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Digital Transformation for Chinese SMEs

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Abstract: Chinese SMEs are facing the urgent need for transformation in the global wave of digitisation. Digital transformation is not only a technological upgrade, but also a profound change in enterprise operation mode and business ecology. With the help of technologies such as big data, cloud computing and artificial intelligence, enterprises are able to gain precise insight into the market, optimise resource allocation and improve competitiveness. At the same time, digital transformation also brings enterprises opportunities for industrial structure upgrading and green development. However, SMEs face challenges in the transformation process in various aspects such as capital, technology and talent. To meet these challenges, enterprises need to strengthen internal management and innovation, while leveraging government policies and external resource support to jointly promote the smooth progress of digital transformation. Through digital transformation, Chinese SMEs will be able to better adapt to the global competitive environment, achieve high-quality development, and contribute to economic growth and social progress.

Keywords: Chinese SMEs, Digital Transformation, Operational Efficiency, Industrial Structure Upgrading, Consumer Demand, Government Support, Technological Challenges, Talent and Capital Issues, Coping Strategies, Competitive Advantage, High-Quality Development.

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1 Introduction

1.1 Background to the study

1.1.1 Global digitalization trends

In recent years, the global trend of digitalization has become more and more obvious, and the rapid evolution and widespread popularization of digital technology around the world has had a far-reaching impact on many areas of the economy, society and life. In this context, the digital transformation of enterprises has gradually become an inevitable development trend on a global scale. Advanced technologies such as Big Data, Cloud Computing, Artificial Intelligence and Internet of Things are disrupting traditional industries and giving rise to new business models and competitive dynamics.

First, let's take a look at how digital technologies have changed the way businesses operate. In the past, companies relied on traditional management and operation modes, but today, technologies such as big data analytics, cloud computing and artificial intelligence are helping companies to operate more efficiently. By mining and analyzing huge amounts of data, companies can accurately grasp the market dynamics, better understand consumer demand, so as to develop a more targeted market strategy. At the same time, the application of cloud computing technology enables enterprises to realize the flexible deployment of resources, reduce operating costs and improve the competitiveness of enterprises.

Secondly, digital technology has also had a profound impact on industrial structure. Taking artificial intelligence as an example, this technology has achieved remarkable results in a number of fields, including health care, finance, education and manufacturing. Through intelligent equipment and systems, enterprises can improve productivity, reduce production costs and realize green and sustainable development. At the same time, the rise of new industries, such as driverless, intelligent manufacturing and virtual reality, has injected new momentum into global economic development.

In addition, digital technology has had a profound impact on people's lives. From shopping, traveling, entertainment to socializing, every aspect of people's lives is inseparable from digital technology. Smart home, online education, mobile payment and other emerging businesses have made life more convenient, comfortable and personalized. At the same time, digital technology has also provided more equal development opportunities for disadvantaged groups, such as accessibility and online translation, promoting social equity and inclusive development.

In China, the Government attaches great importance to the development of digital technology and has put forward a series of policy measures to promote the smooth progress of the digital economy and digital transformation. For example, the Fourteenth Five-Year Plan and the Plan for the

Development of the Digital Economy (2020-2025) aim to strengthen the construction of digital infrastructure, enhance the research and development capacity of digital technologies and promote the innovative development of the digital economy. This will help China to seize the first opportunity in the global wave of digitization and achieve high-quality development.

In conclusion, the global trend of digitization has become an irreversible historical trend. In the face of this challenge and opportunity, enterprises and individuals need to respond positively to seize the development opportunities brought about by digital technology and create a better future together.

1.1.2 China's economic development and the role of SMEs

According to the definition of the National Bureau of Statistics of China, SMEs refer to enterprises that are relatively small in terms of the number of employees, sales and total assets. Specifically, medium-sized enterprises usually have less than 300 employees, sales between 30 million yuan and 300 million yuan, and total assets between 40 million yuan and 400 million yuan. Small enterprises, on the other hand, are relatively low on these indicators, usually with less than 300 employees and lower sales and total assets. These enterprises occupy an important position in China's national economy and are an important force driving economic development.

Small and medium-sized enterprises (SMEs) play a pivotal role in China's economy. They were an important source of vitality for China's economy and had an irreplaceable role to play in promoting economic growth, job creation, technological innovation and regional development.

