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Research on the Driving Mechanism of Intelligent Renovation and Digital Transformation in Traditional Enterprises



Abstract: - Intelligent renovation and digital transformation have become effective paths for traditional enterprises to enhance their core competitiveness. The rapid and extensive application of digital technology has become a crucial catalyst for the transformation and upgrading of the manufacturing industry. This digital transformation not only enhances production efficiency, product quality, and cost reduction but also boosts the competitiveness and innovation capabilities of enterprises. In this study, in-depth interviews were conducted with personnel at various levels of 30 traditional enterprises, utilizing grounded theory to extract significant factors that influence enterprise digital transformation. A theoretical model was developed, identifying environmental changes as external factors impacting enterprise digital transformation, and internal driving forces including enterprise resources, entrepreneurial spirit, employee involvement, enterprise capabilities, and strategic planning. Through comprehensive research on the driving mechanism of digital transformation in traditional enterprises, this study proposes effective strategies and path choices for enterprises. These include “government-enterprise collaboration” and “industry chain collaboration” along with “strengthening the foundation” and “enhancing capabilities.” The aim is to promote successful intelligent renovation and digital transformation among traditional enterprises.

Keywords: Intelligent Renovation, Digital Transformation, Driving Mechanism, Grounded Theory, Influencing Factors, Traditional Enterprises.

I. INTRODUCTION

A. Background

With the integration breakthrough and fusion penetration of the new generation of information and communication technologies, cutting-edge technologies such as big data, cloud computing, mobile internet, and artificial intelligence are advancing resource allocation, production methods, and organizational structure change with unprecedented depth and breadth, ushering in a new round of technological revolution and industrial transformation. In the contemporary global context of informatization and globalization, various fields are paying increasing attention to digital transformation. According to the “White Paper on Digital Transformation of Chinese Enterprises” Chinese companies are achieving digital transformation by applying key technologies such as cloud computing, big data, and artificial intelligence. This trend is not limited to China. As stated in the “Global Enterprise Digital Transformation Report” released by Stanford University, companies worldwide are accelerating their digital transformation processes.

Jiangsu Province, at the forefront of China’s economic development, has always been in a leading position in the exploration and breakthroughs of digital transformation. However, many traditional enterprises in Jiangsu still face many problems and challenges in achieving digital transformation.

According to the research conducted by Matt C et al., the key to the success of enterprise digital transformation lies in understanding and determining various driving factors and their interactive relationship [1, 2]. Urbinati A et al., emphasizes the importance of understanding and determining driving factors and their interplay, including the role of chief information officers, corporate culture, organizational structure, corporate strategy, and government policies [3, 4]. However, most of these research findings are concentrated on theoretical exploration, with fewer empirical studies specifically focusing on regions like Jiangsu.

Furthermore, in terms of the study on the policy impact in digital transformation, Aagard A et al. proposes that government policies have a significant impact on enterprise digital transformation in specific regional and national environments [5]. This provides a new perspective for our research on Jiangsu Province.

Based on the synthesis of previous research, we found a relative scarcity of specific studies on the driving mechanisms of digital transformation for traditional enterprises in the Jiangsu region. Therefore, the purpose of

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this study is to fill this research gap, conduct in-depth analysis of the digital transformation of enterprises in Jiangsu Province, and explore the underlying driving factors.

B. *Significance*

The present study focuses on the research of the driving mechanisms for the digital transformation of traditional enterprises in Jiangsu Province. It aims to provide theoretical basis and practical strategies that are instructive for the digital transformation of traditional enterprises in Jiangsu Province by conducting in-depth research and analysis on various driving factors for their digital transformation.

The main research methods include literature analysis and grounded theory research. Specifically, literature review, case study, and in-depth interviews are employed to understand and discover the driving factors and underlying mechanisms of digital transformation in traditional enterprises in different environments in Jiangsu region.

The key conclusion of this article is that environmental changes are external factors for digital transformation in enterprises, while internal driving forces include enterprise resources, entrepreneurial spirit, employee engagement, enterprise capability, and strategic planning. Based on this, two paths are proposed to achieve the digital transformation of traditional enterprises: “government-enterprise collaboration and industry chain synergy” at the external level, and “strengthening foundations and enhancing capabilities” at the internal level. This conclusion holds significant theoretical and practical importance for understanding and promoting the digital transformation of traditional enterprises in Jiangsu Province.

By uncovering the driving mechanisms behind the digital transformation of traditional enterprises in Jiangsu Province, this study aims to provide reference strategies for relevant companies. External strategies include government strengthening propaganda and guidance, service providers enhancing diagnostic capabilities, policy optimization and targeted implementation, and society solidifying the safety of transformation and improvement. Internal strategies involve necessary intelligent transformations of existing workshops based on the standards of intelligent workshops in Jiangsu Province, promoting overall digital transformation by starting with financial digitization, conducting digital transformation with a focus on achieving intelligent manufacturing based on the concept of “replacing humans with machines and brains with data,” expediting the process of digital transformation by starting from the underlying PaaS platform, and ensuring smooth implementation of digital transformation by integrating digital planning throughout the entire transformation process. These strategies facilitate greater development in the digital era, ultimately achieving the goal of enhancing corporate competitiveness and promoting economic development in Jiangsu Province.

