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Research Article

A Fuzzy-Set Qualitative Comparative Analysis of Factors Influencing Servitization Transformation Performance in Chinese Manufacturing Enterprises

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The development of manufacturing industry affects the operation of Chinese economy, and it is necessary to study the possible configuration paths of servitization transformation to support sustainable development. Based on previous studies of manufacturing servitization transformation, it is extended to explore multifactor combinations which affects servitization transformation performance. This paper constructs technology-organization-environment (TOE) framework of servitization transformation performance evaluation and uses fuzzy-set Qualitative Comparative Analysis (fsQCA) method to analyze the key factors and mechanism of servitization transformation with the data of 28 Chinese manufacturing enterprises. The results reveal that the six major factors are not the necessary conditions, and single-factor cannot effectively promote servitization transformation of Chinese manufacturing enterprises. There are four configurations which can be divided into three paths to improve servitization transformation performance. Based on the results of analysis, it proposes strategies to promote the development of Chinese manufacturing enterprises, such as developing targeted servitization strategies, enhancing technology development, and improving technology applications. The findings reveal the mechanism of multiple factors behind the evolution of manufacturing servitization transformation and take useful suggestions for the high-level development of Chinese manufacturing enterprises.

1. Introduction

The concept of "servitization" was first proposed by Vandermerwe and Jada [1]. The main idea is that manufacturing enterprises adopt to create additional value by taking "product-service package" model. Manufacturing enterprises not only provide products to customers but also make service "packages" as the core of products. Manufacturing enterprises was redefined as "service providers" [2]. Manufacturing enterprises are gradually adopting a servitization strategy to incorporate services into their products [3, 4]. Servitization brings new forms of competition, as servitization enterprises offer a combination of products and services to get additional value [5, 6]; influence product sales through servitization strategies [7]; build capabilities and barriers to achieve a competitive advantage [8]; and gain higher profit for firms [9–13]. Neely's research based on a large international database of manufacturing industry showed that the number of manufacturing enterprises implementing service strategy has reached 30% globally [2], and the rate is gradually becoming higher [14]. The servitization transformation of manufacturing has become the key direction of global manufacturing development. Meanwhile, lots of research on the initiatives of manufacturing enterprises to achieve high servitization transformation performance has been conducted. For example, manufacturing enterprises can apply digital technology to promote the servitization transformation process [15–19]; redesign business model [20, 21]; customization strategies [22–25]; innovation [26–28]. These studies show that there are various measures to achieve servitization transformation, but most of them mainly analyze individual factor, which is not consistent with the fact that manufacturing servitization transformation influenced by multiple factors in theory and practice. This point is very important and is reflected in this study. Some factors affecting servitization transformation performance are identified from previous studies, such as the role of digital technology [29]; technology innovation capability [30, 31]; organizational change [32, 33]; market competition [34] and organizational strategy [35, 36]. The factors are important for achieving servitization transformation performance and provide the basis for the analysis in this paper.

According to the abovementioned research, the servitization of manufacturing enterprises is to provide high value-added productive services to customers based on advanced manufacturing, and manufacturing enterprises should change from simply providing "products" to providing "products + services" [1], which is the upgrade of manufacturing industry and one of the main trends of future manufacturing development. The existing studies have mainly been conducted from the perspective of the linear relationship between a single factor and the outcome, exploring the impact of a single factor on servitization transformation, but servitization transformation is influenced by a combination of multiple factors. The studies found that green technology innovation affects the transformation of China's manufacturing industry and puts forward policy guidance and practical guidance to accelerate the development of manufacturing industry [37, 38]. It can be found that the existing studies are mostly conducted with a certain factor affecting the transformation of manufacturing and present their conclusions. But this paper combines the characteristics of the development of servitization transformation in Chinese manufacturing industry and proposes six factors in terms of technology, organization, and environment to analyze the impact on servitization transformation.