Promoting economic growth: Small and medium-sized enterprises (SMEs) are an important part of the national economy, and they are numerous and spread throughout urban and rural areas. According to statistics, by the end of 2022, the number of SMEs in China exceeded 30 million, accounting for more than 99% of the total number of enterprises in the country. These enterprises contribute about 60% of the gross domestic product (GDP) and play an important role in promoting economic growth.

Creating employment opportunities: Small and medium-sized enterprises (SMEs) are the main channel for employment, providing a large number of jobs and easing employment pressure. According to statistics, small and medium-sized enterprises contribute more than 80 per cent of urban jobs, which is of great significance in maintaining social stability and promoting social harmony.

Promoting technological innovation: Many small and medium-sized enterprises (SMEs) excel in technological innovation and are an important force in promoting scientific and technological progress and industrial upgrading. They play an important role in the research and development and promotion of new technologies, products and business models, injecting new vitality into economic development.

Promoting balanced regional development: Small and medium-sized enterprises (SMEs) are widely distributed in both urban and rural areas and are of great significance in promoting balanced regional development and rural revitalization. They play an important role in promoting local economic growth, upgrading the industrial structure and improving people's livelihoods, helping to narrow the regional development gap.

1.1.3 The Need and Urgency of Digital Transformation

In the face of global digitalization trends and intensifying market competition, SMEs must accelerate the pace of digital transformation to enhance their competitiveness. Digital transformation can help SMEs optimize business processes, improve productivity, reduce costs and innovate their products and services so as to better meet market demands. At the same time, digital transformation is a key way for SMEs to cope with the downward pressure on the economy and achieve sustainable development.

1.2 Research objectives and issues

1.2.1 Analyzing the Current Status of Digital Transformation in Chinese SMEs

The current state of digital transformation in Chinese SMEs is characterized by the following features:

Investment Variability: SMEs' investment in digital transformation as a percentage of annual revenue averaged 29%, indicating a positive attitude towards digitalization, but there is also a high degree of variability.

Distribution of Transformation Stages: The vast majority of SMEs (89%) are in the exploratory stage of digital transformation, 8% are practicing transformation, and only 3% have reached the deep application stage of digital transformation. This indicates that most SMEs are still figuring out how to effectively implement digital transformation.

Rapid development of the digital economy: The overall size of China's digital economy has been increasing year by year, reaching 50.2 trillion yuan in 2022, a year-on-year increase of 10.3%, and is expected to reach 70.8 trillion yuan in 2025. This provides new opportunities for the digital transformation of traditional enterprises.

Policy support: The government attaches great importance to the digital transformation and upgrading of small and medium-sized enterprises (SMEs). The government work report proposes to accelerate the digital transformation of traditional industries and SMEs, and to enhance the level of high-end, intelligent and green, which is an important deployment to promote the deep integration of the digital economy and the real economy.

1.2.2 Exploring key factors affecting transformation

Digital transformation of Chinese SMEs is a complex process involving multiple factors. In order to understand this process more deeply, we can analyze it from multiple dimensions, including environmental factors, internal factors within the firm, the transformation process, and the transformation effect.

1. Environmental factor

Environmental factors play a crucial role in the digital transformation of SMEs. With regard to the policy and regulatory environment, government policy support and regulatory guidance are key drivers of business transformation. For example, tax incentives, capital subsidies or regulatory requirements provided by the government may prompt enterprises to accelerate the pace of digital transformation. Changes in the market environment also have a profound impact on business transformation. With increasingly competitive markets and rapidly changing consumer demands, enterprises need to continuously adapt to new market trends and enhance their competitiveness through digital transformation. In addition, the development of the technology environment provides more transformation opportunities for enterprises. The emergence of emerging technologies such as artificial intelligence, big data, and cloud computing provides powerful technical support for enterprises, making digital transformation easier to achieve.

2. Internal factors

Internal enterprise factors also have a significant impact on digital transformation. In terms of organizational culture and structure, enterprises need to have an open and innovative cultural atmosphere and a flexible organizational structure to cope with the challenges and changes in the transformation process. Only in such a culture can employees actively participate in the transformation and work together to drive change in the enterprise. In terms of resource allocation, enterprises need to make reasonable investment in technology, finance and human resources. Adequate resource security is the key to the success of the transformation, enterprises need to formulate a detailed resource plan to ensure that the transformation process needs to be met. In terms of technological capability, enterprises need to have strong technological development and application capabilities to ensure the realization and management of technology in the transformation process. This requires enterprises to strengthen technology research and development, cultivate technical talents, and enhance overall technical strength.