II. LITERATURE REVIEW

In the digital age, the digital transformation of traditional enterprises has become one of the key paths to achieve sustainable development. Many scholars and research institutions have conducted extensive research and discussions on the driving mechanisms of digital transformation for traditional enterprises. The following is a summary of some relevant literature.

Firstly, from a technological perspective, the impact of information technology on the digital transformation of traditional enterprises is one of the important directions of research. Many studies have pointed out that the rapid development and innovation of information technology provide the basis and tools for the digital transformation of traditional enterprises [6]. For example, the application of emerging technologies such as cloud computing, big data, and artificial intelligence can help companies achieve digital transformation in various aspects such as production, sales, and services [7]. At the same time, the popularization of information technology and the reduction of costs also provide opportunities for traditional enterprises to undergo digital transformation [8]. Therefore, the driving role of information technology plays an important role in the digital transformation of traditional enterprises.

Secondly, from a market-driven perspective, the role of market demand in driving the digital transformation of traditional enterprises is also highly regarded. With the constant changes in consumer demand and intensified competition, traditional enterprises need to meet market demand through digital transformation. For example, the rise of e-commerce platforms and the widespread adoption of mobile payments have forced traditional enterprises to shift towards online sales and services to adapt to consumers’ shopping habits and demands [9, 10]. At the same time, intensified market competition compels traditional enterprises to accelerate their pace of digital transformation in order to enhance competitiveness and market share [11-13]. Therefore, the driving role of market demand plays an important role in the digital transformation of traditional enterprises.

Lastly, from a policy-driven perspective, the guiding role of government policies in the digital transformation of traditional enterprises should not be overlooked. Government policies and support measures can provide policy environment and resource support for the transformation of traditional enterprises [14]. For example, policy measures that encourage innovation, support technology companies, and cultivate the digital economy can expedite the pace of digital transformation for traditional enterprises [15-17]. Moreover, government policy guidance can also promote collaboration between traditional enterprises and research institutions, universities, etc., to strengthen technological innovation and talent development, further driving the implementation of digital transformation [18-20]. Therefore, policy-driven approaches play an important guiding role in the digital transformation of traditional enterprises.

To sum up, technology-driven, market-driven, and policy-driven mechanisms are important driving forces for the digital transformation of traditional enterprises. In-depth research on these driving mechanisms can provide theoretical support and practical guidance for traditional enterprises, helping them succeed in their digital transformation journey. Additionally, it can also provide references and insights for the digital transformation of traditional enterprises in other regions and industries, thereby promoting the overall digital transformation process of the national economy.

III. RESEARCH DESIGN AND MODEL ANALYSIS

A. *Research Design*

1) *Research design*

This study aims to explore the driving mechanisms of digital transformation in enterprises through grounded theory. Grounded theory is a qualitative research method proposed by sociologists Glaser and Strauss in 1967, and is regarded as one of the most scientific methods in qualitative research. Grounded theory conducts research in a bottom-up manner, with the purpose not to verify hypotheses. Firstly, empirical generalizations are made from the survey data, extracting concepts that reflect enterprise phenomena. Then, categories and the relationships between categories are excavated, gradually forming a theory. Grounded theory requires researchers to continuously compare different cases and perspectives during the process of data analysis, and determine how to collect data based on the current analysis results. Data collection and analysis are conducted simultaneously, continuously refining and revising the theory [21].

2) *Case selection*

This study chooses the digital transformation of traditional enterprises in Jiangsu Province as the research object for three reasons. Firstly, with the advent of the digital economy era, traditional manufacturing industry is facing both the pressure and opportunities of digital transformation. Secondly, the COVID-19 pandemic has brought impacts to the manufacturing industry, prompting more companies to realize the importance of digital transformation. Lastly, relevant industry associations and organizations are highly focused on promoting the process of digital transformation in traditional manufacturing industry [22].

According to the research objectives and theoretical sampling methods, samples of traditional enterprises in Jiangsu Province were selected. Firstly, the range of sample selection was determined by conducting a preliminary survey to understand the current situation of digital transformation in Jiangsu's manufacturing industry. The research group participated in digital transformation conferences held by the governments of Jiangsu Province and its various districts, where they learned that many companies had voluntarily applied for free diagnostic projects. The researchers also visited these companies in person and communicated with relevant management personnel to obtain information about their digital transformation methods and effectiveness. Secondly, based on the preliminary survey results, SAIC Maxus Motorhome Technology Co., Ltd. was selected as the first sample. There are three reasons for this selection: firstly, this company belongs to the automobile industry with a high level of intelligence and is a subsidiary of SAIC Motor Corporation Limited, whose parent company is at the industry-leading level in terms of intelligent manufacturing [23]. The researchers quantitatively benchmarked Maxus Motorhome using an intelligent manufacturing diagnostic model. Secondly, the relevant data and information of the selected company are obtainable, complete, and convenient. Thirdly, the selected company has the characteristics of batch production, scale production, and standardized production in the automobile industry. It is also the first research and production base dedicated to large-scale customized motorhomes in China. The production process involves small batches and multiple varieties, making it representative in the manufacturing industry of Jiangsu.

