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Research Article

Empirical Analysis of Influence of Furniture Manufacturing Servitization on Industry Performance Based on Big Data

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In the era of big data, the furniture manufacturing industry takes digitization and intelligence as its core, and its servitization degree is constantly improving. In this paper, based on input-output table data from major manufacturing countries throughout the world in the period 2000–2014, this study empirically analyzes the impact of servitization on the industrial performance and productivity of the furniture manufacturing industry and finds that servitization level of the global furniture industry is about 20%, showing small growth in the sample period. Developed countries are in the leading position in the process of servitization strategy, and the servitization level among countries is gradually converging. Furniture manufacturing industry does not show a servitization dilemma, and servitization has a positive impact on industry performance and total factor productivity.

1. Introduction

The furniture manufacturing industry is an important medium- and low-technology industry absorbing the social labor force. With the acceleration of economic globalization and increasingly intensified market competition, the furniture manufacturing industry has encountered development bottlenecks to varying degrees. The core problem is how to align innovation, transformation, and upgrading and reshape the competitive advantage of the manufacturing industry under the disadvantage of losing the cost advantage and dissolving the channel advantage. Facing this challenge, service transformation is gradually becoming an important force leading industrial upgrading and sustainable development in the industry. Manufacturing servitization is a dynamic process in which enterprises transform the value chain from a manufacturing center to a service center to meet customer demand, realize added value, and gain competitive advantage [1]. The Advanced Manufacturing Plan of the United States, Industry 4.0 in Germany, and the Made in China 2025 also aim to shift manufacturing toward a service orientation as one of the directions of future manufacturing development [2–4]. At present, digital technologies such as artificial intelligence, blockchain, cloud computing, big data and Internet of Things have entered the stage of large-scale application [5]. The use of information and communication technology (ICT) developed for furniture manufacturing to break through the bottleneck of the modern service industry and the addition the service items to the product can provide furniture manufacturing enterprises more confidence in the face of market competition. For example, some traditional furniture manufacturing enterprises make use of mobile Internet technology to engage with customer requirements and implement personalized customization. The incorporation of the mobile Internet with the Internet of Things technology can achieve seamless connection between production and marketing, [6] making it possible to build an ecological chain of production and services and increase customer input in services [7].The information technology interconnection platform integrates sales, design and manufacturing, and transfers the traditional manual operation to the automatic control of the information platform. It is promoting the furniture industry to develop toward intelligent design, intelligent manufacturing, intelligent management, and intelligent service [8].

Although incorporating service elements can, theoretically, contribute to the sustainable development of the

furniture manufacturing industry by providing inexhaustible power, current research has shown that the effects of service in the whole manufacturing value chain have not always been actively promoted, as in most situations including services tends to produce an inhibitory effect on enterprise performance, in a phenomenon called the service dilemma [9, 10]. In the case analysis, scholars found that inhibition and promotion both appear repeatedly in terms of their impact on enterprise performance [11]. There currently remain differences in the conclusions of relevant studies on servitization, and most of them discuss the relationship between servitization and the overall manufacturing industry. Obviously, high-, low-, and medium-tech industries have different development paradigms and different demands for servitization. There is no clear consensus in the existing literature on whether the increase in added value and cost brought about by service-oriented transformation to low- and medium-tech firms is a driving force or a burden. This study therefore seeks to determine whether servitization in the furniture manufacturing industry has resulted in the so-called servitization dilemma within the industry from a macroperspective based on data from an international input-output table. Based on the resulting analysis, this study explores solutions and provides targeted policy suggestions.

2. Literature Review

Service innovation is not a new concept. As early as the innovation theory put forward by Schumpeter in the early 20th century, the theoretical elaboration of product and production process innovation has involved the innovation of service modes such as enterprise marketing channels. The main research interests among western scholars in service innovation have mainly concentrated in the pure sense of the service sector, such as retail, electricity, medical services, and software development, which has placed service innovation in the manufacturing industry in the background of research. After the 2008 financial crisis, however, service innovation for manufacturing industry was identified as a new path for development, with the potential to provide a new profit growth point and promote upgrades to the industrial structure. For example, Yan et al. have suggested that design and sales service is an important way for the sustainable development of mahogany furniture enterprises [12]. Pan, meanwhile, has suggested that the consumer-to-manufacturing (C2M) mode plays a positive role (and is an important path) in the transformation and upgrading of the current stage of China's furniture manufacturing industry [13]. However, scholars also point out that there are two opposing trends—positive and negative—in the effects of servitization on the performance of manufacturing enterprises, which means that blind industrial extension cannot promote improved enterprise performance, but may indeed have a certain inhibitory effect (i.e., the servitization dilemma). Fang et al. believe that the final effect of manufacturing enterprises' servitization strategy depends on whether the services provided by enterprises complement and coordinate well with the physical products [14]. Zhou also found that the degree of impact of service factor input differed for different types of manufacturing upgrading [15].