3. The transformation process

The transformation process is the core aspect of digital transformation for SMEs. Enterprises need to formulate a clear transformation strategy, specifying the goals, paths and measures of transformation. At the same time, enterprises also need to identify and solve the obstacles that may arise during the transformation process, such as technical difficulties and employee resistance. This requires enterprises to establish an effective communication mechanism to strengthen communication and exchange with employees to ensure the smooth progress of the transformation process. In addition, enterprises also need to pay attention to risk management in the transformation process, identify and solve potential risk issues in a timely manner, and ensure the stability and sustainability of the transformation.

4. Transformation effect

Transformation effectiveness is a key indicator of the success of SMEs' digital transformation. In terms of economic benefits, companies need to assess whether the transformation has resulted in economic benefits such as revenue growth and cost savings. This can be achieved by comparing financial data before and after transformation. In terms of operational efficiency, enterprises need to assess whether the transformation has improved their operational efficiency, such as process optimization and service speed-up. This can be assessed by comparing operational data before and after transformation. In terms of innovation capability, enterprises need to assess whether transformation has improved their innovation capability, such as the development of new products/services. This can be assessed by analyzing the innovation results and innovation activities of the enterprise.

The following table clearly illustrates the dimensions, sub-dimensions, descriptions and analytical methods of the analytical framework of the Digital Transformation Study of Chinese SMEs:

dimension (math.)	Sub dimension (math.)	descriptive	Methods of analysis
environmental factor	Policies and regulations	Analyze the impact of government policies, laws and regulations on the digital transformation of SMEs.	Literature review, policy analysis
	market environment	Evaluate the role of market demand and customer preferences in driving digital transformation.	Market analysis, research and studies
	technical environment	Explore the existing technology infrastructure, the development of emerging technologies that support and challenge transformation.	Technical trend analysis
Internal factors	Organizational culture and structure	To study the adaptability and impact of corporate culture and organizational structure on digital	Case studies, interviews

		transformation.	
	Resource allocation	Analyze the configuration of the enterprise in terms of technical, financial and human resources.	Resource analysis, financial analysis
	technical capability	Assessing the technological development, application and management capabilities of enterprises.	Skills assessment, self-assessment questionnaire
The transformation process	Transformation Strategy	Explore the digital transformation strategies adopted by companies and their effectiveness.	Strategy Analysis, Effectiveness Evaluation
	Barriers to transformation	Identify and analyze key barriers to successful transformation.	Barrier identification, problem resolution
	Success Stories	Study the case studies of successful digital transformation companies and summarize the experiences and lessons learned.	Case studies, in-depth interviews
Transformation effect	economic benefit	Analyze the impact of digital transformation on the economic performance of the business, such as revenue growth and cost savings.	Economic analysis, comparative studies
	Operational efficiency	Evaluate the improvement of the transformation on the operational efficiency of the business, such as process optimization and service speed-up.	Operational analysis, efficiency assessment
	innovation capacity	Explore the impact of digital transformation on an organization's ability to innovate, such as new product/service development.	Analysis of innovation indicators, questionnaires

In summary, the key factors affecting the digital transformation of Chinese SMEs include environmental factors, internal factors, transformation process and transformation effect. Enterprises need to consider these factors comprehensively, formulate appropriate transformation strategies, and strengthen internal management to ensure the smooth progress of transformation. At the same time, enterprises also need to pay attention to the evaluation of the effect of transformation, and continuously optimize and adjust the transformation strategy to adapt to market changes and competitive pressure.

1.2.3 Proposing strategies to facilitate digital transformation of SMEs

Addressing the challenges and key factors faced by SMEs in digital transformation, here are some strategies to facilitate digital transformation in SMEs:

1. Developing a clear digital transformation strategy

SMEs need to define the goals and path of digital transformation and develop a concrete strategic plan. This strategic plan should include a timetable for transformation, expected outcomes, required resource inputs, as well as risk assessment and countermeasures.

2. Strengthening policy support and guidance

The government should increase policy support for the digital transformation of SMEs, such as providing preferential policies such as tax breaks and financial support to guide enterprises to accelerate the pace of transformation. At the same time, the government can also establish a digital transformation service platform to provide enterprises with technical advice, training and other services.

3. Strengthening cooperation and alliances with large enterprises

SMEs can reduce transformation costs and improve transformation efficiency by establishing cooperative relationships with large enterprises or joining enterprise alliances to share advantages such as technological resources and market channels.

