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Research on The Construction of Digital Transformation Evaluation Index System of Small and Medium-sized Enterprises from The Perspective of Digital Economy

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Abstract. With the popularization of digital technology, small and medium-sized enterprises are facing many new development opportunities. To this end, this project plans to sort out the research results related to the digital transformation of small and medium-sized enterprises, and incorporate them into a complex and dynamic environment, and establish its evaluation index system. This research provides an evaluation index system for the digital transformation of small and medium-sized enterprises in the context of digital economy, which is of great help to small and medium-sized enterprises.

Keywords: Small and Medium-sized Enterprises; Digital Transformation; Evaluation Index System.

1. Introduction

In the new era, the environment faced by enterprises is increasingly complex, and the market competition is increasingly intensified. With the development of social economy, the application of information technology in society is more and more extensive, the application of information technology in society is more and more extensive, and the application of information technology in society is more and more extensive [1]. For example, in the beginning of 2020, the COVID-19 outbreak made it difficult for enterprises to produce and operate, especially for small and medium-sized enterprises with weak risk resistance. However, in the process of the epidemic and resumption, digital technology has shown very strong stability. For example, communication products such as telecommuting and online meetings are beneficial to enterprises to resume production and business activities [2]. Technologies such as unmanned distribution and intelligent interaction can help enterprises realize online transformation and develop new business models.

2. Construction of Evaluation Index System for Digital Transformation of Small and Medium-Sized Enterprises

2.1. The Foundation of Index System

First, through the establishment of digital network architecture, small and medium-sized enterprises can operate stable in the complex and changeable market environment. In the face of such emergencies as the epidemic, many small and medium-sized enterprises use online platforms such as Dingding, Tencent Conference and enterprise WeChat to complete their work, to complete their daily operations [3]. Therefore, in the initial stage of digital transformation, the most prominent feature of small and medium-sized enterprises is that they have a certain digital technology foundation.

Secondly, before the application of digital technology, small and medium-sized enterprises to recognize the digital technology is necessary. At the same time, overall, small and medium-sized enterprises will also fully realize the value of digital technology, realize the importance and unstoppable of its development. Therefore, the managers and practitioners of small and medium-sized enterprises should strengthen the cultivation of their digital literacy in this period to create a good development environment for enterprises.

On this basis, the goal of comprehensive informatization is put forward. In this complex and changeable situation, risks and opportunities coexist. For example, under the blow of the epidemic, many service industries have exposed many defects in traditional service modes and business models. At the same time, home entertainment, online platform and other industries have also seen new development trends. It is obvious that the market pattern will be affected by the changing environment [4].

2.2. Construction of Index System

To evaluate them and select the most representative index that can reflect its characteristics, to establish a complete evaluation index system. Based on this index system, the digital transformation of comprehensive score should be able to reflect in the complex, dynamic environment, the real situation of the digital transformation of small and medium-sized enterprises, and be able to comprehensively evaluate the digital transformation of small and medium-sized enterprises have an important role of various factors, and then targeted to put forward the opinions of the corresponding transformation strategy adjustment [5]. The meaning of digital transformation of small and medium-sized enterprises and the related research basis, the design objectives and principles of the above indicators are comprehensively considered. In this case, this paper constructs an evaluation index system for digital transformation of small and medium-sized enterprises in a complex and dynamic environment, see Table 1 below:

Table 1. Evaluation index system for digital transformation of small and medium-sized enterprises.

Numble	Primary indicator	Secondary indicator	Tertiary indicators
1	Digitalize supporting technology	Technical input Technology output Technology application	Number of computers owned by 100 people Network performance level Economic benefits Office automation
2	Digitalize organizational ecology	Organizational culture Organization structure Histomorphology	Leader influence Digital transformation concept Structural toughness
3	Digitalize operation management	Demand forecast Cost control supply Cost control supply Chain management dynamic Optimization pricing	Flattening Precision marketing Disintermediation Omni channel sales Dynamic inventory Cash return mechanism Differentiated pricing

3. Empirical Evaluation and Outcome Analysis

3.1. Sample Descriptive Statistics

As can be seen from the industry distribution, information technology enterprises are as high as 22%, 18% in wholesale and retail, 15% in manufacturing, 14% in catering, 11% in energy and 20% in other industries. See Fig. 1 for details. The variety of sample enterprises is relatively wide, and information technology companies occupy the largest proportion.