The fsQCA method is used to analyze the configuration path of a servitization transformation. As a new sociological research method, fsQCA adopts a holistic perspective and configurational thinking, considers the research object as a configuration of different combinations of condition variables, and discovers the aggregated relationships between configurations of condition variables through ensemble analysis, which helps to solve problems such as causal asymmetry and equivalence of multiple scenarios of causal complexity [39–41]. Therefore, the fsQCA method is applied to explore the joint effects of six influencing factors in three dimensions: technology, organization, and environment, and how their interactions affect servitization transformation performance from a systematic and comprehensive perspective.

This paper makes several principal contributions: (1) this paper finds four possible configurations leading to servitization transformation in Chinese manufacturing enterprises. The fsQCA method is used to analyze servitization transformation of Chinese manufacturing enterprises, single-factor necessity analysis and multifactor adequacy analysis are conducted, and four configurations are obtained. (2) This paper remains other factors when analyzing single factor considering the causal complexity of servitization transformation. The existing quantitative or qualitative analyses mainly reveal the influence of single factor, but this paper is conducted on the comprehensive impact of different combinations of factors on servitization transformation. (3) This paper provides practical guidance for the servitization transformation development of Chinese manufacturing enterprises. Three paths are proposed for the servitization transformation based on the four configurations, which provides practical help for Chinese manufacturing enterprises to achieve servitization transformation.

The paper is organized as follows. Firstly, Section 2 describes the design of this study, including analytical framework, research method, variable design, case selection, and data calibration. Then, Section 3 describes data analysis. The main results are present in Section 4. Finally, Section 5 draws some conclusion of the study and presents some implications and limitations as well.

2. Materials and Methods

2.1. TOE Framework. The TOE framework proposed by Tornatizky and Fleischer is to understand the adoption of emerging technologies [42]. It is subject to a combination of technological, organizational, and environmental factors in the process of application. Firstly, the framework emphasizes technological factors, such as technological availability [43], technological resources, and technological capabilities [44, 45]. Then, organizational factors include organizational profile characteristics and organizational resources [46]. Finally, environmental factors emphasize the influence of the external environment, such as policy environment [43], competitive intensity, and demand pressures [45].

The existing studies of TOE framework are distributed not only by firms but also by governments, such as sustainable smart cities governance [47]; customer relationship management (CRM) [48]; enterprise resource planning (ERP) [49, 50]; driving paths of Chinese digital economy [51]. There are also some studies applied the TOE framework to analyze the servitization transformation of Chinese industry [52–55]. Previous research has been conducted from several fields, which has contributed to the development of TOE framework and made it an important research framework [56, 57]. However, there is little research on TOE combined with servitization transformation performance in manufacturing, so in-depth research is needed in this area. As discussed above, the TOE framework can be used to study the behavior of servitization transformation.

2.2. FSQCA Method. The fsQCA method proposed by Ragin and Rihoux can be used to identify sufficient or necessary subset relationship [42]. This paper uses fsQCA method to explore the factors affecting the servitization performance of Chinese manufacturing enterprises. This paper uses the fsQCA 3.0 software to analyze the data.

The fsQCA is based on Boolean algebra and set theory and focuses on the analytical method to solve the configuration perspective problems, and the core idea is to analyze the causal relationships between results and variables to explore the typical paths affecting the results. Compared with PLS structural equation method, the PLS structural equation is a quantitative method which studies the effect of single factor on the outcomes, so it cannot propose a configuration path with the combination of multiple factors. The fsQCA has both qualitative and quantitative advantages, which facilitates the analysis of special problems such as complex antecedent conditions, asymmetric causality, and cross-level variables, and can reduce the complexity of the sample objects, thus providing a deeper interpretation of the sample cases.