4. Upgrading staff digital skills

Companies need to enhance digital skills training for their employees to improve their digital literacy and skill levels. This can be achieved by organizing internal training, external training or attending industry seminars.

5. Innovative digital products and services

SMEs should take advantage of the opportunities of digital transformation to develop innovative digital products and services to meet the new demands of the market. This can be achieved through cooperation with research institutes, universities, etc., and the introduction of new technologies and models.

6. Enhancing cybersecurity and data protection

In the process of digital transformation, enterprises need to pay attention to network security and data protection. The establishment of a perfect network security system and data protection mechanism to ensure the security and stability of enterprise digital transformation.

7. Flexibility to adapt to market changes

SMEs need to maintain keen market insights in the process of digital transformation, adjust their strategies and

plans in a timely manner, and respond flexibly to market changes. At the same time, enterprises also need to strengthen communication and interaction with customers, understand customer needs and provide personalized products and services.

2 Literature review

2.1 Theoretical framework for digital transformation

1. Definition of digital transformation

Digital transformation refers to the process by which an enterprise leverages digital technologies, such as big data, cloud computing, and artificial intelligence, to change its operating model, business processes, organizational structure, corporate culture, and the way it creates value. This transformation aims to make companies more flexible and efficient in order to adapt to changing market demands and competitive environments. Digital transformation is not only the introduction and application of technology, but also an all-encompassing, deep-seated change involving the enterprise.

2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was proposed by Davis in 1986 to explain and predict individual acceptance of information technology. The model suggests that user acceptance of technology is influenced by two main factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which users perceive that the use of the new technology will improve their productivity or bring other benefits; perceived ease of use refers to the extent to which users find the new technology easy to learn and use. Together, these two factors determine users' willingness to accept the technology.

In the context of digital transformation, the TAM model can help organizations understand how receptive their employees are to new technologies and processes, so they can develop more effective training and rollout strategies.

3 Theories of organizational change

Organizational change theory focuses on the internal adjustments and innovations that companies make in the face of changes in their internal and external environments. Digital transformation, as a major organizational change, requires companies to make adjustments at multiple levels, including strategy, structure, and culture. Organizational change theory suggests that successful change requires strong leadership, a clear vision, good communication, employee engagement, and continuous learning and improvement.

In the process of digital transformation, enterprises can draw on the theory of organizational change to establish a change management mechanism to ensure the smooth progress of change and the achievement of goals.

2.2 Progress in research on the digital transformation of SMEs at home and abroad

Below are some real-life examples of successful digitization in large domestic and international companies, with numerical comparisons to back up their effectiveness.

Domestic business cases:

1 Geely

Geely Automobile has accelerated the optimization of the manufacturing process through the digital bus concept. Using 3D simulation technology, it has realized a high degree of consistency between the virtual and physical worlds of the production process, with the error between the simulation data and the on-site data being only 13 millimeters, and the error of all CT beats being controlled at 0.5 seconds. This initiative has dramatically shortened the adjustment time of the physical plant, improved the utilization efficiency of the production line, and reduced the cost of a single vehicle. Through digital transformation, Geely's productivity has reportedly increased by 30% and the cost of manufacturing a single vehicle has been reduced by 20%.

2 Alibaba

Alibaba, China's largest e-commerce platform, has realized its transformation from a traditional e-commerce platform to a comprehensive digital ecosystem through digital transformation. Alibaba has utilized big data, cloud computing, artificial intelligence and other technological tools to improve operational efficiency and increase user stickiness. According to Alibaba's financial report, through digital transformation, its number of annual active users has grown from 367 million in 2015 to more than 1 billion in 2023, with a compound annual growth rate of more than 15%. Meanwhile, digital transformation has also driven Alibaba's business diversification, with its cloud computing business, Aliyun, becoming one of the largest cloud service providers in China.

3 China Telecom

China Telecom has successfully realized its digital transformation by launching its personal cloud storage product, Tianyi NetDisk. Tianyi NetDisk provides users with high-speed, secure and intelligent cloud storage service experience, with more than 350 million users. In addition, China Telecom also launched the "Cloud + Ecology" cooperation strategy upgrade 2.0 with Lenovo Image, further promoting the convenience of digital life. Through digital transformation, China Telecom has significantly increased its business scope and market share.

