

Research on the Current Situation and Improvement Path of Digital Transformation of Small and Medium-sized Enterprises in China

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ABSTRACT

In the era of digital economy, digital transformation has become a key factor for small and medium-sized enterprises (SMEs) to enhance their competitiveness and achieve sustainable development. However, the digital transformation process of SMEs is constrained by many challenges such as lack of resources, insufficient capacity, and low coordination efficiency. Based on the practical dilemma of digital transformation of small and medium-sized enterprises and relevant research literature at home and abroad, this paper systematically analyzes the current situation of digital transformation of small and medium-sized enterprises, and identifies the four core challenges of capital and technology short board, data island phenomenon, backward business model and security risk. On this basis, this study constructs a fusion path model of ' technology lightweight empowerment-ecological resource integration-value network creation-systematic collaborative governance '. This study proposes that SMEs should use agile tools, integrate into the platform ecosystem, reconstruct business models, and use precise policy support to achieve a strategic transformation from closed innovation to open value co-creation, with a view to providing a theoretical framework and practical guidance for breaking through the dilemma of digital transformation.

KEYWORDS

SMEs; Digital transformation; Practical dilemma; Value co-creation

1 Introduction

As a key micro-subject in China 's economic system, small and medium-sized enterprises, like the ' capillaries ' of the human body, play an irreplaceable role in promoting economic growth, promoting technological innovation and maintaining employment stability. Relevant statistics show that SMEs contribute more than 50 % of tax revenue, more than 60 % of GDP, more than 70 % of technological innovation achievements and more than 80 % of urban labor employment. At present, digital technology, represented by big data, artificial intelligence and cloud computing, is deeply reshaping the industrial development pattern. Digital transformation has become an inevitable choice for small and medium-sized enterprises. However, compared with large enterprises with superior resource endowments, small and medium-sized enterprises are facing many difficulties in the process of digital transformation, and there are three major problems of ' dare not transform, will not transform, can not transform '. Therefore, this paper is intended to fill this theoretical gap. By integrating relevant research results at home and abroad, a comprehensive model corresponding to the challenges and paths is constructed, and a clear and feasible action guide is provided for small and medium-sized enterprises in transition dilemma.

2 Literature Review

In the study of the path of digital transformation, domestic scholars Chen Jian et al. (2020) and Ma Xiaoyue (2025) mentioned that the digital transformation of Chinese enterprises is not only the upgrading of technology, but also a holistic system change covering strategy, business and organization. For small and medium-sized enterprises, Xiao Jinghua (2021), Ni Dehui (2023), etc. emphasized that the success of their transformation depends on whether they cooperate with the upstream and downstream of the industrial chain, rather than fighting alone.

In terms of SME innovation, Dong Xiaosong (2022) and Peng Tao (2025) found through empirical research that SMEs can significantly improve product innovation performance by interacting with users and creating value with social platforms in the case of limited resources. Lv Tie (2019), Cheng Qiuwang (2024) and Wang Lan (2023) analyzed the policy role of China 's digital transformation of manufacturing industry, and put forward that the government 's support for small and medium-sized enterprises should be changed from " inclusive " to " precise drip irrigation, " especially the construction of public technology service platform is very important.

Nambisan et al. (2017) found in their research that digital technology, especially cloud computing, big data analysis and artificial intelligence, has built an efficient interactive bridge between SMEs and users, suppliers and other stakeholders, which greatly expands the boundary of value co-creation and is no longer limited to traditional physical

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space and linear processes. With the help of digital platforms, enterprises can obtain user feedback in real time and quickly integrate it into product iteration and service optimization, forming a closed-loop value co-creation model of "user participation design-prototype test-market feedback-redesign," which significantly improves the market response speed and innovation success rate of SMEs.

In addition, from the perspective of business model, Zott and Amit (2020) emphasize that the core of the digital business model is to promote multi-value co-creation by building an efficient value network. They believe that SMEs should be more actively embedded in the digital ecosystem due to their limited resources, and share data, technology and channel resources through partnerships with platform enterprises, technology service providers, etc., so as to achieve the scale effect of value co-creation. Teece (2007) emphasized that in a rapidly changing environment, the ability of enterprises to integrate, shape and reconfigure internal and external resources to maintain competitive advantage is critical. In essence, digital transformation is the process of small and medium-sized enterprises to build this dynamic capability.

The above research all recognizes the importance of digital transformation and value co-creation for SMEs. However, the research still has the following shortcomings: the analysis of how the resource rigidity and ability weakness of SMEs directly affect their value co-creation process is not sufficient; the proposed path is often too general and fails to build a precise correspondence with specific challenges. This paper argues that the transformation process of small and medium-sized enterprises is actually a process of responding to external challenges and systematically improving their dynamic capabilities by constructing specific paths, and finally achieving the goal of value co-creation. Based on this, the article first cuts in from a multi-dimensional perspective, analyzes the core challenges faced by small and medium-sized enterprises in the transformation process, and builds an integration path for existing problems to help small and medium-sized enterprises resolve difficulties and successfully achieve digital transformation.