The previous studies on manufacturing servitization transformation are conducted from variables methods, the main reasons using fsQCA method are as follows: (1) the traditional linear relationship is mainly used to explain the problems with symmetry, but there are so many nonlinear relationships in life, the traditional linear relationship is difficult to analyze this complex situation. The fsQCA method considers that it is the set of conditional factors rather than individual factors that play a key role in the results, which is more theoretically logical and realistic. (2) The fsQCA method mainly considers different influencing factors as "concurrent causality," and different influencing factors may produce the same result through reasonable combination, i.e., $XY \longrightarrow A$ and $XZ \longrightarrow A$. It is the same result in two different paths, which is different from the traditional statistical methods that analyze the influence of individual factors on the results.

It is the calculation formulas of consistency and coverage:

$$\begin{aligned} \text{Consistency } (X_i \leq Y_i) &= \frac{\sum \min(X_i, Y_i)}{\sum \min X_i}, \\ \text{Coverage } (X_i \leq Y_i) &= \frac{\sum \min(X_i, Y_i)}{\sum \min Y_i}. \end{aligned} \quad (1)$$

In the formula, X_i is the membership of case i in configuration set X and Y_i is the membership of case in outcome Y. The value range of Consistency ($X_i \leq Y_i$) is 0-1, and consistency is an indicator of whether the conditional configuration constitutes a subject of the outcome, which is generally not less than 0.8. The value range of Coverage ($X_i \leq Y_i$) is also 0-1. Coverage represents the interpretation degree of outcome Y caused by the combination of X [58].

The process of fsQCA method can be demonstrated briefly in Figure 1.

2.3. Variable Design. Based on the TOE framework and existing research results, the technology conditions emphasize attention on how the attributes of the technology can influence its adoption decision. The organization conditions are related to the company's resources and the environment conditions consist of "the stage" in which an organization conducts its activity. These conditions constitute the internal and external factors that influence the servitization transformation of manufacturing enterprises.

Technology updating is mainly manifested in two aspects: product technology updating [31] and digital platform building [29]. Product technology updating refers to the comprehensive use of digital technology, big data, artificial intelligence, and other technologies. Digital platform building refers to the digital infrastructure construction and industrial Internet supporting facilities construction to enhance the level of digital hardware.

Organization management is mainly manifested in two aspects of enterprise strategic transformation [35] and talent system building [59]. Enterprises should actively make strategic adjustments, and need to guarantee the effective implementation of the strategy. Talent system building refers to efficient personnel management and scientific construction, and workers management is the basic guarantee for servitization strategy to be effective.

Environment changes are mainly in two aspects: the pressure of enterprise competition [34] and changes in customer demand [60]. The pressure of enterprise competition refers to the pressure of survival brought by the lowering of industry profitability and market scrambling among enterprises. Changes in customer demand refer to changes in the functional attributes and new design of the product, so that the product can meet customer needs.

2.4. Research Model. Previous studies have showed that various factors can affecting servitization transformation, but almost all factors can be categorized as technology, organization, or environment conditions. The influencing factors can be integrated with TOE framework to form a research model. The similar model has been used in a lot of studies, such as the factors driving digital economy [57], complex adoption behavior of cloud services [61], and the configuration of firm innovation ability [62]. Thereby, based on the compilation and analysis of existing servitization research results, this study integrates the main influencing factors in the dimensions of technology, organization, and environment as a set of variables to construct a grouping model of the advantages of servitization transformation of manufacturing enterprises, as shown in Figure 2.

2.5. Case Selection and Data Collection. The process of case selection is as follows. Firstly, the basic principles of sample selection are determined. Under the premise of considering the adequacy and accessibility of the sample quantity, we ensure that the sample enterprises meet the requirements of implementing service transformation. Secondly, it investigated the basic situation of 187 large, medium, and small manufacturing enterprises, and established a database of basic enterprise information. At the same time, manufacturing enterprises that implement servitization transformation strategies are marked out. Finally, it is ensured that the cases come from different technology levels and different concentrations. The cases not only meet the principles of representativeness, richness, and accessibility but also conform to the relevant studies of the fsQCA standard. In this paper, 28 cases were finally selected for analysis in the context of actual situation of the study. The basic information of the main technical fields of the case is shown in Table 1.