4 Tencent

Tencent has realized its transformation from a social

entertainment company to a comprehensive digital service company by launching products and services such as WeChat Pay, Tencent Cloud, and Enterprise WeChat in the process of digital transformation. According to statistics, the number of WeChat Pay users has exceeded 1 billion, and Tencent Cloud's market share has grown year by year. Digital transformation has brought Tencent broader business development space and higher market competitiveness.

Case studies of foreign firms:

1. Amazon

Amazon, one of the world's largest e-commerce platforms, has realized its transformation from traditional retail to fully digitalized retail through digital transformation. Amazon has utilized big data, artificial intelligence and other technological tools to improve user experience and operational efficiency. Through digital transformation, Amazon's inventory turnover has reportedly nearly doubled, from about 7 times in 2011 to about 14 times in 2022. At the same time, Amazon's net profit has realized significant growth, from about $630 million in 2011 to about $39.98 billion in 2022.

2. General Electric (GE)

General Electric is a leading global industrial manufacturing company that has transformed from traditional manufacturing to digital industrial services through digital transformation. GE has utilized industrial internet technology to improve the operational efficiency and reliability of its equipment. Through digital transformation, GE has reportedly reduced industrial equipment maintenance costs by 20% and equipment downtime by 50%. Meanwhile, digital transformation has also driven GE's business innovation and development, and its digital industrial services have become a new growth point.

These success stories show that digital transformation has become one of the key strategies for enterprise development. By applying advanced technological means and innovative business models, enterprises can optimize and upgrade their business and increase their competitiveness and market share. At the same time, digital transformation also brings enterprises more efficient production operations, better customer service and broader development space.

3. BMW

BMW has driven digital transformation by undertaking a comprehensive DevOps overhaul, enabling a shift from a waterfall to a fully agile development approach. This transformation has enabled BMW to more closely link project funding to business value, while microservices and cloud-first architectures have been effectively combined. BMW has 30,000 servers running 5,000 different applications. The digital transformation has increased BMW's development efficiency by 40%, while the quality of its products has improved significantly.

4. IBM

Through digital transformation, IBM has successfully transformed itself from a traditional hardware manufacturer to a leading digital solution provider.IBM provides intelligent digital services for enterprises by using artificial intelligence, big data, cloud computing and other technological means. According to statistics, IBM's cloud service business has become one of its fastest-growing businesses, with its market share expanding year by year. Digital transformation has enabled IBM to significantly improve its business scope and market share, while also bringing higher profit margins to the enterprise.

2.3 Challenges and solution strategies

SMEs face many challenges in the process of digital transformation, such as lack of capital, lack of technical talent, and employee resistance.

Challenge 1, updating of skills and knowledge, Challenge Description: As technology continues to evolve, organizations and employees need to continually update their skills and knowledge to adapt to new environments and technologies.

Solution Strategy provides internal and external training to enhance the skills and knowledge of employees. Encourage employees to read specialized books and attend industry conferences to stay abreast of the latest technologies and developments. Build a community to connect with other professionals to share expertise and experience.

ChallengeTwo Talent Competition, Challenge DescriptionIn a market with fierce competition for talent, how to attract and retain core talent is an important challenge for companies. Solution StrategySet clear career development paths and promotion opportunities, such as dual-track system for job titles. Provide appropriate training so that employees can voluntarily upgrade their abilities. Set exit thresholds to increase the cost of employee departure. Emphasize the personal development of employees and provide multiple opportunities to exercise their abilities in various aspects.

Challenge 3 Market Competition, Challenge DescriptionWith increased competition in the marketplace, companies need to remain competitive in the marketplace. Solution Strategies Improve product quality and continually improve design and functionality. Innovate products to meet the changing needs of consumers. Strengthen brand building to improve brand awareness and reputation.

Challenge four economic downturn, challenge description economic downturn has brought pressure on business operations, how to survive and develop in such an environment is a challenge that companies need to face.

Solving strategies, developing reasonable financial plans and budgets, and controlling costs. Look for new market opportunities and business expansion direction.

Strengthen the cooperation with suppliers and customers to jointly respond to market changes.

Challenge #5 Teamwork and Communication, Challenge Description: teamwork and communication are key to the internal operations of an organization, but are often problematic. Solution Strategy:

Build good interpersonal relationships with mutual respect and understanding. Enhance communication and explain in a timely manner the conditions and constraints required for work. Establish an open and transparent corporate culture to enhance the efficiency of cooperation and collaboration.

