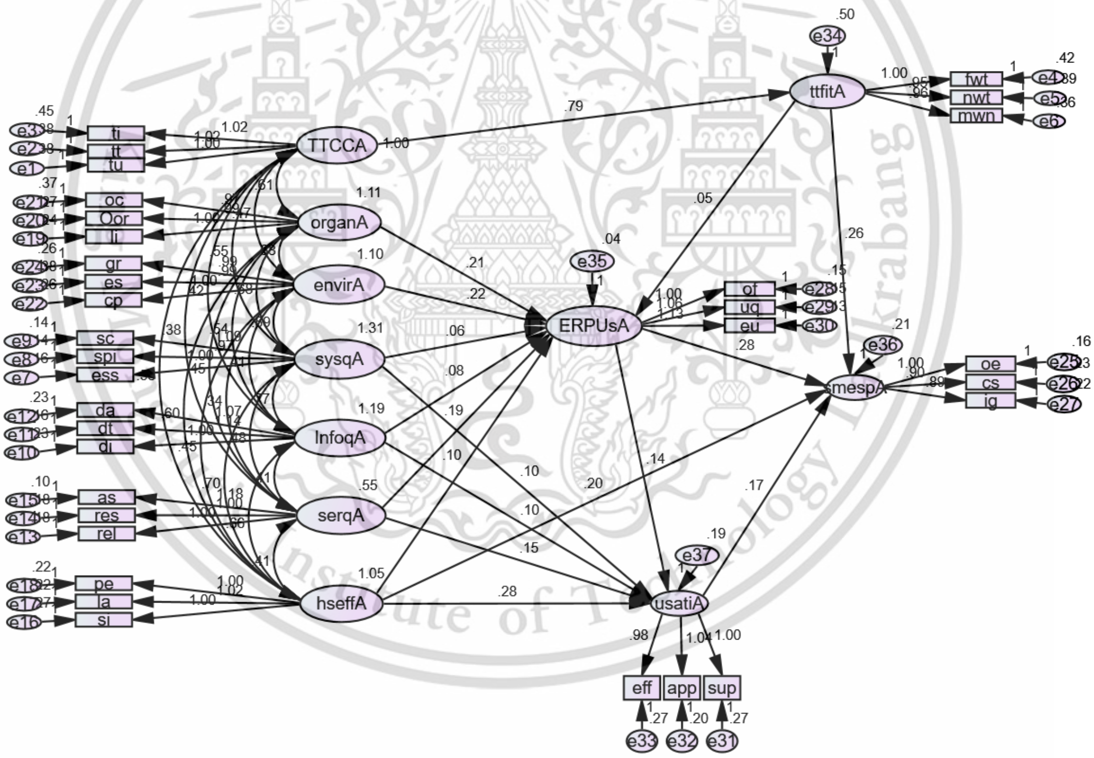


Figure 4.13 Empirical Model

Table 4.34 Relative Impact of Model Items (Regression Weights) (N=660) Results

Hypotheses	Estimate	S.E.	C.R. (t-value)	P-value	Hypothesis testing results
H1 : ORGANA → ERPUSA	0.21	0.02	10.406	***	Accepted

Hypotheses	Estimate	S.E.	C.R. (t-value)	P-value	Hypothesis testing results
H2 : ENVIRA → ERPUSA	0.22	0.017	12.862	***	Accepted
H3: TTCCA→TTFITA	0.79	0.043	18.28	***	Accepted
H4: TTFITA→ERPUSA	0.05	0.018	2.792	0.005	Accepted
H5: TTFITA→SMESPA	0.26	0.032	7.96	***	Accepted
H6: HSEFFA→ERPUSA	0.1	0.02	5.094	***	Accepted
H7: HSEFFA→USATIA	0.28	0.034	8.249	***	Accepted
H8: HSEFFA→SMESPA	0.20	0.041	5.008	***	Accepted
H9: SYSQA→ERPUSA	0.06	0.016	3.666	***	Accepted
H10: SYSQA→USATIA	0.10	0.029	3.367	***	Accepted
H11 : INFOQA → ERPUSA	0.08	0.016	5.215	***	Accepted
H12 : INFOQA → USATIA	0.10	0.028	3.536	***	Accepted
H13 : SERQA → ERPUSA	0.19	0.024	7.892	***	Accepted
H14: SERQA→USATIA	0.15	0.045	3.257	0.001	Accepted
H15 : ERPUSA → USATIA	0.14	0.063	2.271	0.023	Accepted
H16 : ERPUSA → SMESPA	0.29	0.054	5.248	***	Accepted
H17 : USATIA → SMESPA	0.17	0.055	3.153	0.002	Accepted

Note: A p-value less than 0.001 is indicated with ***, representing a statistically significant impact of the independent variable on the dependent variable.

From Table 4.34, the interpretation of the hypothesis testing results for the variables in this study is as follows:

4.8.1 Hypothesis1 (H1): The organization has a positive impact on ERP use

The hypothesis testing results show that organization positively impacts ERP use, with a causal relationship value of 0.21(see Table 3.34). Therefore, this study indicates that the better the organizational conditions, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, indicating that organization positively influences ERP use.

4.8.2 Hypothesis 2 (H2): The environment has a positive impact on ERP use

The hypothesis testing results show that the climate positively impacts ERP use, with a causal relationship value of 0.22(see Table 3.34). Therefore, this study indicates that the higher the environmental support, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, indicating that the environment positively influences ERP use.

4.8.3 Hypothesis 3 (H3): Task characteristics significantly affect the task-technology fit

The hypothesis testing results show that task characteristics positively impact task-technology fit, with a causal relationship value of 0.79(see Table 3.34). Therefore, this study indicates that the higher the level of task characteristics, the higher the task-technology fit. Based on the results, this hypothesis is accepted, suggesting that task characteristics positively influence task-technology fit.

4.8.4 Hypothesis 4 (H4): Task-technology fit has a positive influence on ERP use

The hypothesis testing results show that task-technology fit positively impacts ERP use, with a causal relationship value of 0.05(see Table 3.34). Therefore, this study indicates that the higher the level of task-technology fit, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, suggesting that task-technology fit positively influences ERP use.

4.8.5 Hypothesis 5 (H5): Task technology, fit of ERP, has a positive influence on SMEs performance

The hypothesis testing results show that task-technology fit positively impacts SMEs' performance, with a causal relationship value of 0.26(see Table 3.34). Therefore, this study indicates that the higher the level of task-technology fit, the higher the SMEs' performance. Based on the results, this hypothesis is accepted, suggesting that task-technology fit positively influences SME performance.

4.8.6 Hypothesis 6 (H6): There is a positive relationship between human self-efficacy and ERP use

The hypothesis testing results show that human self-efficacy positively impacts ERP use, with a causal relationship value of 0.1(see Table 3.34). Therefore, this study indicates that the higher the level of human self-efficacy, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, suggesting that human self-efficacy positively influences

ERP use.

4.8.7 Hypothesis 7 (H7): There is a positive relationship between human self-efficacy and user satisfaction

The hypothesis testing results show that human self-efficacy positively impacts user satisfaction, with a causal relationship value of 0.28(see Table 3.34). Therefore, this study indicates that the higher the level of human self-efficacy, the higher the user satisfaction. Based on the results, this hypothesis is accepted, suggesting that human self-efficacy positively influences user satisfaction.

4.8.8 Hypothesis 8 (H8): There is a positive relationship between human self-efficacy and SMEs performance

The hypothesis testing results show that human self-efficacy positively impacts SMEs performance, with a causal relationship value 0.20(see Table 3.34). Therefore, this study indicates that the higher the level of human self-efficacy, the higher the SMEs performance. Based on the results, this hypothesis is accepted, suggesting that human self-efficacy positively influences SMEs performance.

4.8.9 Hypothesis 9 (H9): There is a positive relationship between system quality of ERP and ERP use

The hypothesis testing results show that system quality positively impacts ERP use, with a causal relationship value of 0.06(see Table 3.34). Therefore, this study indicates that the higher the level of system quality, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, indicating that system quality positively influences ERP use.

