



## Customer Orientation, Services Innovation and Servitization of Manufacturing

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**Abstract:** The paper is based on prior literature, the influence of customer orientation on the service level of enterprises, as well as the intermediary effect of service innovation, in order to clarify the mechanism of customer orientation impact on the degree of service. Based on the survey data of 258 manufacturing enterprises in China, this paper uses the structural equation model and the test method of the medium effect to test the hypotheses. Empirical analysis results show that customer orientation degree of enterprise service has significant positive effect; service innovation degree of enterprise services have significantly improved function; relationship between the customer orientation, service level of service innovation has partial mediating effect.

**Keywords:** Customer orientation, Mediating effect, Service innovation, Servitization of manufacturing

### 1 Introduction

Manufacturing is still an important force in China's economic development. The national bureau of statistics data show that China secondary industry increased value of 27.4278 trillion yuan in 2015, 6.1% increase over last year, as a share of GDP is 40.5%. The added value of GDP has fallen significantly compared with 2014. At present manufacturing industry in China is still at the bottom of the value chain and industrial chain, mainly labor-intensive industries, the degree of specialization and research technology is relatively backward, the profit is low. A research firm AndyNeely studied global 13 thousands manufacturing listed companies to provide services, found that Servitization of manufacturing levels in the developed countries are significantly higher than the country in process of industrialization. Manufacturing and services integrated companies in U.S. account for 58% of the total number of manufacturing companies,

51% of Finland, 45% of Malaysia, 40% of Netherlands, 37% of Belgium. In contrast, In contrast, servitization of manufacturing in China is relatively backward, only 2.2% companies have a service-oriented manufacturing capabilities<sup>[1]</sup>. At the same time, with the shorter product life cycle and increasingly personalized needs of customers, the traditional competitive advantage is gradually weakened with the core of quality and cost, more and more companies will continue to improve the corresponding services to obtain a new source of profit<sup>[2,3]</sup>. In the new business environment, enterprises need to change the traditional mode of production of a single product, strengthen cooperation with customers, targeted to provide services. Therefore, customer orientation as a new product innovation model, is being widely used in enterprises to improve the degree of service<sup>[4]</sup>. The implementation of service oriented strategy to adapt to the trend of service has become an inevitable choice.

The academic circles about the transformation and research of manufacturing enterprise service, began in the 1960s American economist Greenfield<sup>[5]</sup> in the study and classification of services, first proposed the concept of producer services. Pappas and Sheehan<sup>[6]</sup> continue the concept of producer services of Green-field, that the producer services can promote the development of manufacturing industry, points out that the integration of manufacturing activities and service activities is a new trend of industry development. Vandermerwe et al<sup>[7]</sup> think enterprises to purchase manufacturing products to ensure service provide and create "servitization" used to describe the manufacturing enterprise service transformation, the essence is a new manufacturing system and business model, its core is the height of the center of customer orientation. Lightfoot<sup>[8]</sup> continue to follow the "servitization" consider the manufacturing industry of service innovation and service transformation activities is a series of organizational capabilities and processes of innovation, from simple product sales to product service system, in order to create higher value. Lei Lin and Wu Guisheng<sup>[9]</sup> proposed that service has become the

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manufacturing industry to enhance the competitiveness of the important ways, elements of the service has become an important source of profit and value.

Therefore, it is necessary to conduct in-depth study of customer orientation in the context of China, to explore the path and mechanism of its impact on the degree of service. The paper focuses on the enterprise service innovation, how to affects the relationship between the degree of customer orientation and enterprise service. The paper tries to solve two key problems:

(1) Whether the customer orientation has a significant role in improving the service level of manufacturing enterprises in china;

(2) The relationship between service innovation and customer orientation and the service level of the enterprise has an intermediary role.

The paper from the perspective of customer orientation, study influence factors of manufacturing enterprise service transformation, and verify the influencing factors through specific research, in order for China's manufacturing enterprises of service innovation and service transformation provides some ideas and suggestions.