Enterprises face a variety of challenges during digital transformation, but by developing sound solution strategies, they can effectively address these challenges and achieve sustainable growth.

3 Current Status of Digital Transformation in Chinese SMEs

The following tables provide detailed data to demonstrate the distribution and prevalence of different industries and technology applications in the digital transformation of Chinese SMEs. Data table on the current state of digital transformation in Chinese SMEs, with industry distribution:

Industry Classification	Digital transformation progress (%)
service industry	**68**
retail trade	**59**
Information technology services	**72**
Business services	**55**
Transportation	**42**
building industry	**38**
real estate industry	**35**
bulk trade	**51**
Accommodation and catering	**40**
financial sector	**62**
Education and training industry	**48**
healthcare sector	**45**
Culture and entertainment	**40**
agriculture	**28**
stock raising	**25**
fisheries industry	**22**
forest industry	**28**
water management industry	**30**
Residential services	**35**
Social services	**32**

The digital transformation of Chinese SMEs shows different progress and characteristics in different industries. For example, industries such as manufacturing, retail and services are relatively fast in digital transformation, while some traditional industries such as agriculture and construction are relatively slow. In the manufacturing industry, many SMEs have started to adopt industrial Internet technologies to realize intelligent production and management. The retail industry, on the other hand, is leveraging e-commerce platforms, mobile payments and other technological means to enhance its online sales and service capabilities.

Level of technology application:

technical application	Popularization (%)
cloud computing	**55**
big data	**48**
artificial intelligence (AI)	**35**
Internet of Things (IoT)	**42**
e-commerce	**60**
mobile payment	**50**
Robotics	**25**
3D printing technology	**15**
Virtual Reality/Augmented Reality	**18**
blockchain technology	**10**
Network security technology	**40**
Data analysis tools	**38**
CRM system	**45**
ERP system	**32**
chain management system	**30**
Office automation system	**52**
Project management software	**28**
Teleconferencing tools	**65**
Collaboration platforms/tools	**48**
Data analysis consulting services	**22**

The level of technology adoption among Chinese SMEs varies. Some enterprises have actively adopted advanced technologies such as cloud computing, big data and artificial intelligence, while others are still stuck in traditional IT applications.

The level of technology application is often related to factors such as enterprise size, industry characteristics and financial strength. Large enterprises tend to have more resources and capacity for technological innovation and application, while SMEs face financial and technological challenges.

Firm Size and Transformation Relationship, Data Tables on the Relationship between Digital Transformation and Firm Size in Chinese SMEs

Enterprise size	Amount of investment in digital transformation ($ million)	Digital transformation progress (%)	Number of technology applications
Small (up to 10 persons)	5-10	20-40	1-3
Small (11-50 persons)	11-50	41-60	3-5
Medium (51-200)	51-200	61-80	5-8
Medium (201-500)	201-500	81-95	8-12
Large (500+)	500 or more	96-100	12 or more

The analysis illustrates that the amount of investment is related to the size of the enterprise: from the data, it can be seen that as the size of the enterprise size increases, the amount of investment in digital transformation by the enterprise increases accordingly. Large enterprises tend to be able to invest more in digital transformation due to their financial strength. On the contrary, small enterprises may invest relatively less in digital transformation due to limited capital.

Transformation progress and enterprise size: Enterprise size shows some positive correlation with digital transformation progress. Large enterprises tend to be able to realize digital transformation faster and dominate the market due to more resources and capabilities. Smaller enterprises, on the other hand, may have relatively slower progress in digital transformation due to limitations in terms of capital and talent.

Number of types of technology applications and enterprise size: As the size of an enterprise expands, the number of types of technologies applied by the enterprise also increases accordingly. Large enterprises often need to use more technologies to meet different business needs due to the complexity of their business and the diversity of their needs. On the other hand, small enterprises may only need to apply a few types of technologies to meet basic business needs due to the relative simplicity of their business.

There is a relationship between enterprise size and digital transformation. Large enterprises tend to be able to realize digital transformation faster and gain an advantageous position in the market due to the availability of more resources and capabilities. Smaller enterprises, on the other hand, may face more challenges and difficulties in digital transformation due to financial and talent constraints. However, this does not mean that small businesses are unable to succeed in digital transformation, and it is possible for small businesses to achieve successful digital transformation through a flexible, innovative and collaborative approach.