4.8.10 Hypothesis 10 (H10): There is a positive relationship between system quality of ERP and user satisfaction

The hypothesis testing results show that system quality positively impacts user satisfaction, with a causal relationship value of 0.10(see Table 3.34). Therefore, this study indicates that the higher the level of system quality, the higher the user satisfaction. Based on the results, this hypothesis is accepted, indicating that system quality positively influences user satisfaction.

4.8.11 Hypothesis 11 (H11): There is a positive relationship between the information quality of ERP and ERP use

The hypothesis testing results show that information quality positively impacts ERP use, with a causal relationship value of 0.08(see Table 3.34). Therefore, this study indicates that the higher the level of information quality, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, suggesting that information quality positively influences the desire to use ERP.

4.8.12 Hypothesis 12 (H12): There is a positive relationship between the information quality of ERP and user satisfaction

The hypothesis testing results show that information quality positively impacts user satisfaction, with a causal relationship value of 0.10(see Table 3.34). Therefore, this study indicates that the higher the level of information quality, the higher the user satisfaction. Based on the results, this hypothesis is accepted, suggesting that information quality positively influences user satisfaction.

4.8.13 Hypothesis 13 (H13): There is a positive relationship between the service quality of ERP and ERP use

The hypothesis testing results show that service quality positively impacts ERP use, with a causal relationship value of 0.19(see Table 3.34). Therefore, this study indicates that the higher the level of service quality, the higher the willingness to use ERP. Based on the results, this hypothesis is accepted, suggesting that service quality positively influences the desire to use ERP.

4.8.14 Hypothesis 14 (H14): There is a positive relationship between service quality of ERP and user satisfaction

The hypothesis testing results show that service quality positively impacts user satisfaction, with a causal relationship value of 0.15(see Table 3.34). Therefore, this study indicates that the higher the level of service quality, the higher the user satisfaction. Based on the results, this hypothesis is accepted, suggesting that service quality positively influences user satisfaction.

4.8.15 Hypothesis 15 (H15): ERP usage is positively correlated with user satisfaction

The hypothesis testing results show that ERP usage positively impacts user satisfaction, with a causal relationship value of 0.14(see Table 3.34). Therefore, this study indicates that the higher the willingness to use ERP, the higher the user satisfaction. Based on the results, this hypothesis is accepted, suggesting that ERP usage positively influences user satisfaction.

4.8.16 Hypothesis 16 (H16): ERP use positively affects SMEs performance

The hypothesis testing results show that ERP usage positively impacts SMEs performance, with a causal relationship value of 0.29(see Table 3.34). Therefore, this study indicates that the higher the ERP usage, the higher the SMEs performance. Based on the results, this hypothesis is accepted, indicating that ERP usage positively influences SMEs performance.

4.8.17 Hypothesis 17 (H17): User satisfaction affects SMEs performance

The hypothesis testing results show that user satisfaction positively impacts SMEs performance, with a causal relationship value of 0.17(see Table 3.34). Therefore, this study indicates that the higher the user satisfaction, the higher the SMEs performance. Based on the results, this hypothesis is accepted, indicating that user satisfaction positively influences SMEs performance.

4.8.18 Direct Effects and Indirect Effects

The ERP usage model summarizes each variable's direct and indirect effects. Table 4.35 presents the extent of the direct, indirect, and total impact of each variable on the acceptance model, as detailed below:

Table 4.35 Summary of Direct, Indirect, and Total Effects on ERP Usage

Variable	Path	Direct influence	Indirect influence through other variables	Total influence
TTCCA	TTCCA- TTFITA- ERPUSA- SMESPA		0.0115	0.217
	TTCCA- TTFITA- SMESPA		0.2054	
TTFITA	TTFITA-SMESPA	0.257		0.272
	TTFITA-ERPUSA- SMESPA		0.014	
	TTFITA-ERPUSA- USATIA-SMESPA		0.0012	
ORGANA	ORGANA -ERPUSA- SMESPA		0.06	0.065
	ORGANA -ERPUSA- USATIA-SMESPA		0.005	
ENVIRA	ENVIRA -ERPUSA- SMESPA		0.06	0.065
	ENVIRA -ERPUSA- USATIA-SMESPA		0.005	
SYSQA	SYSQA-ERPUSA- SMESPA		0.017	0.036
	SYSQA-USATIA-SMESPA		0.017	

Variable	Path	Direct influence	Indirect influence through other variables	Total influence
	SYSQA-ERPUSA-USATIA-SMESPA		0.0015	
INFOGA	INFOGA -ERPUSA-SMESPA		0.024	0.043
	INFOGA -USATIA-SMESPA		0.017	
	INFOGA -ERPUSA-USATIA-SMESPA		0.002	
SERQA	SERQA-ERPUSA-SMESPA		0.054	0.084
	SERQA-USATIA-SMESPA		0.025	
	SERQA-ERPUSA-USATIA-SMESPA		0.0047	
HSEFFA	HSEFFA-ERPUSA-SMESPA		0.029	0.285
	HSEFFA-USATIA-SMESPA		0.049	
	HSEFFA-ERPUSA-USATIA-SMESPA		0.0025	
	HSEFFA-SMESPA	0.204		
ERPUSA	ERPUSA -SMESPA	0.29		0.3138
	ERPUSA-USATIA-SMESPA		0.0238	
USATIA	USATIA-SMESPA	0.17		0.17

CHAPTER 5
CONCLUSIONS AND DISCUSSIONS

This study aims to develop a model to investigate the usage of ERP in SMEs and its impact on SME performance. It also seeks to explore the direct effects, indirect effects, and overall impact relationships between organizational factors, environmental factors, ERP system quality, information quality, service quality, human self-efficacy, task characteristics, task-technology fit, user satisfaction, ERP usage, and SME performance. Various statistical testing methods were employed in this study, including descriptive analysis, correlation analysis, data reliability and validity analysis, Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM). This chapter includes a discussion of the research results, a summary of the findings, implications based on the results from previous chapters, and research recommendations. The results of this study show three levels of statistical significance: very significant, highly significant, and statistically significant.

5.1 Conclusions

Through empirical research, this study aims to explore the factors that influence Chinese SMEs' use of ERP systems and improve their efficiency. The study uses the TOE model, IS model, human self-efficacy theory, and TTF theory to investigate the factors that motivate Chinese SMEs to adopt ERP. Additionally, by examining the direct effects, indirect effects, and overall impact relationships between organizational factors, environmental factors, ERP system quality, information quality, service quality, human self-efficacy, task characteristics, task-technology fit, user satisfaction, ERP usage, and SME performance, this study further explores the factors that encourage SMEs to use ERP systems.

Based on the results and discussion section, this section summarizes the study's conclusions. Firstly, the study concludes that the model applied in this research meets all the requirements, including reliability, validity, and model fit thresholds, indicating that the reported results are trustworthy. Secondly, the study investigates the impact of various observed variables on SMEs' use of ERP systems. The research conclusions indicate that eight variables (organizational factors, environmental factors, ERP system quality, information quality, service quality, human self-efficacy, task characteristics, and task-technology fit) significantly influence Chinese SMEs' use of ERP systems. Furthermore, ERP usage significantly impacts user satisfaction, and both ERP usage and user satisfaction significantly affect SME performance.

The literature review supports the study's conclusions regarding ERP usage in Chinese SMEs. These findings include the TOE model (organizational factors, environmental factors), IS model (system quality, information quality, service quality), and TTF theory (task characteristics, task-technology fit, human self-efficacy).

5.2 Discussions

The discussion of the study's conclusions is organized based on the research questions and hypotheses, and it references other research results to see if they are consistent. This section answers the research questions by investigating the factors influencing ERP usage in Chinese SMEs, specifically: "What factors affect ERP usage in Chinese SMEs and improve SME performance?" and "How can ERP user satisfaction be increased?"