After determining SAIC Maxus RV as the first sample, the next step is to conduct on-site interviews with certain individuals from different departments of this company. Firstly, considering that digital transformation belongs to

the strategic level of the enterprise, the research group interviewed the general manager of the company. During the interview, the interviewee mentioned that the production vice president has a deeper understanding of intelligent production lines, thus identifying the second interviewee. Subsequently, based on the organization and coding of the interview data from the first company, combined with relevant information provided by the interviewees about other companies, and utilizing an intelligent manufacturing diagnostic model for specific quantitative benchmarking, which means similar levels of intelligent manufacturing, the second company that needs to be interviewed was determined. This process continues. Finally, building upon the collected interview samples from the first phase, which were from companies with a relatively high level of intelligent manufacturing, the research group supplemented the second phase by collecting samples from specialized, innovative, and industry-leading companies. Ultimately, a total of 30 samples were obtained from 30 high-tech enterprises, including SAIC Maxus RV Technology Co., Ltd., Jiangsu Sineng Lubrication Technology Co., Ltd., and other 30 high-tech enterprises.

Table 1: Examples of Categories Formed through Open Coding

Original representative statements in interview data	Concept	Category
As a wholly-owned subsidiary of Shanghai Automotive Group Co., Ltd., our company has corresponding requirements for intelligent manufacturing and digital applications (D1-1).	Business development requirements	Enterprise development strategy
Our management company headquarters is located in Shanghai, which is the first research and production base dedicated to large-scale customized RVs in China. Its innovation momentum is very impressive (D1-3).	Innovation trends in the manufacturing industry	Corporate innovation capability
I think the pandemic has accelerated the process of digitization, leading to an increasing trend in remote work, automation replacing manual labor, and the use of digital platforms (D1-4).	Impact of the pandemic	Random events
Both the Shanghai headquarters and the Liyang base have dedicated technical departments and teams for research and development (D1-5).	Independent research and development capabilities	Internal technological resources
We are at the forefront of intelligent manufacturing in the RV industry, achieved through an intelligent production scheduling system that links customer orders and displays real-time vehicle installation processes and required components at workstations, enabling C2B customization (D1-9).	Enterprise technological level	
We have established 65 small and micro campsites in 15 provinces, autonomous regions, and municipalities in China, with over 1,130 intelligent water and electricity charging stations, covering the entire RV industry chain (D1-10).	Internet companies	Partner resources
Leveraging our ecosystem advantage, we have established strategic partnerships with over 500 domestic travel agencies, planning and designing a diverse range of “RV+” travel products, covering 140 RV travel routes (D1-12).	Online platforms	
However, in this aspect, I believe that the management team must have a better understanding of the current trends in socio-economic development, including the impact of “RV+” travel products on consumption, and whether we can adhere to the development direction of manufacturing industry service-oriented transformation (D1-16).	Leader’s information identification ability	Entrepreneurial spirit
Manufacturing is a relatively traditional industry, and the quality of talent in the industry may not be very high. Some employees may have outdated thinking and may not be exposed to new things among the post-80s and post-70s generations (D1-17).	Employee mindset	Employee quality
Due to the promotion from the headquarters, our company has a high acceptance of digital, technological, and online platforms from top to bottom (A2-1).	Employee acceptance of new technologies	

Note: In the coding, letters represent the company code, and the numbers following the letters represent the respondents of that company. The numbers after ‘-’ represent the original statement number of the respondent. For example, D1-1 represents the first meaningful original statement of the first respondent from Datoong RV. The coding logic for other original statements listed in the article follows the same pattern.

3) Data collection and processing

This study explores the digital transformation of some typical companies in terms of production modes, level of intelligent manufacturing, service processes, and operational management. The determination of the sample size follows the principle of theoretical saturation, which means continuously adding new participant data until saturation is reached. The research group selected 30 digital transformation companies in Jiangsu Province as the research objects between March and April 2022 and August 2023, and conducted semi-structured in-depth

interviews with 40 middle and senior management personnel. There were 31 male and 9 female respondents, aged between 32 and 56 years old, with more than 5 years of work experience in their respective companies. The interview questions were divided into two parts: firstly, the respondents’ understanding of the concept of corporate digital transformation and the current situation of digital transformation in their companies, including their understanding of corporate digital transformation and the application of digital technology in the company, etc.; secondly, the respondents’ cognition of the influencing factors of corporate digital transformation, including external factors, internal factors, and challenges during the digital transformation process. The interview duration for each respondent was approximately 40 minutes. The final research results are only intended for academic communication. This study randomly selected 20 samples for coding analysis, and the remaining 10 samples were used to test the theoretical saturation.

B. Grounded Theory Model Analysis

In this study, qualitative exploration of the data was conducted through the procedural application of grounded theory. The detailed implementation steps include “open coding - axial coding - selective coding,” and theoretical saturation is examined at the end.

1) Open coding

This study analyzed the original data using the open coding method and employed Nvivo11, a software for coding analysis, to abstract 315 sentences into 90 initial concepts. These relevant concepts were further categorized into 19 categories. Detailed coding of some categories can be found in Table 1.