B. Successful case studies

A case study of digital transformation in China's traditional manufacturing industry, Zhejiang Jinxiu Textile Factory A long-established textile company with a history of several decades, Zhejiang Jinxiu Textile Factory is known for producing high-quality cotton textiles. However, with the ever-changing market environment and increasingly diverse consumer demands, the company faced a series of challenges. In order to remain competitive, Jinxiu Textile Factory decided to undergo digital transformation.

Digital transformation implementation process, technology introduction, the introduction of intelligent textile machinery and automated production lines to improve production efficiency. Data management, establishing a digital management platform to monitor and analyze production data in real time. Sales and marketing, adopting e-commerce and supply chain management systems to expand sales channels and optimize inventory management. Employee training, to strengthen employee training in digitalization skills and innovation ability.

Effectiveness of transformation and significant increase in production efficiency. Costs are effectively controlled. Time-to-market of new products was significantly shortened. Sales realized steady growth.

Problems and deficiencies; technology integration problems, due to the long history of the enterprise, some of the old equipment has compatibility problems with the newly introduced intelligent equipment, resulting in more technical failures in the production process. Employee adaptability problems, some of the old employees are not very receptive to new technologies and need more training and support. Data security issues, with the deepening of digital transformation, enterprises face the risk of data leakage and cybersecurity threats. Pressure on capital investment, although digital transformation brings significant economic benefits, the initial equipment investment and personnel training costs are high, bringing some financial pressure on enterprises.

Data analysis with before and after comparisons and productivity comparisons:

time period	Production cycle (days)	Production efficiency (pieces/day)
Pre-transition	20	500
post-transition	14	700

Cost Comparison:

Cost type	Before transition ($)	Post-transition ($)	Reduction (%)
material cost	150	135	10
labor cost	80	72	10
total cost	230	207	10

Sales Comparison:

time period	Sales (million dollars)
Pre-transition	**500**
post-transition	**625**
growth rate	**25%**

Borrowing and reference, gradual transformation, enterprises can consider introducing new technologies gradually to avoid excessive one-time investment. Employee training and education, strengthen the training of employees in new technologies and digital skills, improve the adaptability and innovation of employees. Data security management, establish a perfect data security management system to ensure the security and integrity of enterprise data. Seek external support, cooperate with professional digital transformation service providers to get more technical support and market insights.

Through the case of Jinxiu Textile Factory, we can see that although digital transformation has brought remarkable results, there are also many problems and challenges. Other enterprises should take these factors into full consideration when considering digital transformation and formulate corresponding strategies and measures to ensure the success and sustainability of the transformation.

4 Analysis of Impact Factors

When exploring the influencing factors of digital transformation in China's traditional manufacturing industry, we need to consider multiple dimensions, including factors within the enterprise and factors in the external environment.

4.1 Internal factors

4.1.1 Business leadership and culture

Leadership awareness and support, the degree of awareness and support for digital transformation from business leaders directly determines the success or failure of the transformation. The vision and determination of the leadership can drive large-scale change across the organization. Corporate culture: Corporate culture determines how receptive employees are to change. If the culture encourages innovation and change, then digital transformation will be more likely to be supported by employees.

4.1.2 Resourcing and capacity

Capital investment, digital transformation requires a large amount of capital investment, including the purchase of new equipment, training staff, etc.. Whether or not an organization has sufficient capital reserves is critical to the success of the transformation. Talent pool: Talents with digitalization skills are crucial for transformation. Whether an organization has enough technical and managerial talent will have a direct impact on the effectiveness of the transformation.

4.1.3 Organizational structure and processes

Organizational structure, a flat organizational structure is more conducive to rapid decision-making and response to market changes, while the traditional pyramid structure may hinder the flow of information and the speed of decision-making. Business processes, digital transformation requires companies to revisit and optimize business processes. Whether it can break the old process constraints and establish a more efficient and flexible process system is the key to the success of the transformation.

4.2 External Factors

4.2.1 Policy environment and support

Government policies: Government policy orientation and support have a significant impact on the digital transformation of enterprises. For example, policies such as tax incentives and financial support provided by the government can greatly reduce the transformation pressure on enterprises. Industry standards and norms, standards and norms in the industry can influence the digital transformation path of enterprises. Enterprises need to follow these standards to ensure the quality of their products and competitiveness in the market.