Most of the above studies are based on the analysis and expansion at the micro-enterprise level, but there is a lack of literature at the industrial level and the overall macro level. Falk and Peng took the input-output tables of 18 European countries as their data sample to empirically analyze the changes in the employment structure represented by servitization among managers, professional service personnel, and technicians in each subindustry of the manufacturing industry [16]. Huang and Huo conducted an empirical analysis of the macro factors affecting the service-oriented manufacturing industry based on input-output data from major global manufacturing countries [17]. There is, however, a lack of literature on servitization at the industrial level, and scholars still have a blind spot in their thinking about the influencing factors and occurrence mechanisms of servitization in the furniture manufacturing industry, not to mention in the research on the dilemma of servitization throughout the furniture industry as a whole.

This paper thus uses the world input-output table database (WIOD) provided by the world's major countries to supply an input and output table for the calendar year, then calculating the coefficient of the furniture manufacturing industry as a service to analyze the existential dilemmas of the global macro furniture manufacturing value chain. This is also the main point of innovation, making it possible to excavate, explain, and analyze these problems.

3. Theoretical Mechanism Analysis

A simple theoretical model can be set up to illustrate the research in this study, which is based on the C-D copula function model. Barro has suggested that industrial structure can be regarded as an input, similar to labor and capital, [18] and servitization means an increase in the service elements in the manufacturing industry, which is bound to affect the entire national economic structure. Servitization can thus be used to refer to the concept of industrial structure adjustment, and an endogenous economic growth model can be developed after the introduction of servitization. This model can be used to explore the effect of industrial structure on output level and production efficiency. Suppose the output level of a region is Y, then the output function form is as follows:

$$Y_{it} = A \times L_{it}^{\alpha} \times K_{it}^{\beta} \times ser_{it}^{\chi}, \tag{1}$$

where A represents the factors affecting the output level, such as technological progress; I and t represent the regional and time sections; K and L represent the regional capital stock and labor force; ser represents the proportion of the service industry in the local industrial structure; and α, β and χ are all within the range of [0,1]. Therefore, we can take the natural logarithm of Equation (1) and expand it to the following form equation:

$$\ln Y_{it} = \ln A + \alpha \ln L_{it} + \beta \ln K_{it} + \chi \ln ser_{it}. \tag{2}$$

The estimation model between the industrial output and service level is formed here. If another transformation is performed on equation (1), the following equation is formed:

$$\frac{Y_{it}}{L_{it}^{\alpha} \times K_{it}^{\beta}} = A \times ser_{it}^{\chi}. \tag{3}$$

The ratio of output and input, which can be understood as productivity, is calculated on the left side of the above formula. Assuming TFP (total factor productivity), a linear model between the final industrial structure (servitization) and productivity is formed after Taylor's expansion:

$$\ln TFP_{it} = \ln A + \chi \ln ser_{it}. \tag{4}$$

In the specific empirical regression, the factor A value that represents technological progress and other factors affecting the output level above can be treated as a residual term.

4. Index Measurement and Model Design

4.1. Analysis on the Level of Global Manufacturing Servitization. The WIOD database collects the input-output tables of 43 countries and regions in the period from 2000 to 2014 and uses the supply table to construct the manufacturing servitization index to measure the intensity of servitization. The specific calculation formula can be expressed as

$$ser_{it} = \frac{\sum TI_{it}}{\sum MI_{it}}, \tag{5}$$

where *ser* is the servitization index of country I in period T, and TI refers to the quantity of the service industry as the input factor in the furniture manufacturing industry, MI. The services involved include trade maintenance and repair services, hotel catering services, transportation, post and telecommunications finance, real estate services, leasing services, national defense, culture, education and sports, social security, and private family service employment activities. The ratio of total intermediate input of all services to the total output value of the furniture manufacturing industry is taken as the representation of the servitization coefficient in this paper.

According to formula (1), we calculated the coefficient of servitization of the furniture manufacturing industry in various countries in the sample period, and selected data from some countries in specific years for display in Table 1 [19].