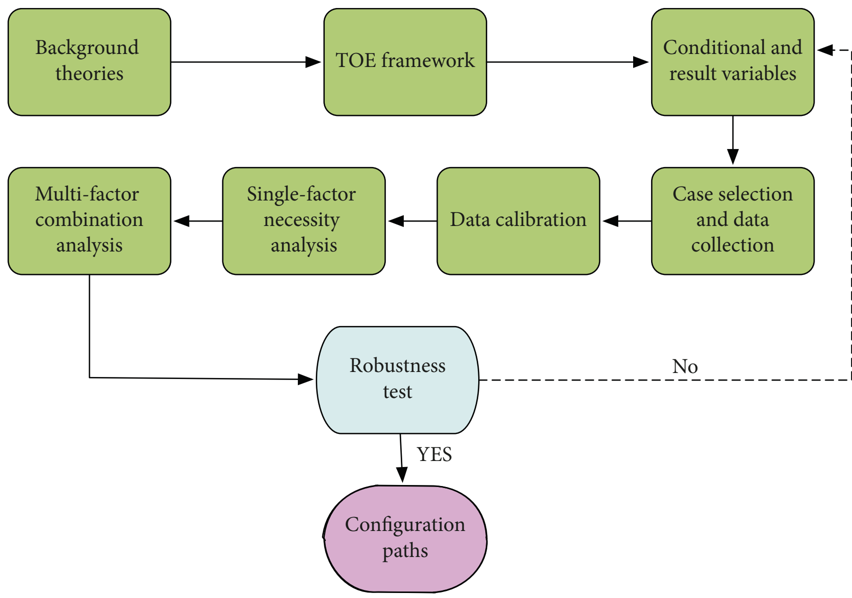

Figure 1: Process of fsQCA method.

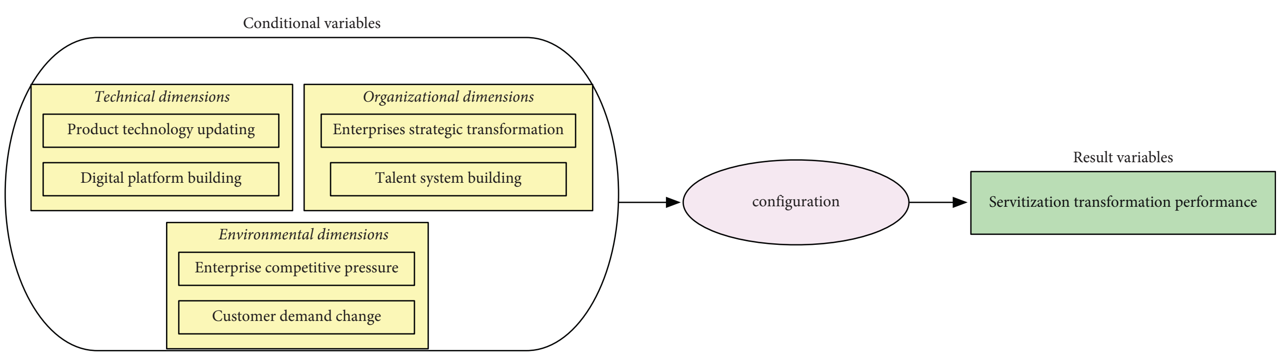

Figure 2: Research model of manufacturing servitization transformation configuration.

The data were collected using the PAPI method from November 2019 through December 2020. A total of 28 questionnaires were returned, and 28 were properly completed and then analyzed.