The eleven variables in the study framework are as follows. There are eight independent variables: (1) Task Characteristics, (2) Task-Technology Fit, (3) Organization, (4) Environment, (5) System Quality, (6) Information Quality, (7) Service Quality, and (8) Human Self-efficacy; and three dependent variables: ERP Use, User Satisfaction, and SMEs Performance. The levels of user opinion are as follows:

Task Characteristics include three observed variables: Task Interdependence, Task Tacitness, and Task Urgency. Respondents were at the "agree" level, with means of 3.591, 3.603, and 3.586, respectively. The overall mean is 3.595, with a standard deviation of 1.083, indicating users' willingness to use ERP.

Task-Technology Fit includes three observed variables: Fits with the Work Tasks, Necessary to the Work Tasks, and Meets the Work Needs. Respondents were at the "agree" level, with 3.615, 3.573, and 3.593, respectively. The overall mean is 3.593, with a standard deviation of 1.088, indicating users' willingness to use ERP.

The organization includes three observed variables: Leadership Involvement, Organizational Readiness, and Organizational Culture. Respondents were at the "agree" level, with means of 3.566, 3.587, and 3.588, respectively. The overall mean is 3.581, with a standard deviation of 1.087, indicating users' willingness to use ERP.

The environment includes three observed variables: Competition Pressure, External Support, and Government Regulation. Respondents were at the "agree" level, with means of 3.583, 3.592, and 3.585, respectively. The overall mean is 3.587, with a standard deviation of 1.090, indicating users' willingness to use ERP.

System Quality includes three observed variables: System Configuration, System Performance Integration, and ERP Software Suitability. Respondents were at the "agree" level, with means of 3.575, 3.453, and 3.436, respectively. The overall mean is 3.480, with a standard deviation of 1.180, indicating users' willingness to use ERP.

Information Quality includes three observed variables: Data Accessibility, Database Timeliness, and Data Integrity. Respondents were at the "agree" level, with means of 3.499, 3.619, and 3.573, respectively. The overall mean is 3.342, with a standard deviation of 0.957, indicating users' willingness to use ERP.

Service Quality includes three observed variables: Assurance, Responsiveness, and Reliability. Respondents were at the "agree" level, with means of 3.518, 3.539, and 3.544, respectively. The overall mean is 3.535, with a standard deviation of 0.813, indicating users' willingness to use ERP.

Human Self-Efficacy includes three observed variables: Previous Experience, Learning Ability, and Social Influence. Respondents were at the "agree" level, with means of 3.623, 3.605, and 3.581, respectively. The overall mean is 3.603, with a standard deviation of 1.071, indicating users' willingness to use ERP.

These results indicate that the respondents rated each variable relatively high, demonstrating users' acceptance and willingness to use ERP.

ERP Use includes three observed variables: Operating Frequency, Usage Quantity, and Extended Use. The means are 3.610, 3.585, and 3.594, respectively. The overall mean for ERP Use is 3.595, with a standard deviation of 0.814, indicating users' willingness to use ERP.

User Satisfaction includes three observed variables: Efficiency, Applicability, and Supportiveness. The means are 3.608, 3.567, and 3.573, respectively. The overall mean for User Satisfaction is 3.581, with a standard deviation of 0.815, indicating users' willingness to use ERP.

SME performance includes three observed variables: Operation Efficiency, Customer Satisfaction, and Innovation Growth. The ratings are at the "agree" level, with means of 3.536, 3.570, and 3.573, respectively. The overall mean for SMEs Performance is 3.560, with a standard deviation of 0.826, indicating users' willingness to use ERP.

The results have three levels of significance: highly significant, significant, and statistically significant (TLI = 0.983, GFI = 0.937, AGFI = 0.922, CFI = 0.985, RMSEA = 0.032, RMR = 0.079, X^2/df = 1.681). The significance levels for H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, and H17 all reached significant levels.

Firstly, the significance levels for H1, H2, H3, H5, H6, H7, H8, H9, H10, H11, H12, H13, and H16 are highly significant. Internal support within the organization and the external environment helps drive the use of ERP systems in SMEs, thereby improving corporate performance. ERP systems, information, and service quality also positively impact ERP usage. Moreover, employees' self-efficacy can also positively impact using ERP systems and employee satisfaction. Task characteristics and task-technology fit have a positive impact on improving corporate performance.

Secondly, H14 is significant. The reliability, assurance, and responsiveness of the service quality of the ERP system affect user satisfaction. This indicates that service quality positively influences user satisfaction.

Thirdly, H4, H15, and H17 have statistical significance. Task-technology fit provides users with the technology needed to meet work tasks and daily work requirements, impacting the use of the ERP system. Extensive use of the ERP system by SME users and the broadening of ERP usage to meet work needs will enhance employee satisfaction. Improved work efficiency and corresponding support for employees can enhance corporate performance.

These findings indicate that all hypotheses address enhancing ERP usage in Chinese SMEs. For those who pay attention to and listen to influencers' opinions, using ERP by SME employees will impact SME performance. Therefore, organizational support and the external environment are crucial in SME ERP adoption. Additionally, ERP system usage is closely related to system quality, information quality, and service quality. At the same time, task-technology fit and human self-efficacy contribute to better acceptance and use of ERP systems.

TTFITA, ORGANA, ENVIRA, SYSQA, INFOQA, SERQA, and HSEFFA directly affect ERPUSA and USATIA, while TTCCA has indirect effects. All variables exhibit positive impacts on SMESPA.

Below is a summary of the direct and indirect impacts of variables in the model that examines the use of ERP by Chinese SMEs and its impact on corporate performance. The variables have direct, indirect, and total impacts on the ERP usage model. The total impacts are as follows: TTFITA = 0.272 (direct and indirect impacts), HSEFFA = 0.285 (direct and indirect impacts), ORGANA = 0.065 (indirect impact), ENVIRA = 0.065 (indirect impact), SYSQA = 0.036 (indirect impact), INFOQA = 0.043 (indirect impact), SERQA = 0.084 (indirect impact). All variables positively influence ERP usage and enhance corporate performance.

5.2.1 Influence of Organizations on ERP Use

The organization includes three observed variables: leadership involvement, organizational readiness, and organizational culture. The most common influencing factor is "organizational culture," with an average agreement level of 3.588. Organizational culture refers to the culture of SMEs, where the strategic goals of organizational development support the use of ERP systems. Previous studies in the same field have also found similar and concentrated results. Research by Dhiman et al. (2020) found that the organizational factors within the company have a significant impact on the use of ERP systems. Additionally, studies by B.-N. Hwang et al. (2016) and Jo & Bang (2023) indicated that corporate culture significantly influences technology adoption.

In conclusion, this study finds that organizational factors have a positive impact on ERP use, which is consistent with previous literature reviews.

5.2.2 Influence of Environment on ERP use

Environmental factors have a positive impact on ERP usage, with a correlation coefficient of 0.703 and $p < 0.05$. Therefore, Hypothesis H2 is supported, indicating that the external market and government environment are decisive factors in corporate decision-making. This finding is consistent with previous studies: environmental factors, external support, and competitive pressure are considered key factors. Payton (Payton & Brennan, 1999) analyzed the importance of competitive pressure on adoption, proposing that modern technology has changed the rules of competition, reshaping industries and revealing new ways to surpass competitors. Research confirms that external support is not only an important driver of ICT success (DeLone & McLean, 1992b) but also a determinant of actual adoption (Bhattacherjee & Premkumar, 2004). Government regulation is a primary support of the external environment. According to the "Announcement on Enterprise Income Tax Policies for Equipment and Appliance Deductions" issued by the Ministry of Finance and the State Administration of Taxation (Announcement No. 37, 2023), enterprises that purchase ERP-related hardware equipment between January 1, 2024, and December 31, 2027, may enjoy accelerated depreciation policies if their equipment meets specific value requirements. This allows companies to increase cost deductions early on, reducing taxable income.

Environmental factors include three observed variables: competition pressure, external support, and government regulation. The most common response is "external support," with an average agreement level of 3.592. External support refers to various factors and conditions outside of the enterprise's operations that influence strategic decisions and daily operations. Relationships with trading partners are crucial for both operators and scholars. Although partner relationships may be linked to the success of buyers and sellers, they are considered vital in the context of Internet-based inter-organizational systems (IOS). The quick response of partners can be observed from the swift reaction of potential partners, becoming a key focus in inter-organizational system planning and helping to enhance system planning capabilities between organizations (H.-F. Lin & Lin, 2008). Therefore, as an observed variable of the environment, external support has a significant impact on ERP usage.