The data indicate that the servitization level of the global furniture manufacturing industry is generally distributed between 10% and 40%. Although there is an increase in the sample period, the overall servitization level is still around 20% and is slightly higher in developed countries. For example, the servitization coefficient of Canada, France, Italy, and other countries remains above 25% in most years. The small rise in the world's overall level comes from the deepening of the level of service manufacturing in the United States, Japan, Sweden, and other countries. Some developing countries, such as India and Indonesia, have seen

Table 1: Service level of manufacturing industry in different countries. Unit: %.

Name	2000	2002	2005	2008	2011	2014
Australia	16.66	16.62	17.11	18.02	19.25	20.02
Brazil	13.70	12.02	13.58	13.79	15.14	16.35
Canada	27.68	28.30	28.09	27.21	28.16	28.91
China	10.11	10.25	7.46	7.61	8.24	9.77
Germany	23.82	24.24	23.20	24.13	23.57	22.59
Spain	18.88	20.81	22.37	23.05	26.70	26.64
Finland	18.01	18.94	19.37	21.28	22.65	22.70
France	25.11	26.26	27.95	28.27	24.95	23.89
Britain	21.09	22.46	22.24	21.94	15.11	14.86
Greece	51.01	49.91	41.49	38.12	38.48	34.66
Indonesia	27.18	21.32	19.98	18.55	22.73	23.77
India	24.03	27.22	28.10	25.26	25.00	23.32
Italy	28.39	27.96	29.34	29.42	23.40	21.43
Japan	18.39	19.74	21.47	27.54	24.46	24.73
South Korea	13.34	12.78	13.55	15.85	18.95	16.45
Russia	8.39	11.65	14.91	17.05	19.78	18.81
Sweden	18.50	17.88	18.48	21.08	26.91	27.26
Turkey	21.20	21.11	19.01	22.46	20.53	23.06
United States	15.76	18.18	20.84	22.88	21.87	22.86
Average	19.64	19.73	19.88	20.37	20.55	20.44

Note: Calculated according to WIOD data. Limited by space, only some of the data are listed. The average value of the last column is represented by the ratio of the total service factor input to the total manufacturing output of each country. WIOD, world input-output table database.

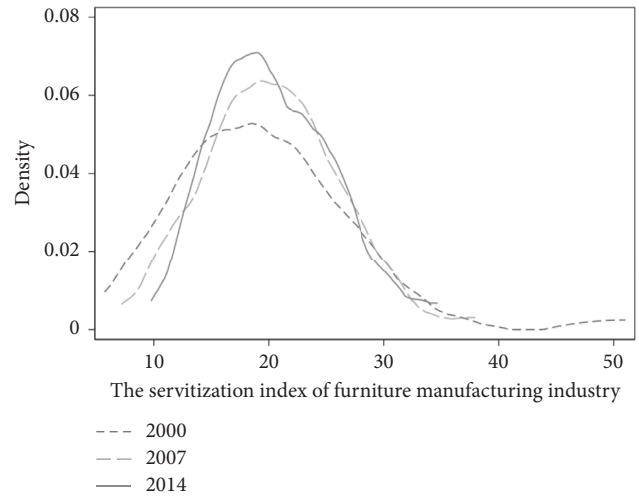

Figure 1: Kernel density diagram of servitization coefficient of furniture manufacturing industry.

varying degrees of decline. The servitization index level of China's furniture manufacturing industry is obviously lower than that of other countries in the world. The overall level in the sample period is no more than half of the world average level, and in 2006, the coefficient is even only about a third of the average level. However, it is worth affirming that China's servitization index still shows a steady increase.

To observe and judge the servitization level of global furniture manufacturing industry more accurately, Figure 1 shows the kernel density distribution of the servitization coefficient in the servitization index during the sample period for 2000, 2007, and 2014. Service level can be found

from the figure, and the furniture manufacturing industry presents a small nuclear density curve moving to the right. This phenomenon was particularly prominent during the period 2000–2007, which suggests that the weight of the furniture manufacturing value chain showed a significant rise in recent years, and the difference in the degree of service between the two types of sample countries have narrowed, as the crest of the nuclear density line moves to the right and rises in height. In comparison, the core density line shifted to the left from 2007 to 2014, but it was still on the right side of the peak in 2000, and the peak height further increased. In fact, at the end of the last century, with the rise of e-commerce and production services, the degree of industrial integration in the global manufacturing industry accelerated, [20, 21] but there was no significant improvement in the degree of servitization in the following decade, which seems to confirm the development dilemma faced by the real manufacturing industry in the process of world economic development from 2007 to 2014 due to the global economic slowdown, among other reasons [22, 23].