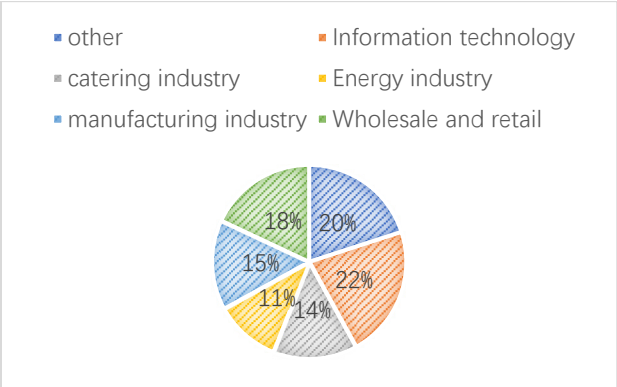

Fig 1. Distribution of industry attributes

By ownership, there are 111 private enterprises, accounting for 83% of the surveyed enterprises; 12 of the state-owned enterprises surveyed, accounting for 9%; 10 foreign companies, accounting for 7% of the surveyed countries; Fig. 2 shows 1 collective business, accounting for 1% of the total number of the samples surveyed. Most of the small and medium-sized enterprises are private ownership, their human and financial resources are relatively weak, so they need more technical support to resist the tide of economic change.

In terms of years of use of digital technology, 13% of companies have less than one year; 43% have 1 to 3 years; 19% have 3 to 5 years; Fig. 3 shows that 25% of business exceeds 5 years. Most enterprises can keep up with the development pace of The Times and have a strong sense of digital transformation. Several companies have been digital applied for less than one year, which shows that the development of digital technology is a strategic behavior, which requires the company to make lasting investment in it.

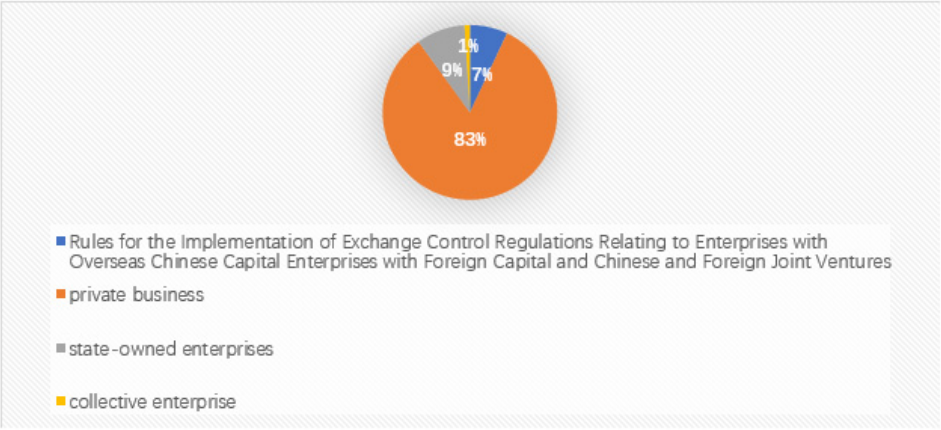

Fig 2. Sample ownership type

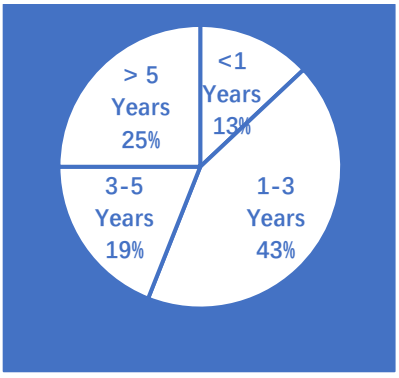

Fig 3. Application time of digital technology in sample enterprises

3.2. Data Processing and Analysis

3.2.1. Exploratory Factor Analysis

Because there are many factors involved in this study, several prominent factors were selected by using the factor analysis method. With the help of principal component analysis, we can adjust all the variables originally proposed and eliminate the repeated and redundant variables, so that we can get as few variables as possible, but compared with the original variables, the new variables can get more information. On this basis, based on this, to build a typical evaluation of the digital transformation of SMEs under complex and dynamic conditions.

3.2.2. Determine the Number of Principal Components

The reliability analysis, KMO and Bartlett initial test for the sample data using SPSS21.0, yielding Cronbach's α value of 0.928, KMO value of 0.885, degrees of freedom of 36, and P=0.000. However, in general, the KMO value for the original variable KMO is greater than 0.6, and therefore, these sample data satisfy both the application conditions of factor analysis and the significant level, indicating that these data are suitable for performing principal component analysis.

When SPSS21.0 was used to obtain the total variance table of influencing factors, Table 2 shows that the first principal component variation was 65.333%, the second principal component 10.446%, and the third principal component 7.015%.

