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Extracting and Investigating the Success Factors of Digital Transformation in Textile and Garment Enterprises: Based on the TOE Framework

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Abstract

This paper extracts 13 success factors based on the TOE framework in the three dimensions of Technology, Organization, and Environment (TOE). The factors are developed from investigating the challenges in the digital transformation of textile and garment enterprises and based on the literature and case studies on the success factors of digital transformation within the TOE theoretical framework. Descriptive statistics and factor analysis are performed on ample data from 201 textile and garment enterprises to verify the applicability of the TOE framework for the classification of success factors of digital transformation of textile and garment enterprises. The basic situation of the digital application of textile and garment enterprises is then summarised. The study finds that the organisational factors have the highest scores, followed by technical factors. From the observation indicators of 13 detailed success factors, the average score is greater than 4, indicating that the role of these success factors in textile and garment enterprises is generally recognised. The "digital strategic thinking" of senior managers has the highest score, followed by the "digital transformation project team." Environmental factor scores of enterprises in the Beijing Tianjin Hebei region are the highest, followed by enterprises in the Yangtze River Delta and Pearl River Delta regions. Medium and large enterprises have higher scores for technical factors and organisational factors. Finally, the paper discusses which success factors should be addressed and improved.

Keywords: Digital Transformation; Success Factors; TOE Framework; Textile and Garment Enterprises

1 Introduction

Not only is the textile and garment industry an essential traditional industry in China, but it is also a significant component of the global industrial supply chain. The international political and economic environment has undergone substantial changes. Textile and garment enterprises face uncertain and unstable problems such as weakening labour resource advantages, declining order volume, and inventory backlog. Therefore, they need to accelerate their transformation and actively deal with these difficulties in the development process. The Chinese government

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attaches great importance to digital development. Various industries have started taking digital transformation as one of the development strategies. Areas of digital transformation of textile and garment enterprises include the digitisation of basic fabrics, personalisation, personalisation of design and customisation, intellectualisation of product production, and digitisation of process management and quality detection. The process can also improve production efficiency and significantly reduce labour costs, allowing rapid response and agile delivery to consumer needs. Therefore, digital transformation is an inevitable solution for textile and garment enterprises to face their challenges. However, the digitalisation of textile and garment enterprises is still relatively weak, and the digital transformation process is uncertain and inefficient. As a result, studying the success factors of the digital transformation of textile and garment enterprises has become an essential issue of widespread concern in theoretical and practical circles.

Tornatzky and Fleischer first proposed the TOE framework in the process of technological innovation. It combines the diffusion of innovation (DOI) and the technology acceptance model (TAM) to select influencing factors of technological innovation from the perspectives of technology, organisation, and environment (TOE) [1]. Among them, technical factor refers to the internal technology and technical support of the organisation; organisational factor refers to the support of senior management, employee participation, the internal structure of the enterprise and other characteristics and resources of the company; and environmental factor refers to the external resources and capabilities of the government, industry and other factors that have an impact on the development of the enterprise. The three factors work together to promote the adoption of innovative technologies. Under the TOE framework, combined with the resource-based theory and the organisational system theory, success factors of digital transformation can be divided into three dimensions: technical factors, organisational factors, and environmental factors. Other studies also believe these are the critical success factors of digital transformation. Zhu K et al. (2006) believe that the influencing factors of informatisation can be studied from these three aspects, and different industries can further refine the influencing factors according to this standard [2]. Solis B. et al. (2014) point out that the success factors of digital transformation can be divided into internal and external resources and capabilities, emphasising the important role of external capabilities in achieving this goal [3]. Deloitte (2018) believes that the influencing factors of digital transformation are organisational structure, organisational culture, digital environment, employees and customers [4]. KPMG (2018) believes that digital strategy, corporate culture, customers and channels, organisations and processes, personnel and dynamic capabilities and other factors affect digital transformation [5]. The role of the three elements in the TOE framework in digital transformation is summarised as follows:

Research on technical factors: the new generation of information technology is the foundation and driving force of enterprise digital transformation. Tong Yu (2022) and Sirilertsuwan P et al. (2022) believe that technological input and application are the driving forces of enterprise digital transformation, which is conducive to achieving higher transformation performance [6-7]. Verhoef P C (2021) and Liu ZC et al. (2018) believe that information technology can help enterprises improve the speed of information transmission and communication and is an important factor in enterprise digital transformation [8-9]. Research on organisational factors: digital transformation is not only a simple technical mutation but also a management problem. It mainly changes the business process and organisational structure to implement strategic changes and create new business models. Feng XB et al. (2022) believe that the resources and capabilities within the organisation are crucial to digital transformation [10]. Yang JD et al. (2021) point out that resources such as the structure and talents within the organisation will play an important role

in the digital transformation process, which largely determines the outcome [11]. Research on environmental factors: enterprises are in an open environment and are always transmitting and exchanging information and resources with the outside world. Zhang X et al. (2020) mention that due to the limitation of resources and capabilities, it is often difficult for enterprises to complete digital transformation alone, and the interconnection of external enterprises can improve the degree of information sharing [12]. Reischauer g (2018) believes that the support of government policies can help enterprises reduce the frequency of violation risks, which is very important for the digitalisation of the manufacturing industry [13].

Although these studies all show the positive role of various success factors in digital transformation, further exploration and research are needed to determine which factors play a greater role, and therefore should be focused on, in the digital transformation of textile and garment enterprises. This study will help enterprises effectively improve the performance of digital transformation.

2 Extract Success Factors from Case Study and Correlation Theory Based on TOE Framework

2.1 Extract Success Factors from Case Study Based on TOE Framework

Observe the digital transformation practice of textile and garment enterprises in reality and select enterprises with significant digital transformation performance, whose digital transformation practice is well known and widely learned by the industry. The case data mainly come from the official website of the enterprise, the conversation records of leaders, well-known official accounts, etc. These data from real observation have certain representativeness and research value. The practical experience summary and factor verification of relevant enterprises are shown in Table 1:

It can be seen from the above table the digital transformation experience of typical textile and garment enterprises proves that among the 13 success factors in the three dimensions of technology, organisation and environment in the previous introduction, IT infrastructure, technical innovation, digital skills training, flat organisational structure, digital strategic thinking of senior managers, active participation of employees, digital transformation project team, professional resources, government policy guidance government financial support and so on, most of the success factors can be extracted from the practical experience of textile and garment enterprises that have done well in the transformation practice.

2.2 Extract Success Factors from Correlation Theory Based on TOE Framework

The resource-based theory mentioned two types of capital, which include material capital and human capital. Material capital includes factors such as infrastructure and technological innovation, and human capital includes factors such as the comprehensive quality of employees. IT infrastructure can provide technical support for the digital transformation of textile and garment enterprises. Technological innovation provides continuous impetus for the digital development of

Table 1: Verification of success factors of digital transformation of textile and garment enterprises