4.2. Indicator Setting. This paper analyzes the impact of servitization on the performance and TFP of the furniture manufacturing industry and explores whether a servitization dilemma exists. Two types of data were collected and calculated from the Socio Economic Accounts (SEA) in the WIOD database. Industrial performance in this study is represented by the value added per capita (Vapc) of employed employees in the furniture manufacturing industry, which is divided by the total number of employees during the sample period. According to the industrial data for added value in the SEA table, the annual prices of various countries are used to calculate value. The price is adjusted according to the price benchmark of 2010 to eliminate the influence of price changes on the quality of the data.

For TFP accounting, the most commonly used model is the DEA-Malmquist index method proposed and constructed by Färe et al. [24]. Using this index, TFP can be decomposed into technical efficiency (*Effch*) and technological progress (*Techch*). When $Effch > 1$, this indicates that the production of the decision-making unit is closer to the production frontier, and relative technical efficiency is improved. Technological progress, also known as the growth effect, measures a unit's ability to improve its own technology. When $Techch > 1$, this indicates that the technology has improved, and the production front has advanced. The Malmquist index is simultaneously affected by these two factors. If the value is greater than 1, it means that productivity has improved in the current period compared with the previous period; if it is equal to 1, it means that productivity has not changed; if it is less than 1, it means that productivity has declined. The basic formula for decomposing the Malmquist index is

$$M_t = Effch_t \times Techch_t, \tag{6}$$

where M is the short form of Malmquist index. Considering the lag characteristic of dynamic productivity index accounting, although the DEA data table starts from 2000, the Malmquist index calculates the dynamic change rate of adjacent years, so 2001, one year later, is the measurement starting point of this study. In the sample period, according to the availability of data, the research variables selected in this paper include several major indicators used to calculate the Malmquist index, such as industrial output value, capital input, number of personnel, and personnel capacity structure. The above data are all from the SEA table.

Manufacturing output: the industrial added value (*Va*) of WIOD countries over the years is taken as the output data in the DEA model. To exclude the price factor, the output values of each year are converted to the constant price of 2010.

Capital stock: table SEA statistics provide the total nominal capital stock level in the furniture manufacturing industry in various countries. Of course, there is an accounting problem of inflation in this data, so the constant price of 2010 is adopted.

Labor capital stock: for this indicator, the SEA table has detailed employment data (*Emp*) by sector.

Table 2: The Malmquist index and the decomposition of the global furniture manufacturing industry (2001–2014).

Year	Technical efficiency	Advances in technology	TFP index
2001/2000	0.731	1.368	1
2002/2001	1.267	0.766	0.97
2003/2002	0.969	1.002	0.971
2004/2003	0.984	1.041	1.024
2005/2004	1.256	0.795	0.998
2006/2005	1.259	0.792	0.997
2007/2006	1.127	0.892	1.005
2008/2007	0.977	0.97	0.948
2009/2008	1.043	0.869	0.906
2010/2009	1.064	0.962	1.024
2011/2010	1.011	1	1.011
2012/2011	1.002	0.966	0.968
2013/2012	0.962	1.032	0.993
2014/2013	0.988	1.025	1.012
The average	1.036	0.953	0.987

Note. TFP, total factor productivity.

Table 2 shows the overall TFP change index and decomposition in the sample countries during the study period. The data indicate that the average technical efficiency of furniture manufacturing in these countries maintained an average annual growth rate of 3.6% during the sample period, but technological progress and the TFP index both showed a slight decline. In other words, the decline of TFP is mainly caused by technological progress. On a year-to-year basis, TFP changes are less volatile, but there was a brief, sharp decline in productivity in 2008 and 2009.

4.3. Establishment and Estimation Methods for the Econometric Models. We use panel data from 43 countries and regions from 2000 to 2014 (the sample period for

Table 3: Influence of servitization on the furniture manufacturing industry.