## 2 Methodology

### 2.1 Theoretical model and hypotheses

#### 2.1.1 Customer orientation and servitization of manufacturing level

The concept of customer oriented is enterprise to meet customer demand and increase customer value for business starting point. In the process of operation, the investigation and analysis of the customer's consumption ability, consumer preferences and consumer behavior, and pay attention to the new product development and marketing means innovation, in order to dynamically adapt to customer demand<sup>[10]</sup>. Li Jinghua, Zhu Wenjuan, Junjie Mao<sup>[11]</sup> proposed the model and hypothesis of the impact mechanism of the manufacturer's service process based on the relationship between manufacturer and customer resource dependence. The manufacturer and the customer interdependence, positive correlation with the manufacturer servicesation process. Zhu Wenjuan<sup>[12]</sup> is based on the resource dependence theory, the manufacturer customer relationship is divided into three dimensions: Joint dependence, manufacturer dependence and customer dependence. By correlation analysis and regression analysis results, Joint dependence is positively correlated with customer dependence, positive correlation with manufacturer's service. The paper assumes that:

**Hypothesis 1:** Customer orientation has a significant positive impact on the servitization of manufacturing.

#### 2.1.2 Customer orientation and service innovation

Influenced by the traditional innovation, the service innovation research has not attracted the attention of the

academic circles for a long time. In addition, the special nature of the service activities, complexity and ambiguity of the results, etc.<sup>[13]</sup>, have brought great difficulties for in-depth study of service innovation activities. Academic research on service innovation is divided into two major schools. Some scholars try to explain the connotation and extension of service innovation from different angles, and the service innovation activities as a service industry or service sector innovation activities<sup>[14-20]</sup>. Another part of the scholars concerned about the service related innovation activities, the understanding of the concept of service innovation to break the restrictions on the classification of industrial areas<sup>[21-24]</sup>.

Wei Jiang<sup>[25]</sup> proposed nine innovation process customer interaction factors and refining the three innovation process at different stages of the degree of interaction factor, these factors through in various phases of the influence of service innovation process of customer interaction degree, thereby affecting the service innovation performance. Gao Li<sup>[26]</sup> to stimulate innovation and service innovation theory and other related knowledge as a theoretical support, around the market demand of customer business, to explore the impact factors of logistics enterprise service innovation activities, 1) Technology matching degree has a significant impact on customer satisfaction of logistics enterprises; 2) demand response speed has a significant impact on the customer satisfaction of logistics enterprises; 3) Customers with different enterprise attributes have significant influence on the cognition of service innovation factors of logistics enterprises; 4) There is a significant difference between the expected value and the actual experience of the service innovation of logistics enterprise. Liu Gang<sup>[27]</sup> pointed out that demand oriented manufacturing logistics service innovation content is a multi-dimensional research, four dimensions including process innovation, product innovation, technological innovation and business model innovation, And customer relations, market orientation, knowledge factors, human resources and external environmental factors will have a positive impact on the manufacturing logistics service innovation. The paper assumes that:

**Hypothesis 2:** Customer orientation has a significant positive impact on service innovation.

#### 2.1.3 Service innovation and servitization of manufacturing level

Carry out service innovation, can bring a lot of new value for manufacturing enterprises, significantly improve the enterprise value creation ability, influence and even change the part of the manufacturing enterprises in the profit model, greatly promoted the transformation of manufacturing enterprise service. Shen Qiqiang (2012)<sup>[28]</sup>, Hu Yutao (2008)<sup>[29]</sup> pointed out, manufacturing enterprises in service in the process of trying and has become a clear trend, the service innovation is manufacturing enterprises use service to improve its competitiveness of an important means, but also the strong driving force of the development of the service industry manufacturing, many manufacturing enterprises

often take service innovation to promote the implementation of service strategy. The paper assumes that:

**Hypothesis 3:** Service innovation has a significant positive impact on the development of servitization of manufacturings.

#### 2.1.4 Intermediary role of service innovation

According to the intermediary variable inspection procedures, the impact on the customer oriented service in manufacturing enterprises can communicate through service innovation. Theoretical logic: manufacturing enterprises to implement customer oriented behavior (organizational behavior), will promote the manufacturing enterprises to comply with the development trend of the environment to implement service innovation strategy to improve the level of service (strategy). The logic of this theory is proved. Therefore, from a logical service innovation can be regarded as customer oriented and manufacturing enterprise service intermediary role, as the service innovation is the complete intermediary or part of the intermediary also need to be further discussed.

**Hypothesis 4:** The degree of service innovation plays an intermediary role in the influence of customer orientation to the servitization of manufacturing.

Based on the above assumptions, this study proposes a theoretical model of the impact of customer orientation, service innovation and servitization of manufacturings. Figure 1 "+" indicates a positive impact.

## 2.2 Sample and data acquisition

The research object of this paper is the manufacturing enterprise in china. The questionnaire of the distribution of the object were selected in Jilin, Heilongjiang, Shandong and other provinces of the 400 manufacturing.