Case Name	Original materials describe	verification
Wanshili Group	① The company has set up a subsidiary to manage the digital transformation of enterprises ② Mr. Li Jianhua, chairman of the board of directors, made a transformation choice at a critical moment and formulated a digital transformation strategy ③ Cooperate with Microsoft to develop digital printing technology ④ Hangzhou government issued relevant policies to support the digital transformation of textile and garment enterprises ⑤ Technological innovation and silk culture inheritance are the key factors of its digital transformation ⑥ Enterprise construction information system put into use to support digital transformation	Set up project team, The strategic thinking of senior executives, Professional cooperation resources, Government policy support, technological innovation IT infrastructure construction
Cool Smart	① It has realised self-government instead of the rule of man, no more posts, and employee self-management. It has realised "de leadership" and stimulated the subjective initiative and creativity of employees. ② It has formed a highly integrated digital information system of consumers, platforms and manufacturers and has a relatively complete Internet of Things system ③ The company establishes four databases of fabric, version, BOM and style, integrates artificial intelligence, Internet and real-time transaction technology, and automatically collects human body data to respond to the special needs of customers. ④ Zhang agent, the founder, is optimistic about the digital future. After numerous trials and errors, he invested a lot of money to build a digital factory	Active participation of employees, Flat organisational structure, IT infrastructure support, technological innovation, Digital thinking of senior managers
Heisberg Clothing	① The company has mastered 14 computer software copyrights and core technologies of personalised customisation ② Established Zhongke Zhishang Information Technology Co., Ltd. to help the group's digital transformation ③ Relying on the core technical force and team of the Chinese Academy of Sciences, with the support of intelligent manufacturing experts, personalised customisation experts and engineers ④ Invested a large amount of money to create the "global clothing personalised customisation network collaborative manufacturing service support platform" and realised the high integration of all links ⑤ The textile and garment industry is competitive in Shandong Province, which has been at the forefront of the world. The government also supports and encourages enterprises to carry out digital transformation	technological innovation, Set up project team, Professional support, IT infrastructure support, Government policies and financial support
Love Silk Clothing	① Organize employees to conduct digital skills training so that they can become a bridge between technology and business and become an advocate of digital transformation ② Let professional people do professional things and help the digital transformation of enterprises with the services provided by Dell Eason	Digital skills training, Participation of professionals or organisations
Taipingbird Company	① Use information technology to establish a fast response supply chain and use big data to obtain the geographical location and preference information of network users ② Cooperation with Alibaba, online product planning, offline customer maintenance and joint operation Chairman Zhang Jiangping constantly adjusted online positioning and products and paid attention to digital marketing and digital production.	IT infrastructure, With the help of specialised organisations, Strategic thinking of senior management
Li Ning Company	① Li Ning has a global digital strategic thinking and is good at empowering employees and cultivating their digital awareness ② Cooperate with Alibaba Cloud to complete the digital transformation of offline stores, build a data centre, collect consumer data, and help operators make intelligent decisions ③ Build a digital supply chain integrating rapid R&D, on-time production and precise sales to form a sales closed loop. ④ Use emerging digital technology to analyse best-selling products, identify membership through Internet of Things technology, and conduct accurate marketing	The digital strategic thinking of key leaders, Help from specialised organisations, IT infrastructure support, technological innovation

enterprises. Digital skills training can improve the quality of employees. Therefore, this paper classifies the technical dimension into "IT infrastructure (T1)", "technological innovation (T2)" and "digital skills training (T3)".

The resource-based theory mentions that senior executives, employees and specialised resources are important human capital of enterprises, and organisational structure is an important organizational capital. The flat organisational structure can effectively transmit internal information. The digital strategic thinking of senior executives can better guide the transformation work. The active participation of employees can reduce resistance to the transformation. Establishing the digital transformation project team is conducive to better communication and interaction among team members. Professional resources help enterprises solve problems encountered in the transformation promptly. In contrast, the assignment of responsibilities and the identification of assessment indicators for digital transformation can help enterprises adjust their target plans in time. Therefore, this paper classifies the organisational dimension into six success factors, namely "flat organisational structure (O1)", "digital strategic thinking of senior managers (O2)", "digital transformation responsibility assignment and assessment (O3)", "active participation of employees (O4)", "digital transformation project team (O5)" and "specialised resources (O6)".

The organisational system theory mentions that the decision-making of enterprises will be subject to three types of pressure: forced convergence, normative convergence and imitation convergence. Forced convergence mainly comes from the government, while imitation convergence comes from the excellent enterprises in the industry and the upstream and downstream enterprises in the industrial chain. Government policy guidance and financial support can provide a guarantee for digital transformation. The demonstration guidance of benchmarking enterprises in the industry, as well as the digital transformation practice of enterprises upstream and downstream of the industrial chain, can provide successful transformation strategies. Therefore, this paper summarises the environmental dimension into four success factors, namely "government policy guidance (E1)", "government financial support (E2)", "traction of upstream and downstream enterprises in the industrial chain (E3)", and "demonstration and guidance of benchmark enterprises in the industry (E4)".