Before the dependent variable	Δ Vapc 2000–2014	Δ Vapc 2000–2007	Δ Vapc 2008–2014	Δ Tfp 2000–2014	Δ Tfp 2000–2007	Δ Tfp 2008–2014
Δ Ser	219.711	300.914	328.907	11.613**	3.366	12.525**
	(316.964)	(239.419)	(330.165)	(4.845)	(7.360)	(5.198)
Δ Ser *x* Δ Vapc	19.325***	46.268***	19.233***			
	(7.428)	(8.183)	(7.043)			
Δ Ser *x* Δ Tfp				3.605	92.721	3.635
				(5.928)	(109.531)	(5.461)
Hansen statistics	1.432	1.486	0.960	1.262	0.963	1.416
	[0.489]	[0.476]	[0.619]	[0.532]	[0.326]	[0.493]
Ser partial effect	609.490	618.191	723.532	15.173	95.623	16.088

Note. () is the standard error, [] is the *P* value, ** and *** are significant at 5% and 1% levels, respectively; the regressions used 5- and 6-order lag of independent variables as instrumental variables.

productivity research is 2001 to 2014) for the analysis, and the model is set as follows:

$$\begin{aligned} Vapc_{it} &= \gamma_i + \beta_1 Ser_{it} + u_{it}, \\ Tfp_{it} &= \delta_i + \chi_1 Ser_{it} + v_{it}, \end{aligned} \tag{7}$$

where I represents the country or region, *Vapc* and *Tfp* represent per capita output and TFP, respectively, *Ser* represents the level of manufacturing servitization, T represents time, u and V are random errors of opposite and same distribution, and γ_i is the regional unobserved effect. It should be pointed out that there are many factors affecting a country's output and productivity. To accurately analyze the relationship between variables, it is necessary to control other related factors. For example, introducing control variables is one solution, but owing to the presence of so many influencing factors and lack of reasonable standards, this approach is very arbitrary. Here, the selection of control variables is avoided, and the technical method of Gan *et al.* (2011) is used for reference, [25] directly controlled by the interaction term of per capita output (or productivity) and servitization. Thus, the econometric model becomes

$$\begin{aligned} Vapc_{it} &= \gamma_i + \beta_1 Ser_{it} + \beta_2 (Vapc_{it} \times Ser_{it}) + u_{it}, \\ Tfp_{it} &= \delta_i + \chi_1 Ser_{it} + \chi_2 (Tfp_{it} \times Ser_{it}) + v_{it}, \\ \Delta Vapc_{it} &= \beta_1 \Delta Ser_{it} + \beta_2 (\Delta Vapc_{it} \times \Delta Ser_{it}) + \Delta u_{it}, \\ \Delta Tfp_{it} &= \chi_1 \Delta Ser_{it} + \chi_2 (\Delta Tfp_{it} \times \Delta Ser_{it}) + \Delta v_{it}. \end{aligned} \tag{8}$$

The panel robustness standard deviation should be used in the estimation, because difference often causes random disturbance of the correlation of the terms. At the same time, the model has serious endogeneity problems due to the interaction terms containing dependent variables in the regression variables. An over-identification test must therefore be done, so the J-test statistic of an effective moment estimate given by Hansen (1982) is used to control the possible over-identification problem of tool variables [26].

5. Empirical Analysis

In the years before and after the 2008 financial crisis, world economic development was turbulent. There is reason to believe that the impact of servitization on the performance of the furniture manufacturing industry has strong time period characteristics. To more deeply understand the impact of servitization on industry performance or productivity, it is therefore necessary to study the relationship between several of the variables in two stages. The estimated results of splitting the two periods are thus also added in Table 3. To further clarify the impact of servitization on industry performance, we also investigate the biased effect of servitization on industry performance and TFP, and the two groups were calculated as follows:

$$\begin{aligned} \frac{\partial V\ apc_{it}}{\partial S\ er_{it}} &= \beta_1 + \beta_2 \times Vapc_{it}, \\ \frac{\partial T\ fp_{it}}{\partial S\ er_{it}} &= \beta_1 + \beta_2 \times Tfp_{it}. \end{aligned} \tag{9}$$

Table 3, columns (1) to (3), shows the estimate of the influence on furniture manufacturing performance based on service, from the perspective of the estimated results of differential items. The estimated coefficient of the "pure" indicators of service itself did not show any significant impact on the performance of the industry as a whole; rather, the real impact on the performance of the industry as a whole is the interaction with the performance of the service industry. From the estimation results it therefore appears that when industry performance increases, the servitization of the furniture industry can stimulate increasing growth in industry performance, producing a virtuous cycle effect. Moreover, the effect of the self-promotion of furniture industry performance through servitization has always been prominent since the beginning of the 21st century. The partial derivative of servitization calculated through equation (9) also supports the above conclusion.