In conclusion, this study finds that environmental factors have a positive impact on ERP usage, which is consistent with previous literature reviews.

5.2.3 Influence of Task characteristics on task-technology fit

Task characteristics positively impact task-technology fit, with a correlation coefficient of 0.629 and $p < 0.05$. Therefore, Hypothesis H3 is supported. Task characteristics include three observed variables: task interdependence, task tacitness, and task urgency. The most common influencing factor is "task tacitness," with an average agreement level of 3.603. This finding is consistent with previous research. According to Lu & Yang (2014), social-technical fit has a dominant influence on users' intentions to use social networking services (SNS). Eddy Cardinals (2022) also found in similar research that task characteristics can influence individual performance and usage intention.

In conclusion, this study finds that task characteristics positively influence task-technology fit, consistent with previous literature reviews.

5.2.4 Influence of Task-technology fit on ERP use

Task-technology fit positively impacts usage intention, with a correlation coefficient of 0.622 and $p < 0.001$. Therefore, Hypothesis H4 is supported. Task-technology fit includes three observed variables: Fit with Work Tasks, Necessity for Work Tasks, and Meeting Work Needs. The most common response is "Fit with Work Tasks," with an average agreement level of 3.615. This finding aligns with previous research. Lu and Yang (2014) found similar results in the same field, and this study also finds that task-technology fit enhances ERP usage. Additionally, Hall (2002) discussed the impact of ERP systems on work organization, including downsizing, flattening hierarchies, and increasing work intensity. Therefore, "Fit with Work Tasks," as an observed variable of task-technology fit, significantly influences ERP usage.

In conclusion, this study finds that task-technology fit positively impacts ERP use, consistent with previous literature reviews.

5.2.5 Influence of Task-technology fit on SMEs performance

Task-technology fit positively impacts SMEs' performance, with a correlation coefficient of 0.671 and $p < 0.001$. Therefore, Hypothesis H5 is supported. Task-technology fit includes three observed variables: Fits with the Work Tasks, Necessary to the Work Tasks, and Meet the Work Needs. The most common response is "Fits with the Work Tasks," with an average agreement level of 3.615. This finding aligns with previous research. Carlos Tam (2016) studied mobile banking and found that task-technology fit influences SME performance. Similarly, Norzaidi and Salwani (Mohamed et al., 2009) studied internet technology and found that task-technology fit can predict the actual use of technology. Other studies have observed similar results, indicating that the higher the alignment between the system and users' interests, the higher the system's usage rate (D'Ambra & Wilson, 2004; Mohamed et al., 2009).

In conclusion, this study finds that task-technology fit positively impacts SMEs' performance, consistent with previous literature reviews.

5.2.6 Influence of human self-efficacy on ERP use

Human self-efficacy includes three observed variables: Previous Experience, Learning

Ability, and Social Influence. The most common response is "Previous Experience," with an average agreement level of 3.623. Human self-efficacy positively impacts ERP usage, with a correlation coefficient of 0.670 and $p < 0.001$. Therefore, Hypothesis H6 is supported. This result is consistent with previous research. Chen et al. (Wen & Chen, 2010) indicated in their study on online shopping that shoppers' self-efficacy positively impacts the use of online shopping apps. When using smartphones for wealth management, users with higher technological self-efficacy believe they can download and operate wealth management applications (Hong, Eunyoung, 2014). Wen-Lung Shiau and Ye Yuan (Shiau et al., 2020) found in a similar field study that human self-efficacy positively influences the use of technology.

In conclusion, this study finds that human self-efficacy positively impacts ERP use, consistent with previous literature reviews.

5.2.7 Influence of human self-efficacy on user satisfaction

Human self-efficacy includes three observed variables: Previous Experience, Learning Ability, and Social Influence. The most common response is "Previous Experience," with an average agreement level of 3.623. Human self-efficacy positively impacts user satisfaction, with a correlation coefficient of 0.667 and $p < 0.001$. Therefore, Hypothesis H7 is supported. This finding aligns with previous research. Singha Chaveesuk et al. (Chaveesuk & Hongsuwan, 2017) found that human self-efficacy positively impacts user satisfaction, thereby validating customer satisfaction. Additionally, Alshibly (2014) discovered that human resources are a critical factor in ERP implementation. Human resources are uncontrollable and unpredictable but are crucial to organizational success.

In conclusion, this study finds that human self-efficacy positively impacts user satisfaction, consistent with previous literature reviews.

5.2.8 Influence of human self-efficacy on SMEs performance

Human self-efficacy includes three observed variables: Previous Experience, Learning Ability, and Social Influence. The most common response is "Previous Experience," with an average agreement level of 3.623. Human self-efficacy positively impacts SMEs' performance, with a correlation coefficient of 0.696 and $p < 0.01$. Therefore, Hypothesis H8 is supported, indicating that human self-efficacy can enhance SME performance. This finding is consistent with previous research. Hwang (Y. Hwang, 2005) studied the impact of users' absorptive capacity on ERP use, showing that users' understanding of ERP knowledge influences their performance through the absorption and application of knowledge. Additionally, both Y. Hwang (2005) and Duan et al. (2015) have verified the significant impact of Previous Experience on improving SME performance.

In conclusion, this study finds that human self-efficacy positively impacts SMEs' performance, consistent with previous literature reviews.

5.2.9 Influence of system quality on ERP use

System quality includes three observed variables: System Configuration, System Performance Integration, and ERP Software Suitability. The most common response is "System Configuration," with an average agreement level of 3.575. System quality positively impacts ERP use, with a correlation coefficient of 0.682 and $p < 0.001$. Therefore, Hypothesis H9 is supported. This finding is consistent with previous research: Venkatesh & Davis (2000) found that reliable system quality significantly impacts system usage. Additionally, Caldeira and Ward (2002) found that the quality of available software in the market is related to the adoption and success of information systems in their study of small and medium-sized manufacturing enterprises in Portugal.

In conclusion, this study finds that system quality positively impacts ERP use, which is consistent with previous literature reviews.

5.2.10 Influence of system quality on user satisfaction

System quality includes three observed variables: System Configuration, System Performance Integration, and ERP Software Suitability. The most common response is "System Configuration," with an average agreement level of 3.575. System quality positively impacts user satisfaction, with a correlation coefficient of 0.594 and $p < 0.001$. Therefore, Hypothesis H10 is supported. This finding is consistent with previous research: Iivari (2005) found a strong association between system quality and user satisfaction in the same domain. Additionally, Adnan Aldholay et al. (2018) studied the impact of online learning software on academic performance by surveying public university students. This study found that system quality positively impacts user satisfaction, thereby validating system quality.

In conclusion, this study finds that system quality positively impacts user satisfaction, which is consistent with previous literature reviews.

5.2.11 Influence of information quality on ERP use

Information quality includes three observed variables: Data Accessibility, Database Timeliness, and Data Integrity. The most common response is "Database Timeliness," with an average agreement level of 3.619. Information quality positively impacts ERP use, with a correlation coefficient of 0.620 and $p < 0.001$. Therefore, Hypothesis H11 is supported. This finding aligns with previous research: Lotfy & Halawi (2015) found a significant correlation between information (or knowledge) quality and usage intention in their study on knowledge management systems. In their study of the London Ambulance Service dispatch system, Fitzgerald and Russo (2005) discovered a positive correlation between information quality and system usage. At the same time, Rai et al. (2002) found a significant relationship between information quality and usage in the same research domain.

In conclusion, this study finds that information quality positively impacts ERP use, consistent with previous literature reviews.

5.2.12 Influence of information quality on user Satisfaction

Information quality includes three observed variables: Data Accessibility, Database Timeliness, and Data Integrity. The most common response is "Database Timeliness," with an average agreement level of 3.619. Information quality has a positive impact on user satisfaction, with a correlation coefficient of 0.582 and $p < 0.001$. Therefore, Hypothesis H12 is supported. This finding aligns with previous research, as studies by Kamble et al. (2023), McGill et al. (2003), Rai et al. (2002), and P. Seddon & Kiew (1996) have found a correlation between information quality and user satisfaction. Additionally, Alzoubi & Snider (2020) found that information quality significantly influences user satisfaction in the same field.