2.6. Reliability and Validity Measures. The data were analyzed with a partial least square by using Smart PLS 3.0 software. Reliability shows the internal consistency by Cronbach's α (CA) and composite reliability (CR). The CA and CR values of each variable are greater than 0.7 and 0.8, indicating that the internal consistency of each variable and the reliability of measurement model are good. Validity can be reflected using construct validity, which is measured by convergent validity and discriminant validity. The average variance extracted (AVE) of the latent variable and the factor loading of the construct are greater than 0.5 and 0.7 through the calculation, indicating that the convergent validity is good. Discriminant validity was used to check whether there were significant differences between the latent variables. The calculated results indicate that the measurement model has high discriminant validity.

2.7. Data Calibration. The results and discussion may be presented separately, or in one combined section, and may optionally be divided into headed subsections. Referring to CODURAS [63] and DU [39], the three anchor points of the 6 conditions and 1 outcome were set as 3 limit values for calibration: 0.05 as a nonbelonging threshold, 0.50 as a turning point of maximum ambiguity, and 0.95 as the threshold of fully belonging to the set [64]. This selection of anchor points is not only in compliance with the characteristics of manufacturing service transformation factors, but also with the criteria for the operation of the fsQCA method [65, 66]. Many previous studies have taken this approach to data calibration, making the data consistent with fsQCA analysis [62, 67]. After determining the completely unaffiliated anchor points, the intersection anchor points and the completely affiliated anchor points, the fsQCA software was used to calibrate them, so that the

Table 1: The codes and fields of sample enterprises.

Company code	Technical areas
TTC	Electronics, communication equipment, network technology
DJKJ	Drone, aerial camera
SHWL	Smart car
MDC	Consumer appliances, HVAC
JLZG	CNC lathe, steel smelting
HXJT	Intelligent home devices, security cameras and surveillance
HLJT	Smart meters, chemical fiber materials
ZJJL	Automotive manufacturing, smart mobility
LXJT	Electronic computers, computer systems services
MJC	Smart home products
STKJ	Robot vacuum
MZGS	Acoustic equipment
SHSL	Elevators, escalators
WTKJ	IoT devices, electronic special materials
SZJY	Face recognition equipment, computer software
PNDC	Intelligent security, IoT technology
HCKG	Construction machinery, high-power engines
SGGS	Intelligent translation devices
ZGGT	Steel smelting, logistics-supply chain integration
LNGS	Sports product R&D, production and logistics-supply chain integration
ZGDZ	Electronic devices, semiconductor lighting, photovoltaic cells
XMGS	Communications equipment manufacturing, software services
HRG	Robotics and automation equipment
GLDQ	Medical devices, laboratory equipment
MDJT	Electrical manufacturing, intelligent supply chain, automated systems
TLKG	New energy vehicle batteries, urban smart microgrid construction
JSYD	New energy vehicle manufacturing, Internet information services
SHDZ	Electronic devices, integrated circuits, intelligent imaging

Table 2: Calibration anchor points of the variables.

Variable	Full affiliation point	Intersection point	Completely unaffiliated points
MEST	34.55	25.50	7.25
PTU	42.55	30.00	10.95
DPB	37.20	26.00	9.50
EST	38.55	27.50	13.80
TSB	29.10	22.50	6.35
ECP	57.55	37.50	7.45
CDC	42.55	32.50	7.80

converted set affiliation was between 0 and 1. If the intersection data is 0.5 after calibration, it cannot be directly put into the truth table for analysis. The anchor data needs to be adjusted to 0.499 or 0.501 and calibrated again before it can be included in the truth table for analysis. The calibration anchor points of the variables are shown in Table 2.

3. Data Analysis

3.1. Single-Factor Necessity Analysis. The necessity of individual factors must be analyzed before using the fuzzy-set truth table procedure. This is necessary to test whether a conditional variable is an outcome variable. The criterion for the necessity test is usually measured using consistency and coverage. Consistency is usually used to determine the extent to which the antecedent condition is necessary for the outcome. It is the extent to which the outcome is covered by the range of antecedent conditions. Coverage reflects the number of cases that can explain the existence of the necessity of the antecedent condition. The baseline is generally set to 0.9, and when the consistency of the condition variable necessity is greater than 0.9, the condition variable can be identified as necessary for the outcome and satisfies the testing criteria related to the necessity condition.