Servitization not only has an impact on the performance of the manufacturing industry, but may also affect its productivity level. The coefficient estimation of this impact is shown in columns (4) to (6) of Table 3. From the estimation results, there is a significant difference between the impact of servitization on TFP and the impact on performance, which is mainly reflected in the estimation coefficient that servitization has a significant positive impact on TFP, while the interaction term between TFP and servitization has no

Table 4: Influence of servitization on technical efficiency and progress in the furniture manufacturing industry.

	Δ Eff	Δ Tech
Δ Ser	12.507**	0.288
	(5.007)	(1.210)
Δ Ser × Δ Eff	3.455	
	(5.977)	
Δ Ser × Δ Tech		10.287
		(18.582)
Hansen inspection	1.168	3.640
	[0.558]	[0.162]

Note. () is the standard error, [] is the P value, ** means significant at 5% level; the regressions used 5- and 6-order lag of independent variables as instrumental variables.

significant impact on TFP. This means that when a country's furniture manufacturing industry develops to a certain scale and generates good returns, servitization will significantly improve the industry's productivity growth.

It can be concluded from the above analysis that, in the global furniture manufacturing industry, servitization has a positive impact on industry performance and TFP on the whole, and there is no servitization dilemma. However, it should be noted that the significant positive impact of industrial servitization on industry performance and productivity in the sample period is mainly reflected in the period from 2008 to 2014. During the period 2000–2007, the influence of servitization on furniture manufacturing industry performance and productivity is negative (although without a significant coefficient). This period was on the eve of the financial crisis, the financial bubble was forming rapidly, the growth of the service industry was far higher than that of the entity industry development speed, and there was a general trend of capital withdrawal from real industry [27, 28]. In other words, it is unwise to overlook "real" industry and blindly pursue servitization, which may cause a "hollowing out of the industry" [29]. Attention should be paid to the rational integration of industrial structure and consolidation of the long-term mechanisms of industry growth.

What is the main carrier of the impact of servitization on productivity? We conducted an extensive empirical analysis on servitization, technological progress (*Tech*) and technical efficiency (*Eff*). The method was also regressive through differential panel data, and the estimated results are shown in Table 4. The estimation results show that the servitization of the furniture industry itself has no significant impact on technological progress, but has some impact on its technical efficiency (below 5% significance). From the perspective of interaction terms, the estimated coefficients are all positive, but not significant. Based on this, we can therefore say that the impact of servitization on TFP mainly comes from the promotion of technical efficiency.

6. Conclusions and Suggestions

Based on the input-output table data from major countries and regions in the world, this study analyzed the influence of servitization in the furniture manufacturing industry on industrial performance and TFP from 2000 to 2014, and tested the potential existence of a servitization dilemma in the global furniture manufacturing industry. The results show that (1) the overall servitization level of the global sample countries is about 20%, showing a small increase in the sample period. Developed countries are in a leading position in the process of strategic servitization, and the servitization level in the furniture manufacturing industry among the sample countries is gradually converging. (2) The TFP productivity of the furniture manufacturing industry in the sample countries declined from 2000 to 2014. In the TFP decomposition index, the technical efficiency of each country maintained good performance, but the technical progress showed a slight decline, and the decline of TFP was mainly caused by technical progress rather than technical efficiency. (3) Whether from the perspective of performance or TFP, the servitization of the furniture manufacturing industry has a positive impact on the whole, and there does not appear to be any "servitization dilemma." It also appears that the impact of servitization on TFP mainly comes from the self-promotion of technical efficiency. As long as the industry itself can achieve growth in performance and productivity through adjustments to the industrial structure, the virtuous circle of industry self-promotion can be realized. However, it is unwise to overlook the industrialization of furniture industry and blindly develop producer services, so attention should be paid to the quality of industrial development and the promotion of rational integration of the industrial structure.

Based on the analysis, our policy suggestions are as follows: attention should be paid to the rational integration of the industrial structure and maintaining balanced development between secondary and tertiary industries when formulating strategies for servitization in the furniture industry. Decision makers or the industry as a whole should regard servitization as a kind of infrastructure for the strategic development of manufacturing, promotion of service innovation, reduction of operating costs, and improvements in enterprise performance and productivity, for example, to promote the formulation and application of manufacturing data standards, promote the open sharing of data, and accelerate the construction of manufacturing big data resource aggregation and analysis and application platform. At the same time, it is necessary to increase support for R&D and innovation in taxation, finance and financial sectors, as well as encouraging R&D and innovation in the service sector, including in business operation models and related technologies, as this will help us to foster emerging service industries.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Disclosure

Linshu Song and Hao Wang are co-authors of the article.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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