In conclusion, this study finds that information quality positively impacts user satisfaction, consistent with previous literature reviews.

5.2.13 Influence of Service Quality on ERP Use

Service quality includes three observed variables: Assurance, Responsiveness, and Reliability. The most common response is "Reliability," with an average agreement level of 3.544. Service quality positively impacts ERP use, with a correlation coefficient of 0.680 and $p < 0.05$. Therefore, Hypothesis H13 is supported. This finding aligns with previous research: Fitzgerald and Russo (2005) found a positive correlation between the effective role of technical personnel (i.e., service quality) and the eventual use of the system in their study of the London Ambulance Service. Caldeira and Ward (2002) found that the capabilities of support personnel, vendor support, and the availability of training influenced the adoption and use of information systems in their study of small Portuguese enterprises.

In conclusion, this study finds that service quality positively impacts ERP use, which is consistent with previous literature reviews.

5.2.14 Influence of Service Quality on user satisfaction

Service quality positively impacts user satisfaction, with a correlation coefficient of 0.552 and $p < 0.05$. Therefore, Hypothesis H14 is supported. This finding aligns with previous research: another study found a positive correlation between developers' technical performance (based on their responsiveness in problem-solving) and user satisfaction (Leonard-Barton & Sinha, 1993). Guimaraes' (1995) similar study indicated that developers' skills significantly affect user satisfaction with expert systems. Leclercq's (2007) case study found that the relationship between the information systems function and users and the support these departments provide affects user satisfaction. During project implementation, mutual understanding between the information systems team and users did not significantly impact the final system satisfaction (Marble, 2003).

Service Quality includes three observed variables: Assurance, Responsiveness, and Reliability. The most common response is "Reliability," with an average agreement level of 3.544. Reliability refers to the services provided by the ERP system. The following are three related questions: (1) When the ERP service department promises to do something by a certain time, they do so (average value 3.555), (2) When users have problems, the ERP service department shows sincere interest in solving them (average value 3.512), and (3) The ERP service department provides services at the promised time (average value 3.567). Chiu et al. (2007) examined the role of support in e-learning environments and found a significant relationship with user satisfaction. Their established model theorized the impact of four components of subjective task value (i.e., attainment, utility, intrinsic, and cost) and three dimensions of fairness (i.e., distributive, procedural, and interactional) on learner satisfaction. It was also suggested that satisfaction and the four components of subjective task value would influence learners' willingness to continue using web-based learning.

In conclusion, this study finds that service quality positively impacts user satisfaction, which is consistent with previous literature reviews.

5.2.15 Influence of ERP use on user satisfaction

ERP use includes three observed variables: Operating Frequency, Usage Quantity, and Extended Use. The most common response is "Operating Frequency," with an average agreement level of 3.610. ERP use positively impacts user satisfaction, with a correlation coefficient of 0.666 and $p < 0.05$. Therefore, Hypothesis H15 is supported. This finding aligns with previous research: Halawi et al. (2007) established a significant relationship between usage intention and user satisfaction in the field of knowledge management. Chiu et al. (2007) confirmed a significant relationship between use and user satisfaction in e-learning environments.

In conclusion, this study finds that ERP use positively impacts user satisfaction, which is consistent with previous literature reviews.

5.2.16 Influence of ERP use on SMEs performance

ERP use includes three observed variables: Operating Frequency, Usage Quantity, and Extended Use. The most common response is "Operating Frequency," with an average agreement level of 3.610. ERP use positively impacts the performance of SMEs, with a correlation coefficient of 0.699 and $p < 0.05$. Therefore, Hypothesis H16 is supported. This finding aligns with previous research: Yuthas and Young (1998) found a correlation between system usage time and decision performance. Burton-Jones and Straub (2006) found a strong correlation between system use and task performance. Halawi et al. (2015) established a significant relationship between usage intention and net benefits, with net benefits measured by improvements in job performance. Numerous studies confirm these findings, establishing substantial relationships and correlations between system use and net benefits. Additionally, Zhu and Kraemer (2004), in a similar field of study, found that system use significantly impacts enterprise performance.

In conclusion, this study finds that ERP use positively impacts SMEs' performance, which is consistent with previous literature reviews.

5.2.17 Influence of user satisfaction on SMEs performance

User satisfaction includes three observed variables: Efficiency, Applicability, and Supportiveness. The most common response is "Efficiency," with an average agreement level of 3.608. User satisfaction positively impacts SMEs' performance, with a correlation coefficient of 0.608 and $p < 0.05$. Therefore, Hypothesis H17 is supported. This finding aligns with previous research, where studies in the same field (Guimaraes, 1995; Guimaraes & Igbaria, 1997; Torkzadeh & Doll, 1999) found that user satisfaction positively influences job performance. Additionally, the study by Law & Ngai (2007), which evaluated the relationship between ERP system user satisfaction and organizational performance, indicated a significant impact between the two.

In conclusion, this study finds that user satisfaction positively impacts SMEs performance, consistent with previous literature reviews.

5.3 Implications

This study integrates the concepts of the TOE model, IS model, TTF theory, and human self-efficacy to enhance the understanding of ERP system usage and performance improvement in Chinese SMEs. These implications are categorized into two types: theoretical significance and practical significance.

The theoretical significance aims to develop a model applicable to ERP usage by Chinese SME users and to examine the direct, indirect, and overall effects of task-technology fit, organization, environment, system quality, information quality, service quality, and human self-efficacy on ERP usage, user satisfaction, and SME performance.

The practical significance lies in showcasing the status of ERP system usage from the perspective of SME users. It enhances and develops the selection of systems for managing Chinese SMEs from the users' perspective, aiming for further academic and professional development. This indicates that the direct effects, indirect effects, and combined impact factors influence Chinese SME users when choosing ERP systems as big data tools for enterprise management. It helps enterprises strategically plan daily operational management, finding the best improvement methods from the actual users' standpoint.

The results indicate that all hypotheses are supported, and these variables directly and indirectly impact the acceptance model.

5.3.1 Theoretical Implication

The model and findings of this study make a significant contribution to the theoretical understanding of factors influencing the intention to use ERP systems. This study integrates the following concepts: the TOE model, a theoretical framework used to study organizational technology innovation and adoption, focusing on the various internal and external factors organizations face when adopting new technologies. Analyzing the internal and external factors of SMEs helps summarize the factors affecting ERP usage. The IS model is a theoretical framework used to understand and analyze the design, implementation, and use of information systems, assisting researchers and practitioners in explaining the effectiveness, success factors, and impacts of information systems on organizations and users. Through this model, SME users can analyze the adoption factors of ERP systems. The Task-Technology Fit (TTF) theory is a theoretical framework used to understand and evaluate how information technology supports task and work requirements, emphasizing that the effectiveness of information technology depends on the degree of fit between technology and user tasks. Additionally, human self-efficacy is considered. Integrating these concepts provides a comprehensive understanding of ERP system usage in SMEs. The research subjects in this study are Chinese SMEs, which also provides a relatively comprehensive model for SMEs in other countries when adopting ERP systems.