Table 2: The Main Categories Formed by the Encoding of the Primary Axis

the connotation of a category	subcategory	Category
Technologies such as the Internet, artificial intelligence, and 5G have influenced the country’s level of intelligent manufacturing.	Technological environment	Environmental changes
The country has proposed to build a “Digital China” and enhance the application of the Internet, big data, and artificial intelligence in the real economy.	Policy environment	
Industry competition drives companies to regain market share through digital transformation.	Industry environment	
Changes in customer consumption patterns prompt companies to reevaluate market opportunities.	Market environment	
The impact of the pandemic has raised higher requirements for companies in office operations and monitoring customer health conditions.	Random events	
The professional literacy, knowledge reserves, spiritual qualities, and personal abilities of corporate leaders.	Entrepreneurial spirit	Entrepreneurial spirit
The technological level and R&D capabilities of the company itself.	Internal technological resources	Company resources
Support from partner companies in terms of technology, systems, and other aspects.	Partner resources	
Fashion-oriented and digitally skilled talents within the company.	Human resources	
Specialized funding support for the digital transformation of the company.	Financial resources	
The company’s relevant intelligent devices and systems.	Hardware resources	
The company’s ability to innovate in technology, products, and services.	Company’s innovation capability	Company capabilities
The company’s acceptance of new technologies.	Ability to adopt new technologies	
The company’s economic strength to undergo digital transformation.	Company’s economic capability	
The company’s sensitivity and insight into external environmental changes.	Environmental sensing capability	
The company’s ability to adjust organizational structure and strategic changes.	Organizational change capability	
Strategic planning and development requirements from corporate groups and owners.	Company’s development strategy	Strategic planning
Employees’ thinking, knowledge, and overall literacy.	Employee quality	Employee engagement level
The establishment of a talent cultivation and incentive mechanism for digital talents within the company.	Mechanism for the development of digital talents	

2) Axial coding

Based on open coding, this study further clusters categories using axial coding methods to form more comprehensive and abstract main categories. The research topic aims to explore the influencing factors of

intelligent transformation and digitalization in the manufacturing industry. Through in-depth analysis of 19 initial categories, it was found that there are logical relationships among the categories, which are summarized into 6 main categories as shown in Table 2.

3) *Selective coding*

Selective encoding is a process of refining core categories at a higher level of abstraction and connecting them with other categories through a “storyline” to construct a theoretical model. This study analyzes the interactive results of selective encoding on the internal and external driving factors of intelligent transformation and digitalization in manufacturing enterprises, based on literature review and interview data, as shown in Figure 1.

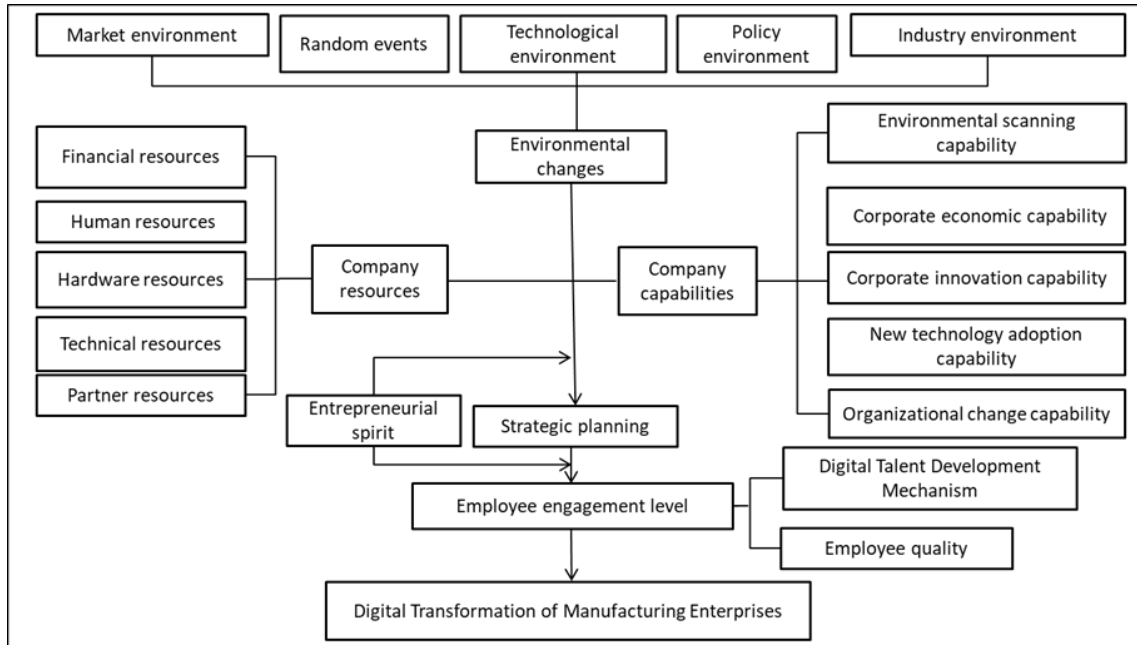


Figure 1: Selective Coding of Driving Factors for Intelligent Renovation and Digital Transformation

4) *Selective coding*

In order to test the theoretical saturation, 10 samples were selected for analysis. By conducting an analysis of the encoded data, it was found that although new labels emerged, no new concepts or categories were identified. Therefore, it can be concluded that the previously established model for the influencing factors of manufacturing industry intelligent transformation and digitalization performs well in terms of theoretical saturation.

IV. CONSTRUCTION AND ANALYSIS OF THE DRIVING MECHANISM FOR DIGITAL TRANSFORMATION OF TRADITIONAL ENTERPRISES

A. *Dual-wheel Driving Mechanism for Digital Transformation in the Manufacturing Industry*

When analyzing based on the theory of rootedness and studying the results of 30 cases including DaTong RV, the core driving factors that influence the digital transformation of manufacturing enterprises can be divided into external driving factors and endogenous driving factors. By conducting a detailed analysis of the causal relationship and internal mechanism between each factor and the digital transformation and upgrading of manufacturing enterprises, a dual-wheel driving mechanism for digital transformation of manufacturing industry enterprises has been constructed, as shown in Figure 2.