3 Methodology

3.1 Questionnaire Design

The questionnaire consists of two parts. The first part contains the basic information. It mainly involves five items: personal position, enterprise nature, enterprise scale, enterprise location, and the company's current digital application field. These are objective data and reflect the basic situation of the interviewees and their enterprises. The second part is the survey of success factors of the digital transformation of the textile and garment enterprises. In this paper, the 13 success factors mentioned above are taken as observation indicators. The data of the 13 observation indicators are measured by Likert's five-level scale method. The respondents are scored according to their recognition of the performance of the enterprise's digital transformation practice, with one being the lowest and five being the highest [14].

3.2 Questionnaire Distribution

Samples for the formal survey are selected from textile and garment enterprises that have carried out digital transformation practices. The core personnel (digital backbone and management personnel) who are deeply involved in the transformation practice of these enterprises are selected as the survey objects, as they can make an objective and fair evaluation of the actual performance of the corresponding observation indicators of the success factors of the digital transformation of their enterprises. This survey uses an online questionnaire to collect data, mainly through the QUESTIONNAIRE STAR and CREDAMO platform. It sets relevant restrictions according to the research content of this paper to ensure the respondents are familiar with the research content and can objectively answer the questions.

241 questionnaires were sent out, and finally 201 valid questionnaires were obtained, with a recovery rate of 83.40%.

3.3 Sample Overview

Descriptive statistical analysis is performed on the job distribution of the respondents, the nature, scale, and location of the surveyed enterprises and the digital application field within the company. The relevant results are described as follows:

3.3.1 Analysis of the Basic Situation of the Interviewees

52% of the interviewees are internal managers. They have a clear planning and understanding of the company's digital transformation strategy and pay close attention to the company's digital transformation projects. The second largest group is the business backbone and the technical backbone, accounting for 18% and 16% of the sample, respectively. They have played a large role in the specific work of enterprise digital transformation and participated in the transformation strategy of the enterprise. Only 28 people are categorised as other digital participants, accounting for 14% of the survey sample. They have also participated in the digital transformation within the company. The management personnel, digital business backbones and digital technology backbones in this survey account for 86% of the total respondents.

3.3.2 Basic Situation of the Surveyed Enterprises

Descriptive statistical analysis is performed on the location, scale, and nature of the surveyed enterprises. First, nearly 60% of the surveyed enterprises are in the Yangtze River Delta and the Pearl River Delta, and 22.4% are in the Beijing Tianjin Hebei region around Beijing. These three regions have a significant leading position in the degree of digitalisation. Second, most of the interviewed enterprises are medium-sized enterprises with 300-1000 employees, accounting for 61.7% of the survey sample, followed by small enterprises, accounting for 22.9%, and large enterprises, accounting for only 15.4%. Finally, among the interviewed enterprises, private enterprises account for the most, accounting for 46.3% of the survey sample, followed by state-owned and state-owned holding enterprises, accounting for 44.3%, and foreign-funded enterprises, accounting for 9.0%.

4 Results and Discussion

4.1 Results

4.1.1 Analysis of Digital Application in Different Fields of the Surveyed Enterprises

Digital applications in different fields are shown in Table 2 below:

Table 2: Basic information on different fields of digital application

Areas of digital applications	Frequency	Percentage of cases
Purchasing Digitization	137	68.2%
Financial Digitization	136	67.7%
Digitising R&D	132	65.7%
Digitising the Supply Chain	129	64.2%
Manufacturing Digitization	123	61.2%
Digitizing Marketing	118	58.7%
Other Digitization	11	5.5%

The data in Table 2 shows that the surveyed textile and garment enterprises have digital applications in finance, R&D, procurement, manufacturing, and supply chain and marketing. Also, the number of enterprises that practice these areas of digital applications exceeds 50% of the survey sample. First, the frequency of digitisation in procurement is the largest, followed by financial digitalisation, accounting for almost 70% of the survey sample. Second, the proportion of enterprises applying digital technology in R & D, supply chain and manufacturing also exceeds 60%, indicating that the surveyed enterprises have a wide range of digital application fields. The data also reflects the representativeness of sample selection in this paper.