The results of the single-factor necessity analysis of the data using the Necessary Conditions module in the fsQCA 3.0 software are shown in Table 3. The results show that the consistency index of each condition variable is below the baseline of 0.9 and the condition variable is not a necessary condition.

3.2. Multi-factor Combination Analysis. The outcome of manufacturing service transformation is multiple and complex concurrent causation, so it is necessary to further carry out the sufficiency analysis of the grouping under different conditions based on the single-factor necessity

Table 3: Results of single-factor necessity analysis.

Variable name	Consistency	Coverage
PTU	0.8757	0.8265
~PTU	0.4326	0.4658
DPB	0.7381	0.6869
~DPB	0.5869	0.6232
EST	0.7794	0.6111
~EST	0.4821	0.6828
TSC	0.6707	0.6937
~TSC	0.5184	0.6101
ECP	0.8341	0.8030
~ECP	0.4837	0.5012
CDC	0.8770	0.8568
~CDC	0.5203	0.5173

Table 4: Servitization transformation configuration paths.

Condition variables	Configuration			
	1	2a	2b	3
PTU	●	●	●	•
DPB	•	●	●	
EST	•	•	•	●
TSB	●		•	●
ECP	●	•		●
CDC		●	●	•
Consistency	0.9734	0.9746	0.9730	0.9281
Raw coverage	0.4887	0.4721	0.4624	0.6225
Unique coverage	0.0554	0.0389	0.0291	0.1892
Overall solution consistency	0.9375			
Overall solution coverage	0.7459			

analysis. The sufficiency test is to assess whether the set of a certain conditional configuration is a subset of the set of outcomes, which is usually measured using the consistency indicator. The consistency is set to 0.8 and the PRI (proportional reduction in inconsistency) consistency threshold is set to 0.75. The number of cases is 28, which is a medium sample size, so the frequency threshold is set to 1.

Based on the output of the fsQCA 3.0, four configurations affecting servitization transformation performance in Chinese manufacturing enterprises are listed in Table 4.

A longitudinal comparison of the four configurations reveals that the unique coverage of configuration 3 (PTU ∗ EST ∗ TSB ∗ ECP ∗ CDC) is the highest (0.1892). Enterprise strategy transformation, talent system building, and enterprise competitive pressure play a core role, while product technology updating and customer demand change play a secondary role. Configuration 1 (PTU ∗ DPB ∗ EST ∗ TSB ∗ ECP) has the second highest unique coverage index (0.0554). Product technology updating, talent system building, and enterprise competitive pressure are the core driving condition. Digital platform building and enterprise strategy transformation are auxiliary conditions. The unique coverage index of configuration 2a (PTU ∗ DPB ∗ EST ∗ ECP ∗ CDC) ranks third (0.0389), the core conditions of this configuration are product technology updating, digital platform building, and customer demand change, and enterprise strategy transformation and enterprise competitive pressure are the auxiliary conditions. Configuration 2b (PTU ∗ DPB ∗ EST ∗ TSB ∗ CDC) has the lowest unique coverage (0.0291), which takes product technology updating, digital platform building, and customer demand changes as the core driving conditions, and enterprise strategy transformation and talent system building are auxiliary conditions.

3.3. Robustness Tests. Two methods are adopted to ensure the credibility of the above results.

Firstly, the consistency level index is adjusted, and the consistency index is adjusted from 0.8 to 0.81, and the other treatments are unchanged. It is found that the configuration results of servitization transformation do not change significantly; then according to the principle of asymmetric causality it can be known that the hypothesis $X1 + X2 + \cdots + Xn \longrightarrow Y$ does not necessarily lead to $\sim X1 + \sim X2 + \cdots + \sim Xn \longrightarrow \sim Y$. Comparing the results of the group path of nonservitization transformation and the configuration path of servitization transformation, we find that they are not the same. It can validate the robustness of servitization transformation.