Firstly, this study aims to develop a model for ERP usage by Chinese SMEs to enhance and advance ERP usage from the perspective of SME users, thereby promoting the academic and professional development of ERP system usage. This study explores SMEs' willingness to use ERP and is supported by a literature review. These findings encompass the TOE model (including organization, environment, and usage), the IS model (system quality, information quality, service quality, user satisfaction, and organizational performance), the TTF theory (task characteristics, task technology fit), and human self-efficacy. This study developed 17 hypotheses and eleven constructs using empirical data and analyzed them using Structural Equation Modeling (SEM). ERP usage in the research model includes second-order latent variables. The results indicate that the model has reached an acceptable level and can effectively explain a series of hypotheses. The findings of the observed variables are as follows:

Task characteristics include the observed variables of Task Interdependence, Task Tacitness, and Task Urgency. According to the literature review, these observed variables have been validated and recognized through the studies of Valdebenito & Quelopana (2019), Lu & Yang (2014), Cheng (2020), W.-S. Lin & Wang (2012), and Alabama et al. (2023). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

Task-technology fit includes fitting with the Work Tasks, Necessary to the Work Tasks, and Meeting the Work Needs. These observed variables have been validated and recognized through the studies of D. Y. Lee & Lehto (2013), Larsen et al. (2009), Lu & Yang (2014), Jeyaraj (2022), and Jung et al. (2023). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

Organization includes the observed variables of Leadership Involvement, Organizational Readiness, and Organizational Culture. According to the literature review, these observed variables have been validated and recognized through the studies of Awa et al. (2015), Valdebenito & Quelopana (2019), AlBar & Hoque (2019), and J et al. (2023). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

The environment includes the observed variables of Competition Pressure, External Support, and Government Regulation. According to the literature review, these observed variables have been validated and recognized through the studies of Awa et al. (2015), Valdebenito & Quelopana (2019), Mohammed et al. (2023), and Ruivo et al. (2014). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

ERP use includes the observed variables of Operating Frequency, Usage Quantity, and Extended Use. According to the literature review, these observed variables have been validated and recognized through the studies of Burton-Jones & Straub (2006), Petter et al. (2013), Bjelland & Haddara (2018), Chien & Tsaur (2007), and H.-Y. Lin et al. (2006). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

User satisfaction includes the observed variables of Efficiency, Applicability, and Supportiveness. According to the literature review, these observed variables have been validated and recognized through the studies of Petter et al. (2013), Chien & Tsaur (2007), Lutfi et al. (2022), and Chaveesuk & Hongsuwan (2017). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

System quality includes the observed variables of System Configuration, System Performance Integration, and ERP Software Suitability. According to the literature review, these observed variables have been validated and recognized through the studies of Sedera & Gable (2004), M. Shim & Jo (2020), Petter et al. (2013), and Zare & Zareravasan (2014). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

Information quality includes the observed variables of Data Accessibility, Database Timeliness, and Data Integrity. According to the literature review, these observed variables have been validated and recognized through the studies of Koksalmis & Damar (2022), Petter et al.

(2013), Jo & Bang (2023), Hancerliogullari Koksalmis & Damar (2022), Sedera & Gable (2023), and Rizkiana et al. (2021). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

Service Quality includes the observed variables of Assurance, Responsiveness, and Reliability. According to the literature review, these observed variables have been validated and recognized through the studies of DeLone & McLean (2003), M. Shim & Jo (2020), Petter et al. (2013), Chien & Tsaur (2007), Lutfi (2023), and Chaveesuk & Hongsuwan (2017). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

Human Self-efficacy includes the observed variables of Previous Experience, Learning Ability, and Social Influence. According to the literature review, these observed variables have been validated and recognized through the studies of Mullins & Cronan (2021), Bjelland & Haddara (2018), Ifinedo & Nahar (2021), Chou et al. (2014), and Shiau et al. (2020). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

SMEs performance includes the observed variables of Operation Efficiency, Customer Satisfaction, and Innovation Growth. According to the literature review, these observed variables have been validated and recognized through the studies of Petter et al. (2013), Sedera & Gable (2003), Chien & Tsaur (2007), Bernroider (2008), and Chaveesuk & Hongsuwan (2017). Therefore, the findings of this study indicate that the structure is consistent with empirical data.

Furthermore, this study examines the direct, indirect, and overall effects of task characteristics, task-technology fit, organization, environment, system quality, information quality, service quality, and human self-efficacy on ERP usage, user satisfaction, and SME performance. This is to demonstrate these factors' direct, indirect, and overall impacts on the use of ERP systems in Chinese SMEs. Additionally, the results exhibit three significance levels: highly significant, significant, and statistically significant. TTFITA and HSEFFA directly and indirectly impact SMESPA, while ORGANA, ENVIRA, SYSQA, INFOQA, and SERQA have indirect impacts. All variables have a proven effect on performance improvement.

Finally, based on the results of the structural equation modeling, this study demonstrates that the model for enhancing business performance through ERP system usage among Chinese SME users is widely accepted and has both direct and indirect impacts.

5.3.2 Practical Implication

The goal is to provide practical assistance to SMEs, helping them select the resource management system best suited to their business and identifying the most effective methods to increase the usage quantity and frequency of ERP systems from the perspective of actual SME users.

Various ERP systems such as Kingdee, UFIDA, SAP, and Acumatica have evolved from initial MRP and MRP II systems to incorporate technological innovations like the Internet, e-commerce integration, and the Internet of Things (IoT). These technologies enhance efficiency and service quality for SME users. For example, SMEs can customize ERP systems based on their specific characteristics.

From the perspective of the enterprise itself, factors such as leadership involvement and organizational culture need to be considered—whether they actively encourage the use of ERP systems for enterprise management. Organizational readiness also requires adequate support in terms of human and financial resources for ERP systems. In terms of the external environment, competition pressure faced by the enterprise should be evaluated to see if it drives the company to improve its management. Additionally, government regulation, including supportive national policies, should be considered. For the ERP system itself, system quality and system configuration need to align with the company's production structure. System performance integration and ERP software suitability also need to be taken into account. In terms of information quality provided by the ERP system, it's essential to consider data accessibility, database timeliness, and data integrity. Finally, the service quality offered by the ERP system provider should account for assurance, responsiveness, and reliability of the service.

The study aims to demonstrate how task characteristics, task-technology fit, and human self-efficacy align with ERP technology while considering how these factors influence ERP usage. This involves promoting the match between work tasks and ERP system technology and considering how employee self-efficacy impacts ERP usage. Achieving this alignment will lead to user satisfaction and efficiency in ERP systems, thereby enhancing SME efficiency.

Overall, these findings suggest that all hypotheses address the willingness and satisfaction of SMEs to use ERP systems and that they improve their efficiency. Individuals interested in ERP systems would be more willing to use them if they could receive more assistance and support from other enterprises. Therefore, the impact of organizational factors and the organizational environment on ERP usage is very significant. Additionally, the quality of the ERP system and its information will help users be more inclined to use it.

Considering factors such as organizational culture and task-technology fit, SMEs should analyze the support provided by the external environment and then define their vision, mission, strategic issues, objectives, key performance indicators, targets, and initiatives to meet consumer expectations for using ERP. By applying the findings of this study, SMEs can take appropriate action.

5.4 Limitations and Recommendations of the Research

5.4.1 Limitation

The main goal of the study is to investigate the usage of Enterprise Resource Planning (ERP) systems among small and medium-sized enterprises (SMEs) in China and to assess user satisfaction with these systems. The study will use Task Technology Fit Theory (TTF), the Information Systems Success Model (also known as the IS Success Model), and the TOE framework. Additionally, this research primarily focuses on studies conducted within China. National policies in China provide support for SMEs using ERP systems, such as tax incentives, special subsidies, financial support policies, technical support and training policies, and industrial guidance policies. To make the ERP system model more broadly valid and useful, it is suggested that future research should examine other regions to test the model's applicability in different areas. The potential sampling bias should also be considered, as such bias may stem from factors like business type or organizational structure, which could influence the results. Therefore, it is strongly recommended that future research carefully address such biases to enhance the authenticity of the findings. This study primarily collected data through quantitative analysis, using questionnaires to gather the necessary information. The study results are based solely on the statistical processing of the collected data.

5.4.2 Recommendations

In the analysis and research that will take place in the times ahead, applying both qualitative and quantitative methods could be beneficial. This would be important, especially when thinking about the limitations already mentioned. This approach can give a more complete grasp of the factors affecting the setup of enterprise resource planning (ERP) systems in Chinese SMEs. This study intends to gather crucial information by concentrating on SMEs as its main data source. Besides, research is planned by the company to explore how introduction of ERP technology influences the job performance of employees working in small and medium-sized enterprises(SMEs).