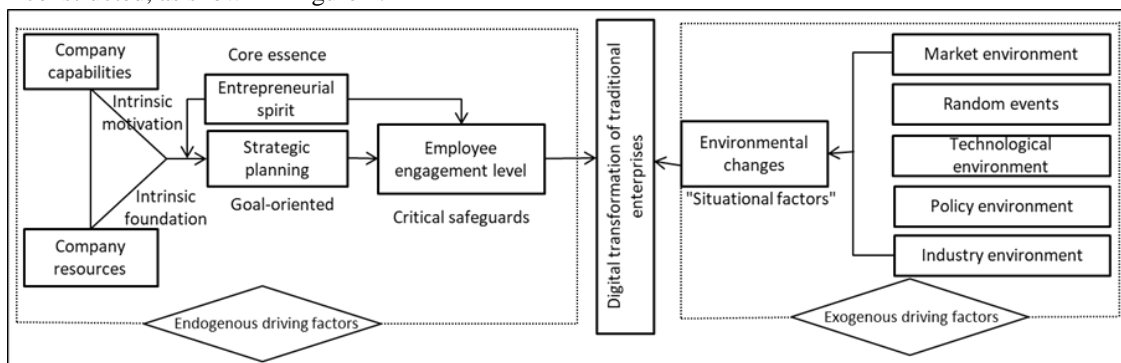


Figure 2: Dual-wheel Driving Mechanism of Intelligent Renovation and Digital Transformation

According to the dual-wheel driving mechanism of digital transformation in manufacturing enterprises shown in Figure 2, external driving factors and endogenous driving factors are two key driving forces for the digital transformation and upgrading system of manufacturing enterprises. Through digital transformation, manufacturing companies strive to increase value, achieve digital management, intelligent production, platform-based services, and collaborative research and development, thereby promoting the enterprise's own collaborative innovation and value co-creation.

B. Analysis of External Driving Mechanism

Enterprises face multiple uncertain factors, including technological environment, policy environment, industry environment, market environment, and random events, which are also known as environmental changes. These factors have put pressure on manufacturing companies and have prompted them to achieve digital transformation. In recent years, the COVID-19 pandemic has been an important random event that has brought significant uncertainty to manufacturing companies and has had a wide range of impacts on them. During the pandemic, due to the decline in the entire tourism market, the demand for motorhomes has almost dropped to zero. Similar to other companies, they have also faced challenges such as supply chain disruptions, employee health and safety issues, etc. To cope with these challenges, many manufacturing companies have accelerated their pace of digital transformation and adopted measures such as remote work, online sales, and intelligent production to adapt to the changes brought by the pandemic.

When the digitalization and intelligentization level of manufacturing enterprises reaches a certain degree, they can better cope with changes in the external environment. Enterprises can use digital and intelligent technologies to acquire and analyze information about technological environment, policy environment, industry environment, market environment, etc., in order to better respond to these environmental changes. In addition, digital transformation can make enterprises more flexible and agile in dealing with challenges brought by random events. This enables enterprises to minimize the interference from external factors during normal operations, thereby improving stability and sustainability.

C. Analysis of Internal Driving Mechanism

1) Enterprise resources are the intrinsic foundation of digital transformation

Through case studies, it has been found that the digital transformation of manufacturing industry relies on the internal resources of enterprises. First, the company's own technological, hardware, and financial resources serve as the material guarantee for digital transformation. Secondly, its own human resources provide the manpower support for digital transformation. Finally, partner resources are crucial for the digital transformation of enterprises. Partners not only provide technical support to the company but also bring new development opportunities, enabling the company to undergo digital transformation more smoothly.

Therefore, to achieve successful digital transformation and achieve good results, enterprises need to fully utilize and integrate various resources. This includes leveraging their own technological, hardware, and financial resources, emphasizing the cultivation and introduction of human resources, and establishing good cooperative relationships with partners. Only by fully utilizing and integrating various resources can enterprises smoothly carry out digital transformation, enhance competitiveness, and achieve sustainable development.

2) Enterprise capabilities are the intrinsic driving force of digital transformation

Corporate capability is the inherent driving force for enterprises in digital transformation, providing support and assurance for enterprises to cope with environmental changes. Its specific impacts are mainly reflected in the following areas. Firstly, corporate capability affects the grasp of the timing of transformation. Enterprises with strong capabilities can more keenly grasp market changes and technological development trends, facilitating timely digital transformation. Conversely, enterprises with weaker capabilities may miss the optimal timing for transformation, resulting in decreased competitiveness. Secondly, corporate capability promotes the implementation of enterprise digital transformation strategies. Enterprises with strong capabilities can better formulate and implement digital transformation strategies, providing support and assurance for digital transformation. In contrast, enterprises with weaker capabilities may encounter difficulties and challenges in digital transformation, making it difficult to achieve strategic goals. Lastly, corporate capability drives comprehensive transformation in enterprise digital transformation. Enterprises with strong capabilities can better address the comprehensive changes brought about by digital transformation, thereby achieving comprehensive improvement and development. Conversely, enterprises with weaker capabilities may encounter resistance and challenges in digital transformation, making it difficult to achieve comprehensive transformation. Corporate capability is an important support and assurance for enterprises in digital transformation, providing the ability to seize

opportunities, implement strategies, and drive comprehensive transformation, thus achieving successful and sustainable development in digital transformation.