The robustness of manufacturing servitization transformation is verified by the above two methods, and both methods pass the test, indicating that the research results have good robustness.

4. Results

The traditional research on manufacturing servitization transformation holds that servitization transformation is influenced by multiple factors but mostly considers the linear influence of single-factor on the results, and does not integrate multifactor analysis on the impact of servitization transformation, such as employees' attitude [68] and supply chain integration technology [69] on the impact of realizing servitization transformation. Therefore, this paper combines the fsQCA method and TOE framework to analyze the impact of six factors on the servitization transformation, in order to provide some help for the development of manufacturing servitization.

Firstly, this paper summarizes the main factors influencing servitization transformation based on TOE framework, which include product technology updating, digital platform building, enterprise strategy transformation, talent system building, enterprise competitive pressure, and customer demand change. Analyzing the servitization transformation from several aspects will help to solve the singleness of the analysis results in the existing research.

Secondly, the results generated by fsQCA demonstrate that different combinations of factors can lead to servitization transformation. According to the core conditions contained in the four configurations, Figure 3 summarizes them into three paths to achieve servitization transformation performance, namely, the collaboration-oriented path under TOE dominant logic (configuration 1), the organization collaboration path under technology-environment dominant logic (configuration 2a and 2b), and the technology collaboration path under organization-environment dominant logic (configuration 3).

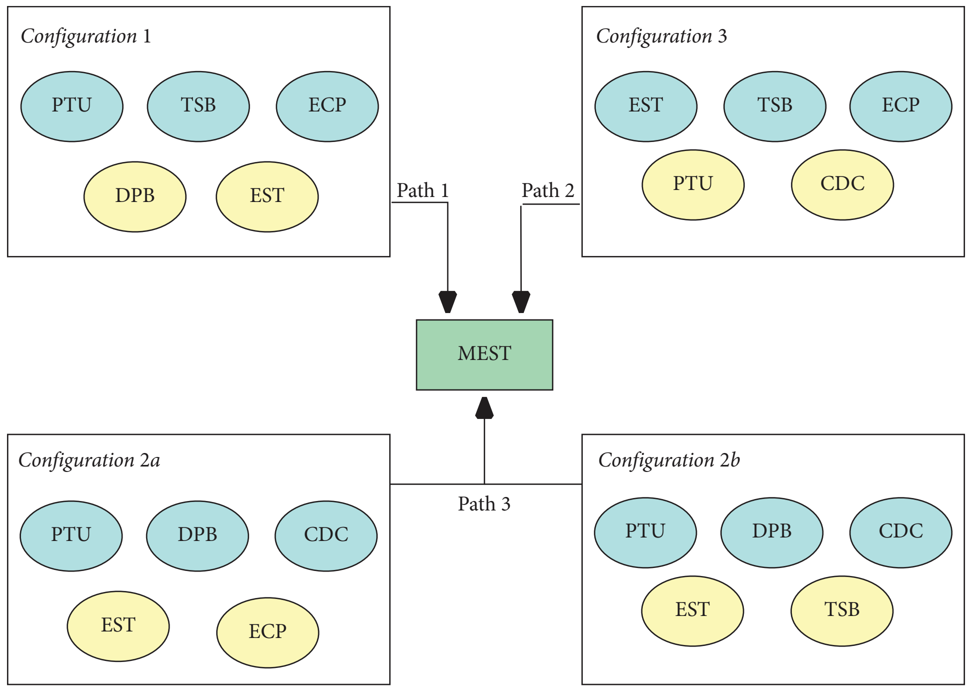

Figure 3: Paths for manufacturing enterprises to achieve servitization transformation performance. The blue box represents the core elements, and the yellow box represents the peripheral elements to achieve MEST.