3 Challenges in the Process of Digital Transformation of SMEs

3.1 Capital and Technology Double Short Board, Transformation Foundation Support is Weak

Due to the limited scale and low credit rating, it is difficult for small and medium-sized enterprises to afford the development cost of customized ERP / CRM system up to millions of yuan. Even if you choose standardized SaaS services, the annual continuous expenditure is also a heavy burden on enterprises with meager profits. At the same time, such enterprises generally lack professional talents such as data analysis, IT operation and maintenance and digital strategic planning. Most of the existing teams have traditional business background, and their understanding and application ability of emerging technologies such as cloud computing and artificial intelligence is limited. Even if they purchase advanced data analysis tools, they can only realize basic data aggregation, and it is difficult to achieve data-driven refined operation level, which makes it impossible for technology investment to be effectively transformed into production efficiency and market competitiveness. In addition, due to insufficient investment in technology research and development, it is difficult for enterprises to independently develop digital solutions that meet the needs of personalized business, and they are highly dependent on external technology suppliers, while the lack of adaptability of standardized external products further aggravates the dilemma of technology application. The dual shortcomings of capital and technology are intertwined, resulting in a very weak foundation for the digital transformation of SMEs.

3.2 Data Island Collaborative Barriers, Ecological Integration is Difficult to Promote

Internal departments of small and medium-sized enterprises often purchase information systems independently according to their own needs. Sales, production and inventory management rely on CRM, ERP and WMS systems respectively. However, there are differences in data formats and interface standards of each system, resulting in manual export and conversion of data flow, which not only increases the workload, but also easily causes data distortion due to human error. In terms of external collaboration, the problem of 'data islands' in the upstream and downstream of the industrial chain is particularly prominent. Taking a garment industry enterprise as an example, its upstream suppliers use traditional Excel to record fabric and capacity data, and downstream distributors transmit order inventory information through WeChat group. The enterprise's own ERP system cannot obtain upstream and downstream data in real time, resulting in frequent adjustment of production plan. This situation may not only miss the opportunity of additional orders due to the failure to grasp the remaining capacity of the supplier in time, but also cause the backlog of finished product inventory to exceed 30% due to the lag of the distributor's feedback. In addition, the lack of data standards further aggravates the crisis of confidence. In order to prevent the leakage of core data, some suppliers blur the shared data and reduce the practical value of the data. This makes it difficult for SMEs to achieve accurate prediction and rapid response through industrial chain data collaboration. The interweaving of internal and external data islands makes it difficult for them to integrate into the digital industry ecology, which in turn hinders the advancement of ecological integration.

3.3 Business Model Innovation Lags Behind and Value Creation Path is Narrow

In the context of the digital age, the application of digital technology by small and medium-sized enterprises is often limited to local optimization of production processes and sales links, aiming at improving efficiency or reducing costs, and failing to touch the fundamental changes in business models. These enterprises still stick to the traditional " production-sales " product thinking, focusing too much on product manufacturing and sales promotion, while ignoring the expansion space of the business model. On the one hand, they fail to take the initiative to transform into a ' product + service ' solution, unable to provide customers with a more comprehensive and personalized value experience ; on the other hand, it has not fully tapped the business potential in operating data, and it is impossible to gain insight into market demand and open up new sources of income through data analysis. This series of factors ultimately lead to the difficulty of maximizing the value of digital transformation, making enterprises miss important development opportunities in the digital wave.

3.4 Data Security Governance Risks, Potential Worries in the Transformation Process

In the process of data management, some small and medium-sized enterprises have not yet established a perfect data classification and grading system. For important assets such as core business data and customer sensitive information, there is a lack of accurate identification and differentiated protection measures, resulting in data collection, storage, transmission, use and other life cycle links. There may be security risks. In addition, the shortage of data governance talents is also an important constraint. Interdisciplinary talents who understand business and are proficient in data security technology and related regulations are particularly scarce, which makes it difficult for enterprises to formulate scientific and effective data security strategies and emergency plans in the face of increasingly complex data security threats. At the level of compliance, with the continuous improvement of relevant laws and regulations, higher requirements have been put forward for enterprise data processing activities. However, some small and medium-sized enterprises do not have a deep understanding of relevant legal provisions, lack of implementation, and weak awareness of data compliance. It is easy to cause legal risks due to improper data processing. This may not only lead to the punishment of the regulatory authorities, but also may incur legal proceedings from customers, further increase the burden of business operations, and become a major hidden danger that hinders the further advancement of its digital transformation.