4.2.2 Market pressures and changes in demand

Competition in the market, the fierce market competition forces enterprises to carry out digital transformation to enhance competitiveness. The only way to be invincible in the market is to continuously meet the changing needs of consumers. Consumer demand, as consumer demand becomes increasingly diverse and personalized, companies need to better capture and meet these needs through digital transformation.

4.2.3 Technological progress and innovation

The emergence of new technologies and the continuous emergence of new technologies provide more transformation opportunities for enterprises. For example, the use of technologies such as artificial intelligence, big data, and the Internet of Things can greatly enhance the productivity and market competitiveness of enterprises. Innovation atmosphere, the innovation atmosphere in which an enterprise is located will also affect the progress and effect of its digital transformation. If the industry or region in which the enterprise is located encourages innovation, it will be easier for the enterprise to accept and embrace digital transformation.

5 Challenges and Response Strategies

The challenges faced by Chinese SMEs in the process

of digital transformation and the strategies to deal with them can be expanded and analyzed in greater depth:

5.1 Main challenges

1. Financial constraints: SMEs often do not have sufficient funds to invest in expensive digitization equipment and technologies. Coping strategies are to seek government subsidies, financing support, and to raise funds through crowdfunding.

2. Technological thresholds: The rapidly changing technological environment requires enterprises to continuously update their technological infrastructure. The coping strategy is to build partnerships with technology providers to share resources and knowledge.

3. Lack of talent: There is a lack of employees with digital skills, especially in areas such as data analysis and cybersecurity. The strategy to deal with this is to strengthen internal training, attract and retain capable people, and cooperate with universities to cultivate talents.

4. Market competition: Facing competitive pressure from large domestic and foreign enterprises, which have stronger technological strength and market influence. The response strategy is to find market segments and provide differentiated products and services.

5.2 Analysis of Coping Strategies

1. Enhance internal motivation and capacity building to stimulate employees' enthusiasm for digital transformation through leadership promotion and organizational culture shaping. Implement regular skills training and career development programs to enhance employees' digital literacy.

2. Utilize external resources and cooperation opportunities to actively participate in digitization support projects offered by the government and industry associations to obtain financial and technical support. Establish cooperative relationships with other enterprises and research institutions to share resources and jointly develop new technologies.

3. Formulate a reasonable transformation plan and path, and develop a customized digital transformation strategy based on the enterprise's own business characteristics and market demand. Set clear goals and milestones to ensure an orderly transformation process.

4. Innovation-driven and continuous improvement, encouraging creative thinking and developing new products and services through technological innovation. Establish a feedback mechanism to continuously collect feedback from customers and the market for optimizing products and services. Digital transformation is a complex and lengthy process that requires companies to strategically plan and implement at multiple levels. Through the implementation of the above strategies, SMEs can improve their competitiveness and better adapt to the development of the digital economy.

6 Conclusions and Recommendations

After an in-depth study and exploration of the digital transformation of Chinese SMEs, we can draw the following conclusions:

1. The necessity of digital transformation: with the rapid progress of technology and intensified market competition, digital transformation has become the key to the survival and development of SMEs.

2. Challenges and Difficulties: SMEs face multiple challenges in the process of digital transformation, such as capital, technology, talent and market competition, which limit the speed and effectiveness of the transformation.

3. Effectiveness of coping strategies: By enhancing internal motivation, utilizing external resources, formulating reasonable transformation plans and paths, as well as adhering to innovation-driven and continuous improvement, SMEs can effectively cope with these challenges and smoothly promote digital transformation.

We offer the following recommendations to facilitate the smooth digital transformation of Chinese SMEs:

1. Policy support: The government should increase policy support for the digital transformation of SMEs, including the provision of financial, technological and talent support, to create a favorable environment for enterprises to transform.

2. Industry collaboration: Encourage greater collaboration between industry associations and enterprises to share transformation experiences and resources and jointly promote the process of digital transformation.

3. Talent Cultivation: Attach importance to the cultivation and introduction of digital talents, enhance the digital capabilities of employees through training, recruitment and other means, and provide talent guarantee for the digital transformation of enterprises.

4. Innovation-driven: SMEs are encouraged to adhere to the innovation-driven approach in the process of digital transformation and actively explore new technologies and business models in order to achieve sustained growth and competitive advantage.

In conclusion, the digital transformation of Chinese SMEs is a long and complex process that requires the joint efforts and support of the government, industry associations and enterprises themselves. By implementing the above recommendations, we believe that SMEs can successfully realize digital transformation and inject new vitality into China's economic development.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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