Finally, the conditions in the four configurations show that product technology updating and enterprise strategy transformation appear in all configurations as core or auxiliary conditions, which are the main driving force of manufacturing servitization transformation; digital platform building, talent system building, enterprise competitive pressure, and customer demand change appear in three configuration, which are important factors of manufacturing servitization transformation. In addition, multiple variables in technology, organization, and environment in all configurations are synergistically matched and jointly function to promote the process of manufacturing servitization transformation.

5. Conclusion

The servitization transformation of manufacturing enterprises is affected by the factors of technology, organization, and environment. These influencing factors are diverse, and the influence effect and mechanism are various. Therefore, this paper studies the key factors affecting the servitization transformation of manufacturing enterprises and the possible configuration paths. Based on the data of 28 Chinese manufacturing enterprises, this paper obtains the following main conclusions.

Firstly, product technology updating, digital platform building, enterprise strategy transformation, talent system building, enterprise competitive pressure, and customer demand change cannot individually constitute the necessary conditions for manufacturing servitization transformation, indicating that individual factor cannot strongly enhance manufacturing servitization transformation performance and effectively promote the process of manufacturing servitization transformation.

Secondly, product technology updating and enterprise strategy transformation show up in all paths, indicating that these two conditions are indispensable in the process of servitization transformation, and manufacturing enterprises should pay attention to strengthen product technology updating and enterprise strategy transformation [29, 35]. Digital platform building, talent system building, enterprise competitive pressure, and customer demand change appear in three configuration and are important driving force of manufacturing servitization transformation. Manufacturing enterprises should place these factors in the main strategic position [62].

The theoretical implication of this study is the innovative application of new research method. The fsQCA is used to analyze the factors affecting the servitization transformation performance of manufacturing enterprises. PLS and SEM are used to explore the factors influencing servitization transformation of manufacturing enterprises in the existing studies. These methods suppose the relationship between variables is symmetric, but the relationship can also be asymmetric in the practice [70]. These methods also dedicated to the study of the influence of independent variables dependent variables, but ignore that the results are probably produced by the joint action of different variables. This situation happens when enterprises work to improve servitization transformation performance. Multiple factors should be considered when making decisions. Based on TOE framework, the fsQCA method is used to analyze the joint effects of product technology updating, digital platform building, enterprise strategy transformation, talent system building, enterprise competitive pressure, and customer demand change on the servitization transformation of manufacturing enterprises, and identifies three paths leading to servitization transformation performance. It improves the understanding of this method for scholars and enrich the application field of fsQCA methods.

The practical implication is that the results of this study have important guidance and inspiration for manufacturing enterprise practitioners. With the development of China's manufacturing industry, servitization transformation has become a major development direction for manufacturing enterprises. In 2020, the Ministry of Industry and Information Technology of China proposed to promote the development of service-oriented manufacturing and accelerate the transformation of manufacturing. The study identifies three paths to guide the servitization transformation performance of manufacturing enterprises. The results will provide relevant practical guidance for the government and manufacturing enterprises to improve the servitization transformation performance, and enhancing the competitiveness of China's manufacturing enterprises.

The endeavor of this paper was to study the factors and paths that affecting the servitization transformation of Chinese manufacturing enterprises. We found that four possible configurations which can be divided into three paths to promote servitization transformation. It might be of significance in the research of servitization transformation of Chinese manufacturing enterprises. However, it also should be noted that this research has limitations. Firstly, for the influencing factors of servitization transformation, this paper only selects six variables. Due to the complexity of servitization transformation, there may be other influencing factors. Secondly, since QCA is limited by cross section data, this paper investigated the servitization transformation performance from a static perspective. In future research, time effects can be taken into consideration.

Data Availability

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy of study participants.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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