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APPENDIX
QUESTIONNAIRE

This questionnaire is a part of the research of the Doctor of Philosophy Program in Industrial Business Administration (International Program), Faculty of KMITL Business School, at KMITL University. The data collected from this questionnaire will be treated with the utmost confidentiality. Kindly answer to the best of your knowledge.

The questionnaire designed for this study will be divided into three parts:

Part 1: Organizational Characteristics - Gathering information.

Part 2: Demographics of the respondents- In this section.

Part 3: Latent Variable Questions - The questions in this section assess the relationship between latent variables.

Part 1: 组织特征（Organizational Characteristics）

1.行业（Industry）

☐农业和食品（Agriculture and food）

☐制造业（Manufacturing）

☐建筑业（Construction）

☐交通运输业（Transportation）

☐服务业（Services）

☐其他（Other）

2.企业类型（Type of organization）

☐国有企业（Public）

☐私有企业（Private）

3.实施的 ERP 系统（Implemented ERP system）

☐国际 ERP 产品（International ERP products）

☐国产 ERP 产品（Local ERP products）

☐没有采纳，正在考虑（Not adopted, but under consideration）

Part 2: 受访者的人口统计资料（Demographics of the respondents.）

4.你在公司的职位。（Your position in the organization）

☐总裁、董事总经理、首席执行官；(President, managing director, CEO;）

☐信息系统经理（Information Systems (IS) manager）

☐业务运营经理、COO；(Business Operation manager, COO;）

☐办事员（Clerk）

☐助理经理（Assistant manager）

☐部门经理（Department Manager）

☐财务人员（Financial staff）

☐生产人员（production personnel）

☐其他________（other）

5.年龄（Age）

☐21-30 岁（21-30 years）

☐31-40 岁（31-40 years）

☐41-50 岁（41-50 years）

☐51-60 岁（51- 60 years）

☐60 岁以上（60 or older）

6.学历（Educational Qualification）

☐专科（Junior College）

☐本科（Bachelor）

☐研究生（Masters）

☐博士（Doctoral）

7.使用 ERP 经验（ERP Usage experience）

☐少于 6 个月（Less than 6 months）

☐6 个月-1 年（6 months-1 year）

☐1 年-2 年（1 year-2years）

☐2 年-5 年（2 years-5years）

☐超过 5 年（more than 5years）

8.使用环节（Modules）

☐运营管理（operations management）

☐计划管理（design）

☐销售业务管理（sales/business management）

☐质量管理（quality management）

☐人力资源管理（human resource）

☐财务会计（financial accounting）

☐其他（Other）

Part 3:潜在变量问题（Latent Variable Questions）

组织 Question(Organization)	Source	Least →Most				
		1	2	3	4	5
领导参与（Leadership involvement）	(Parisa Maroufkhani, 2020)					
Our top management promotes the use of ERP systems in the organization. 我们的高层管理人员在组织内推广 ERP 系统的使用。						
Our senior management provides support for ERP system implementation within the organization. 我们的高级管理层在组织内部为 ERP 系统实施提供支持。						
Our senior management sees ERP systems as a strategic priority for the organization. 我们的高级管理层将 ERP 系统视为组织的战略重点推动。						
组织准备（Organizational readiness ）	(Parisa Maroufkhani, 2020)					
The lack of capital/financial resources prevents my company from fully using the ERP system. 资金/财务资源的缺乏阻碍了我的公司充分利用 ERP 系统。						
The lack of IT infrastructure prevented my company from using the ERP system. 缺乏必要的 IT 基础设施阻碍了我的公司利用 ERP 系统。						
The lack of skilled human resources prevents firms from taking full advantage of ERP systems. 缺乏熟练的人力资源阻止了企业充分利用 ERP 系统。						
组织文化（Organizational culture ）	(Alzoubi & Snider, 2020; Zhu et al., 2010)					
ERP systems support corporate culture. ERP 系统支持企业文化。						

ERP systems play an important role in meeting the degree of demand due to the influence of organizational culture. ERP 系统在满足需求度方面起着重要作用，这是由于组织文化的影响。						
环境 Question(Environment)	Source	Least →Most				
		1	2	3	4	5
竞争压力（Competition pressure）	(Maroufkhani et al., 2020)					
Our choice to adopt a large ERP system will be strongly influenced by what industry competitors are doing. 我们采用大 ERP 系统的选择将受到行业竞争对手正在做的事情的强烈影响。						
Our company is under pressure from competitors to adopt ERP systems for business management. 我们公司面临着来自竞争对手的压力，要求我们采用 ERP 系统进行。						
Our company will adopt an ERP system to deal with competitors' practices. 我们公司将采用 ERP 系统进行企业李来应对竞争对手的做法。						
外部支持（ External support ）	(Maroufkhani et al., 2020)					
Community agencies/vendors can provide the necessary training for adopting ERP systems. 社区机构/供应商可以为采用 ERP 系统提供必要的培训。。						
Community agencies/vendors can provide effective technical support for adopting ERP systems. 社区机构/供应商可以为 ERP 系统的采用提供有效的技术支持。						
政府监管（Government regulation ）	(Maroufkhani et al., 2020)					
Government policies encourage the adoption of new information technologies (such as ERP						

systems). 政府政策鼓励我们采用新的信息技术(如 ERP 系统)。							
Several business laws can deal with security and privacy issues arising from ERP system management technology. 有一些商业法律可以处理 ERP 系统管理技术带来的安全和隐私问题。							
The government provides incentives for using big data management in government procurement and contracting, such as technical support, training, and funding for ERP systems. 政府为在政府采购和合同中使用大数据管理提供激励，例如为 ERP 系统的使用提供技术支持、培训和资金。							
任务匹配 Question(Task characteristics)	Source	Least →Most					
任务相互依赖（Task interdependence）	(Baharuddin, 2020)						
The implementation of an ERP system depends on the cooperation of various departments of the enterprise. ERP 系统实施依赖企业各个部门配合							
The ERP system depends on other units outside the enterprise. ERP 系统依赖本企业以外的其他单位。							
任务隐含性(Task tacitness)	(Jeyaraj, 2022)						
ERP system can design code according to the needs of the enterprise. ERP 系统可以根据本企业需要设计编码。							
The knowledge required for ERP systems is complex. ERP 系统所需知识是复杂的。							
任务的紧迫性(Task urgency)	(University of South Alabama et al., 2023)						
I must use my ERP account anytime and anywhere in my corporate work.							

企业工作中需要随时随地使用到我的 ERP 账户。						
I need to obtain real-time data from the ERP system to complete enterprise tasks. 我需要实时获取 ERP 系统中的数据完成企业任务。						
任务技术匹配模型Question(Task-technology fit)	Source	Least →Most				
		1	2	3	4	5
与工作任务相适应(Fits with the work tasks)	(Jeyaraj, 2022)					
The ERP system has the exact functions required for the enterprise's management tasks. ERP 系统具有企业管理任务所需的确切功能。						
Using ERP is very suitable for me to work in all aspects of the enterprise. 使用 ERP 非常适合我在企业所有方面工作。						
工作任务所必需的(Necessary to the work tasks)	(Jeyaraj, 2022)					
Using ERP fits well with how I like to enhance the efficiency of my work. 使用 ERP 很适合我喜欢的方式提高我的工作效率。						
ERP is suitable for my preferred way of working in the enterprise to strengthen my professional skills and operational practice. 使用ERP很适合我喜欢的方式在企业工作中加强自己的专业技能我现有的操作实践。						
满足工作需要(Meet the work needs)						
The use of ERP is very consistent with my work goals and needs in the enterprise. 使用 ERP 非常符合我在企业中的工作目标和需要。						
The ERP system matches our enterprise's current tasks.						