3) *Strategic planning is the objective of digital transformation*

Strategic planning provides a clear and guiding action plan for enterprises to promote transformation and achieve long-term development goals. In formulating strategic plans, enterprises need to consider multiple factors. Firstly, top-level managers need to have rich knowledge reserves and be able to comprehensively analyze the internal and external environment of the enterprise. Secondly, enterprises need to pay attention to changes in the external environment, understand market demands and competition conditions. At the same time, enterprises also need to assess whether they possess various resources and capabilities to determine whether the formulated strategic plans can be implemented.

Strategic planning is a long-term and complex process that requires support from multiple parties. Correct strategic planning can set long-term development goals for enterprises and prompt their implementation. When undergoing digital transformation, enterprises need to conduct extensive strategic planning and incorporate it into the decision-making process, develop digital strategy implementation plans, and establish appropriate constraints, policies, plans, and indicators to better promote value transformation.

Strategic planning plays an important guiding role when enterprises undergo digital transformation. Through strategic planning, enterprises can set clear strategic goals and directions, formulate corresponding implementation plans, and establish effective constraints and indicators to promote smooth digital transformation and achieve long-term development goals for the company.

4) *Entrepreneurial spirit is the core soul of digital transformation*

Top-level managers play a crucial role in corporate strategy formulation and transformation. Their decision-making and leadership abilities determine whether a company can undergo digital transformation. Firstly, entrepreneurial spirit influences the formulation of corporate strategic planning. Leaders who have active thinking and strong information identification skills are more capable of perceiving market changes, identifying target customers, and discovering online demand touchpoints. Therefore, they are more willing to undertake digital transformation. Secondly, leaders' knowledge and qualities can set an example and create an innovative and change-seeking organizational atmosphere, inspiring employees to shift their mindset and service approach, ensuring their level of engagement, and facilitating the smooth implementation of corporate digital transformation. Additionally, the leadership team is also a crucial driver for implementing corporate strategies. Converting proposed strategies into actual actions requires the knowledge and qualities of the leadership level to coordinate various resources, strengthen interdepartmental connections, mobilize employee enthusiasm, and overcome difficulties during the transformation process. Through effective communication and collaboration, the leadership team can propel the successful implementation of corporate strategies.

5) *The level of employee engagement is an important guarantee for the effectiveness of transformation*

Entrepreneurial spirit has a decisive impact on digital transformation, while the level of employee involvement is an important factor determining the effectiveness of digital transformation. Compared with traditional IT systems, intelligent systems require employees from various departments to break down strong divisions of labor, establish connections, and integrate system data. It is essential for all employees to participate together in order to avoid "data islands" and make digital transformation a reality. Therefore, employees are the specific implementers of strategic plans, and the development strategy of a company must rely on employees to drive it. The degree of employee participation in enterprise digital transformation is mainly determined by their own qualities and the development mechanism of intelligent talents within the organization.

The quality of employees themselves, including their thinking ability, acceptance of new technologies, comprehensive literacy, and knowledge, has an impact on the degree to which employees understand and support organizational strategies. The higher the quality of employees, the more they can form consistent values with the company, which is beneficial for the implementation of digital transformation work. At the same time, the development mechanism of intelligent talents not only helps reserve excellent talents with trend awareness and professional skills, but also builds the company's own human resources, enabling employees to propose suggestions, participate in digital marketing, and better promote digital transformation work.

Entrepreneurial spirit and the level of employee involvement are key factors for a company to successfully carry out digital transformation. Entrepreneurial spirit can drive strategic formulation and implementation, while the level of employee involvement determines the effectiveness of digital transformation. Companies should pay attention to the development of employee qualities and the mechanism for cultivating intelligent talents in order to promote digital transformation work more effectively.

V. THE IMPLEMENTATION PATH OF DIGITAL TRANSFORMATION FOR TRADITIONAL ENTERPRISES

A. *Collaboration between Government and Enterprises, and Synergy along the Industrial Chain*

In order to promote high-quality economic development through the digital transformation of the manufacturing industry and with informationization and intelligence as the driving force, it is necessary to cultivate new economic growth momentum, accelerate the synergy between government and enterprises, and promote the coordinated development of the industrial chain. Specific efforts are needed in areas such as understanding, capabilities, policies, and security.

1) *The government strengthens propaganda and guidance*

Firstly, we need to create benchmark demonstration enterprises. The key industrial chains should accelerate the construction of a batch of benchmark demonstration enterprises that have good input-output efficiency, short cycles, and replicable qualities. Secondly, we should promote successful cases. Utilizing platforms such as the Internet, social media, and industry exhibitions, we should widely publicize successful cases and the effects of intelligent transformation and digitalization, actively disseminate advanced experiences and practices in enterprise transformation and upgrading. Thirdly, we should match policies. The government should utilize tools like “policy calculators” to accurately match policies suitable for enterprises, establish a normalized mechanism for government-enterprise communication, and respond promptly to the actual needs of enterprises. Fourthly, we should foster communication and cooperation. Organize companies within the industry to engage in exchanges and cooperation. By holding industry forums, seminars, and other forms of activities, we can promote communication and cooperation among enterprises, providing a platform for them to jointly explore methods and paths to problem-solving. Lastly, we should provide training and guidance. Absorb entrepreneurs with rich experience in intelligent transformation and digitalization into the mentor team, improve the quality of training, establish institutions or consulting service organizations for guiding intelligent transformation and digitalization, and provide enterprises with professional guidance and consulting services, offering customized solutions.