4.1.2 Dimension Classification Verification of TOE Framework Exploratory Factor Analysis

KMO and Bartlett's tests are first conducted on the sample before exploratory factor analysis is performed on the success factor scale of digital transformation. When the KMO value is greater than 0.6 and the sig value in the Bartlett test is close to 0, the data is considered suitable for factor analysis [15]. As shown in Table 3 below, the success factor scale is 0.816, which is greater than 0.6, and SIG is 0.000, which is smaller than 0.05, indicating that the scale is suitable for factor analysis.

Table 3: KMO and Bartlett's test of digital transformation success factor scale

The scale of success factors	Kaiser-Meyer-Olkin		0.816
	Bartlett's sphericity test	Approximate chi-square	716.114
		df	78
		Sig.	0.000

Next, the principal component method is used for factor analysis. To ensure a stronger explanation of factors, the maximum variance method is used to rotate the data, and the rotation component matrix is shown in Table 4 (for clear and intuitive distinction, only a factor load value greater than 0.4 is displayed in the table). According to the standard, three factors with an eigenvalue greater than one are extracted from the success factor scale. The cumulative variance contribution rate reaches 55.907%, more than the minimum standard of 50% in academic research. The common factor variances of all factors are over 0.4, and no items are to be eliminated [16]. Moreover, the factor load of each factor in its dimension is greater than 0.5, indicating that the three extracted factors can explain most of the information of the original data.

Table 4: Rotation component matrix of success factor scale

Success Factors	Component			Common factor variance
	F1	F2	F3	
Active Employee Participation (O4)	0.704			0.535
Digital Transition Project Team (O5)	0.699			0.503
Digitised Responsibility Assignment and Assessment (O3)	0.691			0.503
Digital Strategic Thinking for Top Managers (O2)	0.654			0.472
Specialised Resources (O6)	0.651			0.508
Flattened Organization Structure (O1)	0.583			0.455
Government Policy Guidance (E1)		0.763		0.608
Demonstration Lead of Industry Benchmarking Enterprises (E4)		0.753		0.606
Government Financial Support (E2)		0.690		0.531
The Traction of Upstream and Downstream Enterprises in the Industrial Chain (E3)		0.633		0.458
Technology Innovation (T2)			0.834	0.714
Digital Skills Training (T3)			0.788	0.694
IT Digital Infrastructure (T1)			0.768	0.681
Interpretation of each factor (%)	21.739	18.014	16.155	
Cumulative explanations (%)	21.739	39.752	55.907	

The table above shows that O4, O5, O3, O2, O6 and O1 fall on factor F1 and are named as organisational factors; E1, E4, E2 and E3 fall on factor F2 and are named as environmental factors; T2, T3 and T1 fall on factor F3 and are named as technical factors. This is consistent with the expected dimension division of the success factor scale in this paper, indicating that the scale has good structural validity. Also, it reflects the applicability of the TOE framework in the study of success factors of digital transformation of textile and garment enterprises.

4.1.3 Realistic Performance Score of Success Factors in the Perspective of TOE Framework Classification

Firstly, we calculated the mean and standard deviation of 13 success factors based on 201 valid samples. As previously demonstrated, the TOE framework can serve as a classification basis for the success factors of digital transformation in textile and clothing enterprises. Next, we used

the TOE framework as the classification basis for success factors, calculated the mean scores of technical factors, organisational factors, and environmental factors for each sample, and finally calculated the mean and standard deviation of each of the three categories based on 201 samples. The actual performance scores of success factors of digital transformation of textile and garment enterprises in the perspective of TOE framework classification are shown in Table 5 below:

Table 5: Success factors reality performance score (value range 1-5) from TOE framework classification perspective (Textile and garment enterprises)

TOE Classification Perspective	Success Factors	Mean of Success Factors	Standard deviation	Rank of Success Factors	Mean of TOE	Standard deviation	Rank of TOE
Technical factors	IT Infrastructure (T1)	4.24	0.860	①	4.20	0.692	②
	Technology Innovation (T2)	4.15	0.823	③			
	Digital Skills Training (T3)	4.21	0.828	②			
Organisational factors	Flattened Organization Structure (O1)	4.03	0.969	⑥	4.24	0.537	①
	Digital Strategic Thinking for Top Managers (O2)	4.45	0.676	①			
	Responsibility Assignment and Assessment for Digitized Transition (O3)	4.26	0.723	③			
	Active Employee Participation (O4)	4.10	0.841	⑤			
	Digital Transition Project Team (O5)	4.33	0.754	②			
	Specialised Resources (O6)	4.24	0.709	④			
Environmental factors	Government Policy Guidance (E1)	4.24	0.728	①	4.17	0.572	③
	Government Financial Support (E2)	4.03	0.800	④			
	The Traction of Upstream and Downstream Enterprises in the Industrial Chain (E3)	4.21	0.764	②			
	Demonstration Lead of Industry Benchmarking Enterprises (E4)	4.19	0.802	③			

Based on the perspectives of TOE classification and actual performance scores of the three factors, the table above shows that the organisational factors have the highest scores, followed by technical and environmental factors. This ranking result could be explained by the current stage of digital transformation these enterprises are in. Specifically, enterprises are the main body of digital transformation, and organisational factors play a more important role in the performance of digital transformation. However, technological factors can enhance effectiveness, while environmental factors are often driving factors for transformation. From the observation indicators of 13 specific success factors, the average score is greater than 4, which indicates that the actual performance and role of these success factors in textile and garment enterprises are

generally recognised. Among all the success factors, the "digital strategic thinking" of senior managers has the highest score, followed by the "digital transformation project team". The other 11 success factors scored between 4.03 and 4.27.

4.1.4 Analysis of Significant Differences in Realistic Scores of Success Factors in the Perspective of TOE Framework Classification after Grouping Samples

To study the differences in success factor scores among different types of enterprises under the TOE framework perspective, we considered this when designing the questionnaire. We classified them based on their location, size, and nature. The sample proportions based on the three classification criteria have been described in the previous sample features. We analysed variance in the success factors of the sample textile and garment enterprises grouped according to different classification standards, with a significance level of 0.05. The results showed a significant difference (significance level of 0.018) in the Environmental factors' score under the TOE framework perspective after grouping by sample location, as shown in Table 6.

Table 6: Variance analysis results for realistic scores of success factors from TOE framework classification perspective grouped by location

Variable name	Variable value	N	mean value	standard deviation	F	P
Environmental factors (E)	Yangtze River Delta	64	4.203	0.607	3.43	0.018**
	Pearl River Delta	55	4.15	0.504		
	Beijing Tianjin Hebei Region	45	4.333	0.361		
	Other regions	37	3.939	0.742		
	Total	201	4.169	0.573		

The results also showed a significant difference (significance level of 0.002) in the Technical factors' score under the TOE framework perspective after grouping by sample size. There was a significant difference (significance level of 0.005) in the Organizational factors' score under the TOE framework perspective after grouping by sample size, as shown in Table 7.

From the results of Tables 6 and 7, it can be seen that the environmental factor scores of enterprises in the Beijing Tianjin Hebei region are the highest, followed by enterprises in the Yangtze River Delta and Pearl River Delta regions. Enterprises in other regions have relatively low environmental factor scores. Medium and large enterprises have higher scores for technical factors, while small enterprises have lower scores for technical factors. Medium and large enterprises have higher scores for organisational factors, while small enterprises also have good scores for technical factors, albeit relatively low.