ERP 系统与我们企业目前任务相匹配。						
人员自我效能Question (Human Self-efficacy)	Source	Least →Most				
		1	2	3	4	5
先前经验（Previous experience）	(Hakkun Elmunsyah,2023), (H.-Y. Lin et al., 2006; Roky & Meriouh, 2015)					
ERP user interface can be easily adapted to one's approach. 我们在公司采用 ERP 系统之前就了解了它的一般概念和功能。						
We knew the specificities of our current module before our company adopted the ERP system. 在公司采用 ERP 系统之前，我们了解了我们当前使用的模块的具体特点。						
We knew the deliverables the ERP consulting firm would provide before our company adopted the ERP system. 我们在公司采用 ERP 系统之前了解了 ERP 咨询公司将提供的可交付成果。						
学习能力 (Learning ability)						
I can Recognize the value of the ERP knowledge I learned. 我们可以将从 ERP 中获得的知识应用于我们的任务。						
I can Assimilate the ERP knowledge I learned and turn it into my knowledge base. 我能够吸收我学到的 ERP 知识，并将其转化为我的知识库。						
I can Learn important ERP know-how. 我能够学习重要的 ERP 专业技能。						
社会影响(Social influence）						
We can apply the advanced processes derived from ERP to our tasks. 我们可以将从 ERP 中获得的先进流程应用于我们的任务。						

We can share knowledge derived from ERP across departments. 我们可以在不同部门之间分享从 ERP 中获得的知识。						
We can share my knowledge with others through the ERP network. 我们可以通过 ERP 网络与其他人分享我的知识。						

系统质量 Question(System Quality)	Source	Least →Most				
		1	2	3	4	5
系统配置（System configuration）						
The overall ERP architecture is already well configured according to the enterprise structure. 整体 ERP 架构已经根据企业结构配置得很好。						
Rigorous and sufficient testing was conducted immediately after the ERP implementation. ERP 实施后立即进行了严格而充分的测试。						
The data inputted into the ERP system were accurate and precise. 输入到 ERP 系统中的数据准确而精确。	(Almajali et al., 2022; Ifinedo & Nahar, n.d.; Vuckovic et al., 2023; Y. Zhu et al., 2010)					
系统性能集成（System Performance Integration）						
ERP system allows for integration with other ICT systems ERP 系统允许与其他信息和通信技术系统集成。						
Our ERP allows for integration with other IT systems. 我们的 ERP 系统允许与其他信息技术系统集成。						
Our ERP has good features. 我们的 ERP 系统具备良好的功能。						
ERP 软件适用性（ERP software suitability）						

The user interface of our ERP system can easily be adjusted to fit one's needs. 我们的ERP系统的用户界面可以很容易地调整，以适应自己的需要。						
Our ERP system is sufficiently fast in responding. 我们的 ERP 系统的响应速度足够快。						
Using our ERP system is easy. 使用我们的 ERP 系统很容易。						
信息质量 Question(Information Quality)	Source	Least →Most				
		1	2	3	4	5
数据可用性（Data accessibility）						
ERP system provides important information. ERP系统提供重要信息。						
The ERP system provides valuable data. ERP 系统提供了有价值的数据。						
The information presented by ERP is efficient (it contributes to the outcome of your business processes at the lowest cost). ERP 提供的信息非常高效（它有助于以最低的成本实现业务流程的结果）。						
数据及时性（Database Timeliness）	(Almajali et al., 2022; Ifinedo et al., 2010; Vuckovic et al., 2023)					
Our ERP database content is up-to-date. 我们的 ERP 数据库内容是最新的。						
The information provided by ERP is timely and up-to-date. ERP 提供的信息是及时且最新的。						
数据完整性（Data Integrity）						
The output options of the ERP system (print types, page sizes allowed, etc.) are sufficient for use. ERP 系统的输出选项(打印类型，允许的页面大小等)足够使用。						
Our ERP system provides concise information.						

我们的 ERP 的信息是简短的。						
服务质量Question(Service Quality)	Source	Least →Most				
		1	2	3	4	5
保证（Assurance）	(Alzoubi & Snider, 2020; P.-F. Hsu et al., 2015; Petter et al., 2008; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul,2023)					
I feel secure when communicating with ERP technical personnel. 在与 ERP 技术人员进行交流时，我感到安全。						
The staff in the ERP service department possesses excellent job knowledge. ERP 服务部门的工作人员具备良好的工作知识。						
The overall infrastructure in place is adequate to support the ERP. 现有的整体基础设施足以支持 ERP 系统。						
响应能力（Responsiveness）						
The ERP service department informs users when the service will be executed. ERP 服务部门告诉用户服务将在何时执行。						
The staff in the ERP service department promptly provides services to users. ERP 服务部门的工作人员迅速为用户提供服务。						
The staff in the ERP system department is never too busy to respond to user requests. ERP 系统部门的工作人员从不太忙以致无法回应用户的请求。						
可靠性（Reliability）						
When the ERP service department commits to completing something by a certain time, they fulfill their commitment. 当 ERP 服务部门承诺在某个时间完成某事时，他们会履行承诺。						
When users encounter issues, the ERP service department shows genuine interest in resolving						

the problems. 当用户遇到问题时，ERP 服务部门表现出真诚的兴趣解决问题。						
The ERP service department provides services within the promised timeframe. ERP 服务部门按照承诺的时间提供服务。ERP 工作人员提供 ERP 硬件和软件的更新。						
ERP 系统使用 Question(ERP Use)	Source	Least →Most				
		1	2	3	4	5
使用频率（Operating Frequency）						
I depend highly on ERP use. 我高度依赖 ERP 的使用。						
I use the ERP system frequently to accomplish my work. 我经常使用 ERP 系统来完成我的工作。						
The ERP is used frequently and extensively. ERP 的使用频繁且广泛。						
使用量（Usage Quantity）						
I use the ERP system intensively to complete my work. 我大量使用 ERP 系统来完成我的工作。	(Hakkun Elmunsyah,2023) (Ganeshkumar & Nambirajan, 2013; Roky & Meriouh, 2015; Mahmoud Hany M. Dalloul,2023)					
I use the ERP system intensively (many hours daily at work). 我非常频繁地使用 ERP 系统（每天在工作中使用很多小时）。						
The use of ERP is greater than originally expected. ERP 的使用量超出了最初的预期。						
拓展使用（Extended Use）						
I intend to continue using ERP at my job. 我打算继续在我的工作中使用 ERP。						
I intend to use more ERP functions. 我打算使用 ERP 的更多功能。						
I intend to continue using ERP to process more						

tasks. 我打算继续使用 ERP 处理更多的任务。						
用户满意度 Question(User Satisfaction)	Source	Least →Most				
		1	2	3	4	5
效率（Efficiency）						
Our ERP improves work-group productivity。 我们的企业资源规划（ERP）系统提高了工作小组的生产力。						
Our ERP enhances solution effectiveness. 我们的企业资源规划（ERP）系统提高了解决方案的效果。						
适应性（Applicability）						
Our ERP improves organizational-wide communication. 我们的企业资源规划（ERP）系统改善了整个组织的沟通。	(Maroufkhani et al., 2020).					
Our ERP improves inter-departmental coordination. 我们的企业资源规划（ERP）系统提高了部门间的协调。						
支持力（Supportiveness）						
Our ERP helps to improve workers' participation in the organization. 我们的企业资源规划（ERP）系统有助于提高员工在组织中的参与度。						
Our ERP creates a sense of responsibility. 我们的企业资源规划（ERP）系统培养了一种责任感。						
中小企业绩效 Question(Smes performance)	Source	Least →Most				
		1	2	3	4	5
运营效率(Operation efficiency)	(Al-Okaily et al., 2021; Vuckovic et al., 2023)					
The ERP system saves me time. ERP 系统节省了我的时间						

Our ERP improves overall productivity. 我们的 ERP 系统提高了整体生产力。						
The ERP system improved productivity. ERP 系统提高了生产力。						
客户满意（Customer satisfaction）						
The ERP system increased customer satisfaction. ERP 系统提高了客户满意度。						
Be perceived as the preferred supplier of ERP system products and services. Establish and maintain a good image and reputation with end-users. 被视为 ERP 系统产品和服务的首选供应商，在最终用户中建立并维护良好的形象和声誉。						
创新发展（Innovation growth）						
Enhance competitiveness or create strategic advantage 增强竞争力或创造战略优势。						
The extent to which an application helps the user create value for the firm's internal or external customers. 应用程序帮助用户为公司内部或外部创造价值的程度。						

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