2) *Enhancing the diagnostic capabilities of service providers*

Cultivating local diagnostic service providers in Jiangsu Province, refining the types of service providers, optimizing selection criteria, and strengthening capacity building to promote the transformation of service providers’ business logic and cultivate local service providers in specific industries or professional application scenarios. Formulating unified pricing standards for diagnostic services across the province, considering dimensions such as quantity, quality, application, and risk, based on the value chain of information gathering, data analysis, and data utilization. To enhance service quality and effectiveness, it is important to promote standardization and normalization through the establishment of industry standards and specifications, clarification of diagnostic service requirements and processes, unification of diagnostic report formats and content, and improvement in the comparability and credibility of results. Additionally, strengthening supervision and evaluation is crucial. In order to enhance satisfaction feedback on diagnostic institutions, it is necessary to strengthen the transformation of diagnostic achievements. This can be achieved by collecting high-quality diagnostic reports, formulating report writing guidelines, and organizing mutual assessment and learning among diagnostic institutions.

3) *Policy optimization and classification implementation*

Strengthen the coordination of policies and optimize the targeted support and scope of policy measures. Enhance policy implementation efforts and establish supervision and evaluation mechanisms. During the policy implementation process, it is necessary to strengthen supervision and evaluation of policy implementation, promptly identify issues, and take corresponding measures to ensure policy implementation. Continuously deepen policy content, improve policy systems, and enhance policy operability and effectiveness based on the actual needs of enterprises. Enhance policy precision. Focus on the challenges faced by enterprises in digital transformation, such as data security and talent shortage, and formulate corresponding policy support measures to assist enterprises in achieving smooth digital transformation. Evaluate the maturity of enterprise digital transformation capabilities and develop targeted policy support measures to help enterprises improve their digital transformation capabilities and levels. Implement differentiated incentives, providing more policy support and guidance to enterprises with weaker digital transformation capabilities, and offering more support in market access, financing, and other aspects to enterprises with stronger digital transformation capabilities, in order to promote digital transformation development.

4) *Strengthening the foundation of societal transformation and security*

Enhance the cultivation and growth of the security market. Actively support the development of small and medium-sized enterprises in the security field through policy support, financial assistance, and other means. Cultivate local leading security companies, promote the construction of the security industry ecosystem, and improve the security level of enterprises. Establish a network security expert database to provide regular support for enterprises. Strengthen support for enterprise network security talent, regularly dispatch experts to diagnose enterprises, help them identify and resolve security issues, and establish and improve the network security protection system.

B. *Consolidate the Foundation and Enhance Capabilities*

According to the case of enterprise digital transformation dual-drive mechanism, a suitable digital transformation implementation path for Datong RV type enterprises is proposed.

Carry out necessary intelligent transformation of the existing workshops according to the intelligent workshop standards of Jiangsu Province. Enterprises can assess and transform existing workshops based on the intelligent workshop standards of Jiangsu Province, introduce intelligent equipment and technologies to improve production efficiency and quality. This can serve as the starting point for digital transformation and lay the foundation for subsequent transformation and upgrading of enterprises.

Promote the overall digital transformation of the enterprise by taking financial digital transformation as a breakthrough. Financial digital transformation is an important part of enterprise digital transformation. By introducing financial management systems, electronic invoices, and other tools, the automation processing and analysis of financial data can be realized, improving financial management efficiency and accuracy. At the same time, by promoting successful cases of financial digital transformation, the digital transformation of other departments in the enterprise can be driven, thereby achieving the overall digital transformation of the enterprise.

Based on the concept of “substituting equipment for labor and data for the brain,” a digital transformation focusing on achieving intelligent production has been carried out. This work aims to achieve the intelligence of the production process by introducing advanced equipment and technologies, and improve production efficiency and quality through data analysis and application. By combining technologies such as artificial intelligence, the Internet of Things, and big data with the manufacturing industry, efforts are dedicated to promoting the digital transformation of manufacturing enterprises, enabling them to respond to market demands and changes more flexibly and efficiently.

Accelerate the process of digital transformation by starting from the bottom-level PaaS platform. The bottom-level PaaS platform is the infrastructure for enterprise digital transformation. Enterprises can choose a PaaS platform that suits their own needs to build the infrastructure for digital transformation, including technologies such as cloud computing, big data analysis, and artificial intelligence. With the support of the bottom-level PaaS platform, the process of digital transformation can be accelerated.

Ensure the smooth implementation of digital transformation by integrating digital planning throughout the transformation process. When enterprises carry out digital transformation, it is necessary to develop clear digital planning and integrate it throughout the entire transformation process. This includes setting clear goals and indicators, formulating detailed implementation plans, and establishing effective monitoring and evaluation mechanisms. Through guided planning and monitoring, the smooth implementation of digital transformation is ensured.

VI. CONCLUSION

This study conducted in-depth interviews with management personnel from 30 traditional enterprises in Jiangsu Province and applied the grounded theory to extract important factors influencing digital transformation of businesses. Environmental changes are external factors for digital transformation, while internal drivers include enterprise resources, entrepreneurial spirit, employee involvement, enterprise capabilities, and strategic planning. By conducting an in-depth investigation into the driving mechanisms of digital transformation in traditional enterprises in Jiangsu Province, we propose the strategies of “collaboration between government and businesses, and synergy within the industrial chain” and “strengthening foundations and enhancing capabilities” to provide effective transformation strategies and pathway choices for enterprises, thereby promoting the successful digital transformation of traditional enterprises in Jiangsu Province.