Table 2. Evaluation index system for digital transformation of small and medium-sized enterprises

Ingredient	Initial eigenvalue			Extract the squared sum and load			Rotary square sum loading		
	Total	Variance%	Accumulate%	Total	Variance%	Accumulate%	Total	Variance%	Accumulate%
1	5.880	65.333	65.333	5.880	65.333	65.333	2.804	31.160	31.160
2	0.940	10.446	75.779	0.940	10.446	75.779	2.776	30.840	61.999
3	0.631	7.015	82.794	0.631	7.015	82.794	1.872	20.795	82.794
4	0.422	4.688	87.482						
5	0.351	3.898	91.380						
6	0.257	2.851	94.231						
7	0.239	2.656	96.887						
8	0.159	1.762	98.649						
9	0.122	1.351	100.00						

3.2.3. Name of the Principal Component Factors

Because many PCA loads of non-rotating PCA are small, it is difficult to get a clear importance of PCA. Therefore, in this paper, the Kaiser orthogonal rotation method expands on the initial factor load matrix obtained by exploratory factor analysis, and then obtain the rotation factor load matrix. As shown in Table 3.

Table 3. Rotational component matrix.

Numble	Specific indicators	Ingredient		
		1	2	3
1	Warehouse dynamic management	0.787		
2	Digital technology brings economic benefits	0.767		
3	Use digital technology to accurately locate consumer demand	0.729		
4	Managers have a very strong digital leadership	0.705		
5	Organizational structure toughness		0.867	
6	The organizational structure is simple and clear division of labor		0.791	
7	OA		0.750	
8	Cash return mechanism			0.861
9	Pricing is conducted by channel			0.830

According to the above table, the results of the principal component analysis can be obtained, namely: F=0.31160F1+0.30840F2+0.20795F3.

It can be seen that the load of the first main component, Factor1, is mainly focused on the dynamic management of warehouses, economic benefits brought by digital technology, accurate positioning of consumer demand with digital technology, and strong digital leadership of managers. Therefore, this paper calls the factor affecting the degree of company informatization the principal factor of the degree of informatization. The application of digital technology in small and medium-sized enterprises shows obvious differences in ability, while the economic benefits generated by the dynamic storage management and digital technology have a more positive effect on enterprises.

The second principal component is Factor2, and the load focuses on the toughness of organizational structure, simple organizational structure level, clear division of labor, and high OA work efficiency. Therefore, the research on its organizational ecology is particularly important in improving the internal competitiveness of small and medium-sized enterprises in China. Most of these two elements are reactions to the operation and management of the enterprise, so we call it "organizational ecology".

The third principal component Factor3, the distribution of its load in cash return, channel and price oriented. This paper holds that the factor affecting the product price is the key factor affecting the product price. Pricing management has an obvious positive impact on the level of economic growth. It is obvious that the use of cash return mechanism and pricing through different channels is beneficial to attract consumers.

4. Conclusion and Suggestion

4.1. Conclusion

Through the analysis of relevant literature and considering the current complex and changing environment, this paper establishes an evaluation index system for the digital transformation status of small and medium-sized enterprises, and conducts an empirical analysis, and draws the following three conclusions:

Firstly, whether the core issue of small and medium-sized enterprises can realize digital transformation is the application of digital technology. For example, during the COVID-19 outbreak, digital technology has been widely used in various industries, and many small and medium-sized enterprises have worked remotely or held meetings online through software such as Dinging and WeChat.

Secondly, organizational ecology is an important factor that affects the digital transformation of SMEs. Compared with large enterprises, the organizational structure of small and medium-sized enterprises is relatively loose, and a flexible and flat organizational structure is urgently needed to help them quickly adapt to the changing complex environment.

Thirdly, one of the more obvious changes in the digital transformation process of small and medium-sized SMEs is pricing management. In the past, the prices of small and medium-sized enterprises often followed the previous practice, only when the market fluctuates violently. After completing the digital transformation, because it has its own database, it can use big data to analyze it, and then make appropriate price adjustments.

4.2. Suggestions

Through third-party platforms, small and medium-sized enterprises can better conduct digital transformation. Compared with large enterprises, small and medium-sized enterprises lack the technical level and financial strength for rapid digital transformation, so they need to find third-party platforms to provide them with technical support. Lakala, for example, by paying for small and medium-sized enterprises can assign, help them establish a digital sales and service model, and established a digital management platform, let those for maternal, FMCG, retail, catering and other

different areas of small and medium-sized enterprises, can quickly establish an online mall, and online operation in a short period of time.

Small and medium-sized enterprises should carry out digital transformation according to their own specific conditions. For the retail industry and foreign trade companies, due to the uncertainty of the external environment, it will have a certain impact on their inventory control ability. If the inventory is not controlled well, it will cause a large amount of inventory accumulation. In order to solve the problem of inventory accumulation caused by the external epidemic, small and medium-sized enterprises in Shunde have adopted online sales methods such as "live broadcast" and "short video", thus finding a new road. So, in the process of digital strategic transformation, small and medium-sized enterprises need to its current digital situation on a comprehensive evaluation, and timely make corresponding response, to deal with the complex and dynamic environment to the technology, organization and management, so as to improve its dynamic adaptability, so as to achieve long-term operation purpose.

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