To further identify which detailed environmental success factors led to significant differences in the actual scores of environmental factors in different location groups, we continued to conduct variance analysis on the four detailed environmental success factors grouped by the location of the enterprise, taking a significance level of 0.05. The results are shown in Table 8.

It can be seen that in the detailed environmental success factors, there is a significant difference in the actual score of E1(government policy guidance) grouped by location. Enterprises in the

Table 7: Variance analysis results for realistic scores of success factors from the TOE framework classification perspective grouped by size

Variable name	Variable value	N	mean value	standard deviation	F	P
Technical factors(T)	Small	46	3.896	0.76	6.597	0.002***
	Medium	124	4.31	0.69		
	Large	31	4.247	0.365		
	Total	201	4.202	0.694		
Organizational factors(O)	Small	46	4.017	0.643	5.521	0.005***
	Medium	124	4.311	0.473		
	Large	31	4.284	0.539		
	Total	201	4.237	0.538		

Table 8: Variance analysis results for realistic scores of detailed environmental success factors grouped by location

Variable name	Variable value	N	mean value	standard deviation	F	P
Government policy guidance (E1)	Yangtze River Delta	64	4.281	0.745	2.766	0.043**
	Pearl River Delta	55	4.182	0.669		
	Beijing Tianjin Hebei Region	45	4.444	0.546		
	Other regions	37	4	0.913		
	Total	201	4.239	0.73		

Beijing Tianjin Hebei region received the highest score in government policy guidance support for digital transformation, followed by the Yangtze River Delta region and the Pearl River Delta region. Other regions also received good scores in government policy guidance support but were relatively ranked lower.

To further identify which detailed technical success factors contribute to significant differences in the actual scores of technical factors across different scale groups and which detailed organisational success factors contribute to significant differences in the actual scores of organisational factors across different scale groups. We continued to perform variance analysis on three detailed technical success factors and six detailed organisational success factors grouped by enterprise size, taking a significance level of 0.05. The results are shown in Table 9.

It can be seen that among the detailed technical success factors, there is a significant difference in the actual score of T1(IT infrastructure) grouped by scale. Large and medium-sized enterprises have high scores for IT infrastructure, while small enterprises have low scores (less than 4 points). In the detailed organisational success factors, there is a significant difference in the actual scores of O1(digital strategic thinking of senior managers) and O6(specialised resources) grouped by size. Large and medium-sized enterprises score high in the digital strategic thinking of senior managers, while small enterprises also score relatively low in the digital strategic thinking of senior managers. Large and medium-sized enterprises score high in specialised resources, but small enterprises score low in specialized resources (less than 4 points).

Table 9: Variance analysis results for realistic scores of detailed technical success factors and detailed organisational success factors grouped by size

Variable name	Variable value	N	mean value	standard deviation	F	P
IT infrastructure (T1)	Small	46	3.854	0.989	6.652	0.002***
	Medium	124	4.365	0.806		
	Large	31	4.333	0.679		
	Total	201	4.239	0.862		
The digital strategic thinking of senior managers (O2)	Small	46	4.188	0.891	5.371	0.005***
	Medium	124	4.516	0.59		
	Large	31	4.63	0.492		
	Total	201	4.453	0.677		
Specialized resources (O6)	Small	46	3.979	0.911	4.909	0.008***
	Medium	124	4.349	0.57		
	Large	31	4.222	0.801		
	Total	201	4.244	0.711		

4.2 Discussion

4.2.1 Technical Factors

Innovation is the driving force behind enterprise development. Textile and garment enterprises should strengthen technological innovation and application in production management and other aspects to provide an innovative driving force for digital transformation. Specifically, enterprises should first raise and allocate resources related to technological innovation. To guarantee funding for digital innovation and improve the efficient use of funds, they should then reasonably apply the financial platform to save unnecessary costs in production and operation. They can achieve this by having transparent financial management, introducing funds into technological innovation in a guided way, disclosing financial data related to the operation, attracting social capital investment, and expanding financing sources. Second, enterprises should fully use the industry's technical information support platform. They should pay attention to the activities of the textile industry association, actively participate in major technical exchange activities, learn frontier knowledge, network with professional and technical personnel, and provide guidance for the company's technical innovation. In addition, the enterprise should also participate in major exhibitions at home and abroad, dive into the customer group to understand their needs, and ensure that the enterprise always stands at the forefront of the market.