In light of this, specific measures for the digital transformation of traditional enterprises in Jiangsu Province include:

External level: Strengthening government propaganda and guidance; enhancing the diagnostic capabilities of service providers; optimizing policy classification and implementation; and strengthening awareness of security during the transformation process.

Internal level: Conducting necessary intelligent transformation of existing workshops based on the intelligent workshop standards in Jiangsu Province; initiating financial digital transformation as a starting point to drive overall digital transformation of enterprises; adopting the concept of “equipment replacing labor, data replacing thinking” to realize intelligent manufacturing as the main focus of digital transformation; starting from the bottom layer of Platform as a Service (PaaS) to accelerate the process of digital transformation; ensuring that digital planning is integrated throughout the entire transformation process to ensure the smooth implementation of digital transformation.

These measures will help manufacturing enterprises effectively address the challenges in the process of digital transformation and promote their sustainable development in the era of digital economy.

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REFERENCES

- [1] Lai Y, Ye L, Xie P, Ma X, Study on the Coupling Coordination between Regional Technological Innovation and Digital Economy. *Science and Technology Progress and Policy*, 2022, 4: 1-11.
- [2] Chanas S, Myers D, Hess T, “Digital transformation strategy making in pre-digital organizations: The case of a financial services provider,” *Journal of Strategic Information Systems*, 2019, 28(1): 17- 33.
- [3] Matt C, Hess T, Benlian A, “Digital transformation strategies,” *Business & Information Systems Engineering*, 2015, 57(5): 339-343.
- [4] Urbinati A, Chiaroni D, Chiesa V, “The role of digital technologies in open innovation processes: An exploratory multiple case study analysis,” *Research and Development Management*, 2018, 50(1): 136-160.
- [5] Aagard A, Presser M, Collins T, “The role of digital maturity assessment in technology interventions with industrial internet playground,” *Electronics*, 2021, 10(10): 11-34.
- [6] Ghobakhloo M, “Determinants of information and digital technology implementation for smart manufacturing,” *International Journal of Production Research*, 2020, 58(8): 2384-2405.
- [7] GURBAXANI V, DUNKLE D, “Gearing up for successful digital transformation,” *Quarterly Executive*, 2019, 18(3): 209-220.
- [8] ARNER K S R, WÄGER M, “Building dynamic capabilities for digital transformation: an ongoing process of strategic renewal,” *Long Range Planning*, 2019, 52(3): 326-349.
- [9] KOHLI R, MELVILLE N P, “Digital innovation: a review and synthesis,” *Information Systems Journal*, 2019, 29(1): 200-223.
- [10] CENNAMO C, DAGNINO G B, DI MININ A, “Managing digital transformation: scope of transformation and modalities of value co-generation and delivery,” *California Management Review*, 2020, 62(4): 5-16.
- [11] FURR N, SHIPILOV A, “Digital doesn’t have to be disruptive: the best results can come from adaptation rather than reinvention,” *Harvard Business Review*, 2019, 97(4): 94-103.
- [12] SOLBERG E, TRAAVIK L E M, WONG S I, “Digital mindsets: recognizing and leveraging individual beliefs for digital transformation,” *California Management Review*, 2020, 62(4): 105-124.
- [13] KRETSCHMER T, KHASHABI P, “Digital transformation and organization design: an integrated approach,” *California Management Review*, 2020, 62(4): 86-104.
- [14] CORREANI A, DE MASSIS A, FRATTINI F, “Implementing a digital strategy: learning from the experience of three digital transformation projects,” *California Management Review*, 2020, 62(4): 37-56.
- [15] KANE G, “The technology fallacy: people are the real key to digital transformation,” *Research-Technology Management*, 2019, 62(6): 44-49.

- [16] Fisher G, Lounsbury M, "Optimal Distinctiveness, Broadening the Interface between Institutional Theory and Strategic Management," *Strategic Management Journal*, 2017, 38(1): 93-113.
- [17] Li J, Chen L, Yi J, "Ecosystem-specific Advantages in International Digital Commerce," *Journal of International Business Studies*, 2019, 50(9): 1448-1463.
- [18] Goldfarb A, Tucker C, "Digital Economics," *Journal of Economic Literature*, 2019, 57(1): 3-43.
- [19] Boudreau K, "Open Platform Strategies and Innovation: Granting Access vs Devolving Control," *Management Science*, 2010, 56(10): 1849-1872.
- [20] Kane C, Palmer D, Phillips N, "Strategy, Not Technology, Drives Digital Transformation," *Sloan Management Review and Deloitte University Press*, 2015, 14: 1-25.
- [21] Glase, Strauss, "The Discovery of Grounded Theory: Strategies for Qualitative Research," *Aldine Publishing Company*, 1967: 20-29.
- [22] Naruei I, Keynia F. Wild horse optimizer. A new meta- heuristic algorithm for solving engineering optimization problems. *Engineering with Computers*, 2021, 38(4): 3025-3056.
- [23] Xue J K, Shen B. A novel swarm intelligence optimization approach: Sparrow search algorithm. *Systems Science & Control Engineering*, 2020, 8(1): 22-34.