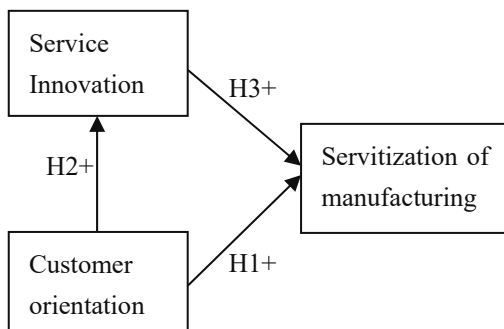


Fig. 1 theoretical model

In the questionnaire design, we choose the variables and indicators of the main reference to foreign literature, and combined with the actual situation of China's manufacturing enterprises, as well as the respondents to understand the ability to adjust the questionnaire. In the phase of pre investigation, the subject group selected 55 enterprises in Heilongjiang Province. Of these enterprises senior management personnel through interview and telephone interview two forms of the questionnaire and

the reliability and validity of the preliminary test and further improve and adjust the formation of the final questionnaire. The form of questionnaire was distributed by mail, the paper questionnaire and field survey.

The survey period from August 2015 to January 2016, there are 400 companies to accept the research and provide the relevant information. The questionnaire response rate is 64.5%, there are 3 companies to complete the incomplete information, so that the questionnaire is invalid, the final effective questionnaire is 255, the overall efficiency of the questionnaire is 99.25%. The survey of enterprises related to state-owned enterprises, private enterprises and foreign-funded enterprises. Considering the obtained in the survey questionnaire, the majority is completed by a single enterprise employees may exist Common Method Variances(CMV). This study adopted Harman 's single-factor method to test, factor test results show that, extracted a total of three factor and 83.67% of variance is explained. The first factor explaining the 39.18% (less than 50%), the above can guarantee homologous variance for the results of this study does not cause significant effect [30].

## 2.3 Variable detection

The theoretical model of this paper involves 3 latent variables, including customer orientation, service innovation, servitization of manufacturing. The index mainly with reference to the overseas related research results, combined with the manufacturing enterprises in our country's actual conditions, and interviews with well-known business enterprises operating conditions of senior management personnel and listen to expert advice and recommendations, for China's actual situation of these latent variables to the metrics of the re design. The variables measured in the questionnaire are as follows:

(1) Customer oriented servitization of manufacturing: reference Kong Ting and other [31] proposed measurement indicators, customer guide is divided into customer focus, customer engagement and customer communication, and other 3 dimensions, 10 items to measure.

(2) Service Innovation: reference Hertog and bilderbeek (1998)[32] proposed 4D service innovation model, combined with Huang Qianming (2010)[33], Zhao Xiaoyan (2012) characteristics of the et al.[34] research and manufacturing enterprises, the manufacturing enterprise service innovation is divided into four dimensions of the concept of service innovation, customer interface innovation, organizational process innovation, technology innovation, eight items to measure.

(3) Manufacturing industry service degree: service degree from put into service and service output of two dimensions to measure: measurement of service inputs, relates to the service elements of the quantity, cost and elements of service emphasis two items [35]; measurement of service output indicators, including the service quantity, service scope and emphasis on service 2 items.

### 3 Results

#### 3.1 Reliability and validity test

Usually use Cronbach 's alpha the reliability of the questionnaire investigation, general reliability coefficient of more than 0.7 is appropriate [36] Firstly, through SPSS16.0 the questionnaire reliability analysis, the reliability level of the whole scale is 0.95, table 3 shows the taken in this paper three structural variables of Cronbach 's alpha values have reached the standard, i.e., greater than 0.7, show that the scale has good reliability.

Validity can be divided into the content validity, the surface validity and the construct validity. The research variables is based on previous mature theory and questionnaire, most of the items in the previous studies also showed good validity, according to the conclusion of the investigation be modified. Therefore, this study has good content validity. The scale was investigated in accepting the relevant experts and the parts of the proposal, the table items related to the linguistic expression, such as repeated modifications, the formation of the final questionnaire. Therefore, this study has good face validity.

Construct validity includes convergent validity and discriminant validity of the two parts. Factor analysis was used to test convergent validity in this study. After the KMO and Bartlett's test, manufacture enterprise customer oriented, service innovation and service degree scale KMO value was 0.831, 0.851 and 0.812, all larger than the standard values of 0.7; Bartlett's test of significance was 0.000, less than the standard value 0.01[37], measurement model and observation data samples have better fitting effect and the sample data generally support model proposed in the paper.,s shown in table 1.