4.2.2 Organizational Factors

4.2.2.1 Encourage Employees to Participate in the Transformation Process Actively

In the digital transformation process, enterprises should encourage employees to participate, align the role orientation of employees with the transformation objectives, and help employees integrate into the transformation environment. Specifically, enterprises should optimise the inter-

nal experience of employees and formulate new work mechanisms through the following means. Enterprises should create a continuous learning and open working environment, simplify the work process of employees, empower employees with digital transformation, allowing the employees to enjoy the benefits of digitalisation, and thus boosting their enthusiasm for work and reducing their resistance to the process.

4.2.2.2 Optimize Organizational Structure

To increase performance in the digital transformation of enterprises, the internal corresponding guarantee is required. The flat organisational structure provides an organisational guarantee for the transformation. Therefore, enterprises should flatten the organisational structure. Specifically, they should streamline the setup of organizational departments and establish miniaturised teams. Facing the rapidly changing market demand, enterprises need to streamline team personnel. Second, enterprises should improve communication channels and mechanisms and strengthen the construction of information transmission networks. Information means power. When the superior transmits information to the subordinate, there could be problems such as information leakage and miscommunication. People at different levels can obtain external information in time and exchange information internally using networks to better promote the implementation of the flat organisational structure.

4.2.3 Environmental Factors

The government should increase their financial support to enterprises. On the one hand, local governments are encouraged to set up special funds by the provisions to provide preferential policies such as tax reduction and exemption, financial subsidies, and financing guarantees for enterprises' digital transformation. On the other hand, the government can arrange funds to strengthen infrastructure construction for the digitalisation process, such as network broadband, data centres and industrial internet platforms, and to introduce service companies in the region, comprehensively promoting diagnostic and consulting activities related to digital transformation.

5 Conclusion

Studying the success factors of digital transformation of textile and garment enterprises has become an important issue with widespread concern in the theoretical and practical circles. This paper extracts 13 success factors in technology, organization and environment (TOE). Descriptive statistics and factor analysis of the effective sample data of 201 textile and garment enterprises verifies the applicability of the TOE framework to the classification of the success factors of the digital transformation of textile and garment enterprises. The sample enterprises surveyed were mostly in the Yangtze River Delta and the Pearl River Delta, accounting for nearly 60%, and most of them were medium-sized enterprises and private enterprises. The results show that:

First, over half of the textile and garment enterprises apply digital technology in finance, R&D, procurement, manufacturing, supply chain and marketing. Among them, most enterprises apply digital technology in procurement, followed by finance, accounting for nearly 70%.

Second, the ranking of the realistic performance scores of the three dimensions of technology, organisation and environment is as follows: organisational factor > technical factor > environmental factor.

Third, the average value of the realistic performance scores of the 13 success factors is greater than 4, which indicates that the interviewees generally recognise these factors. Among them, the average value of "digital strategic thinking of senior managers" is the highest, followed by the average value of "digital transformation project team", indicating that most surveyed enterprises highly recognise the realistic performance of these two success factors. The other 11 success factors scored between 4.03 and 4.27.

Finally, analysis of significant differences shows that environmental factor scores of enterprises in the Beijing Tianjin Hebei region are the highest, followed by enterprises in the Yangtze River Delta and Pearl River Delta regions. Medium and large enterprises have higher scores for technical factors and organisational factors.

This paper also discusses how to apply these success factors in practice to improve the performance of digital transformation. The contribution of this research is to find out what dimensional factors have played a greater role in the current digital transformation of textile and garment enterprises and which success factors need to be focused on in practice.

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