4 Construction of the Integration Path of SMEs'Digital Transformation

4.1 Lightweight Technology Empowerment, Breaking Through the Technical Limitations of Funds

Faced with the realistic challenges of capital shortage and weak technological foundation, SMEs should abandon the " big and complete " heavy asset investment model and adopt a lightweight and agile technology empowerment strategy. Specifically, it can be systematically promoted from the following three aspects. First of all, the cloud ERP, CRM and other systems of SaaS mode are preferentially adopted to convert the high fixed asset investment into on-demand operating expenses, which significantly reduces the initial cost pressure. Secondly, actively use the low-code/ no-code development platform, so that business personnel can independently build application systems after basic training, effectively alleviating the shortage of professional and technical personnel ; finally, the phased promotion strategy is implemented, and priority is given to the application scenarios such as marketing customer acquisition and customer service that are effective and easy to implement for digital transformation. Through rapid acquisition of transformation benefits, team confidence is enhanced, laying a solid foundation for subsequent in-depth transformation. This progressive and lightweight technology empowerment path can help small and medium-sized enterprises to achieve a smooth start and continuous deepening of digital transformation under the condition of limited resources.

4.2 Ecological Resource Integration, Build a Win-win Pattern of Synergy

In order to cope with the problem of data islands and collaborative barriers, SMEs need to change from a closed resource accumulation model to an open ecological integration model. First of all, it is deeply integrated into the industrial Internet platform, relying on the standardized data interface and collaboration tools provided by the platform to achieve real-time sharing and collaboration with upstream and downstream enterprises in key business data such as orders, inventory, and logistics, thereby improving the overall efficiency of the supply chain. Secondly, lead or participate in the construction of industry data alliance, under the premise of ensuring data security and implementing privacy protection, jointly build and share industry database with enterprises in the same industry, and jointly carry out industry-level data applications such as market trend analysis and risk early warning. Finally, build an open innovation network, and actively establish strategic cooperation with universities, research institutes and professional consulting institutions to obtain cutting-edge technical guidance and innovation resources. Through these three levels of ecological integration measures, SMEs can break through their own resource constraints and gain development momentum in a broader value

network.

4.3 Network Value Creation, Reconstruction of Core Competitive Advantage

In order to solve the problem of lagging business model innovation, small and medium-sized enterprises need to change from the traditional linear value chain thinking to the network value creation thinking. Enterprises should actively promote the transformation of servitization, from simple product sales to comprehensive solution providers of products and services. At the same time, we should further explore the C2 M reverse customization mode, make full use of the consumption data of the e-commerce platform and the user community, and guide the production system to implement the flexible transformation of small batches and multiple varieties, so as to accurately meet the personalized needs. In addition, it is very important to build an open innovation platform, which invites core users to deeply participate in key links such as product design, functional testing and creative solicitation, so as to transform traditional consumers into prosumers and create product value together. This networked value creation model will help small and medium-sized enterprises to establish sustainable competitive advantages in differentiated competition.

4.4 Systematic Collaborative Governance, Build a Strong Transformation Guarantee Mechanism

In the face of security risks and governance challenges in the process of transformation, it is necessary to build a multi-party collaborative governance system of enterprises, governments and industries. At the enterprise level, it is necessary to establish a digital transformation leadership mechanism responsible for the founders, set up a cross-departmental special promotion team, and establish a basic network security protection system, including regular data backup, employee safety awareness training and other basic measures. At the government level, we will introduce a more targeted 'digital special subsidy for small and medium-sized enterprises' policy, optimize the subsidy application process, and lead the construction of a public safety service platform for small and medium-sized enterprises to provide inclusive safety testing and protection services. At the industrial level, it is recommended that industry associations should lead the establishment of industry-unified data security standards and interface specifications to reduce collaborative costs and technical risks among enterprises. Through the collaborative governance of these three levels, we can build a comprehensive security system for the digital transformation of small and medium-sized enterprises, and ensure that the risk of the transformation process is controllable and steadily advancing.

5 Conclusion and Prospect

This study systematically identifies four core challenges in the process of digital transformation of SMEs, and constructs a four-dimensional fusion path model with clear targeting. The research shows that small and medium-sized enterprises must complete the thinking transformation from "single point technology application" to "systematic ability construction" in order to achieve successful transformation. This paper achieves this goal through four dimensions of organic coordination, laying a solid foundation for transformation with lightweight technology, breaking through the resource boundary with ecological integration, reshaping the business model with value network, and ensuring the security of transformation with systematic governance. The four dimensions support and promote each other, which together constitute a complete transformation framework system. This path model not only provides a new theoretical perspective for understanding the digital transformation of small and medium-sized enterprises, but also provides clear action guidance for small and medium-sized enterprises in practice, which helps them to achieve steady and effective digital transformation under resource constraints.

Funding

Undergraduate Innovation Training Program Project (ON: 202510463030)

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