**Table 1 Sample reliability test**

Variable	Dimension	Cronbach's alpha
Customer orientation	Customer focus	0.756
	Customer participation	0.715
	Customer communication	0.773
	Service concept innovation	0.779
Customer orientation	Customer interface innovation	0.798
	Organizational process innovation	0.772
	Technology choice innovation	0.755
Customer orientation	Input service	0.766
	Output service	0.742

#### 3.2 Intermediary variable test

In the paper, the intermediary role of the manufacturing enterprise service is tested. Baron and Kenny (1986) proposed by the intermediary effect of the test procedures [38], as shown in table 2.

**Table 2 Analysis of the intermediary role of service innovation**

Step	Independent variable	Dependent variable	Standard path coefficient	The value of T
1	Customer orientation	Degree of service	0.51***	5.470
2	Customer orientation	Service Innovation	0.53***	6.415
3	Customer orientation	Degree of service	0.19*	2.464

Note: \* \* \* is significant on the level of  $p < 0.001$ ; \* \* is significant at the level of  $p < 0.01$ ; \* is significant at the level of  $p < 0.05$ .

First, examine the impact of customer orientation on the degree of service. Customer orientation can significantly explain the degree of service (a  $t=5.470$ , path,  $p < 0.001$ ); secondly, examine the impact of customer orientation on service innovation. Changes in customer orientation can significantly explain the mediating variable, which absorbed ability changes for path B,  $t=6.415$ ,  $P < 0.001$ ). Finally, the service innovation of intermediary variables control alone test customer orientation of service degree of influence. Visible, after the control of intermediary variables, the impact of customer orientation on the degree of service is still significant (C  $t=2.464$ , path,  $p < 0.05$ ), but the path coefficient has been reduced. This indicates that the impact of customer orientation on the degree of service is part of the impact of service innovation, indicating that service innovation plays a partial intermediary role.

#### 3.3 Hypothesis test

**Table 3 Hypothesis test result**

Hypot heis	Structure path	Standard path coefficient	Validation results
H1	Customer orientation → Degree of service	0.19* (2.464)	Support
	Customer orientation → Service Innovation	0.53*** (6.415)	
H3	Service	0.47***	Support

The assumptions mentioned in this paper are H1, H2, H3 by testing the standard path coefficients and T values, all of which are verified, as shown in table 3.

## 4 Conclusions and Prospects

The paper selects 258 manufacturing enterprises as the research sample, using structural equation model (SEM) to analyze the relationship between customer orientation, service innovation and service level. Through the service innovation as the intermediary variable, the establishment of the corresponding conceptual model, and by the empirical analysis to the results:

(1) The customer orientation has a significant positive impact on the service level of manufacturing enterprises. To develop the customer orientation and take the active service innovation strategy to the manufacturing enterprise service level to play the positive role. This is the main contribution of this paper, in the previous research on customer orientation and servitization of manufacturing of the relationship between the study is still few. This hypothesis is supported, the enlightenment enterprises should strengthen the importance of customer oriented, the products are sold to actively from the hands of customers obtain product information, enterprises in carrying out customer orientation should focus on from the three aspects of customer focus, customer participation and customer communication expansion together with a strong customer directly involved in the enterprise service improvement efforts and improvements in the service of upfront with customers maintain efficient communication, help to improve the service transformation success rate.

(2) Customer orientation has a significant positive impact on enterprise service innovation. Manufacturing enterprises can promote the process of service innovation through customer orientation. In the manufacturing enterprise transformation period, and customer contact and in-depth internal, system analysis of customer demand, can make the enterprise to make the corresponding service to make the corresponding market. Enterprises should be from single traditional vertical relationship of organizational development contact, extended to close contact with the development of external customers, will stimulate the enterprises intangible customer resources into innovation and integration, to form their own unique competitive advantage.

(3) Service innovation has a significant mediating effect on the relationship between customer orientation and service level. Manufacturing enterprises through service innovation strategy can promote the role of customer oriented, and can promote the development process of service. Servitization of manufacturing strategy in transition period by to serve as the carrier and

customer contact, in-depth internal customer, system analysis of customer demand, to provide includes hardware products and supporting the personalized service, to use service innovation to further promote the manufacturing enterprise service strategy smooth implementation.

The paper has certain limitations and shortcomings, first of all, the study sample only manufacturing industries in northern China and the central part of the city, in the later study expanded scope and the type of industry, make the conclusion is more practical and extensive.

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