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Research on Manufacturing Servitization in China：A Survey

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ABSTRACT: *In recent years, with the accelerated transformation and upgrading of China's manufacturing industry, manufacturing service is becoming a new momentum for enterprises to improve their competitiveness, and some new studies continue to emerge. However, the summary of these studies is still lacking. In this study, the advanced retrieval method of CNKI is used to search the articles named "manufacturing service" in the "A Guide to the Core Journals of China" and "Chinese Social Sciences Citation" database, and 78 articles with the highest relevance are summarized and analyzed.*
The previous research on manufacturing service in The results show that can be divided into five aspects: concept research, development stage research, motivation research, path research and effect research. Based on these five aspects, this paper makes a comprehensive review of the relevant research on manufacturing service in China, and puts forward some opinions and suggestions on the future research direction according to the problems found in the research process.
KEY WORD*: Manufacturing servitization, systematic literature review, service-oriented manufacturing, industrial chain, service-oriented*

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I. INTRODUCTION

With the rapid development of China's manufacturing industry, the manufacturing industry plays a vital role in China's modernization. In order to maintain sound development and achieve the ultimate goal of service-oriented manufacturing, the made in China 2025 report points out: "accelerate the coordinated development of manufacturing and service, promote business model innovation and format innovation, and promote the transformation from production-oriented manufacturing to service-oriented manufacturing." The report emphasizes the importance of the transformation and upgrading of the manufacturing industry and points out the important process of the transformation from an industrial economy to a service economy(Doni, Corvino, & Martini, 2019).

In this study, the "A Guide to the Core Journals of China" and "Chinese Social Sciences Citation" databases in CNKI are searched for "manufacturing service". After data processing and irrelevant literature elimination, 231 articles are obtained. As shown in the figure, the overall research on manufacturing service is increasing year by year, which shows that the hot spot of manufacturing service is increasing year by year, and the relevant scholars' research on manufacturing service is gradually in-depth.

Figure 1: Annual Trend Chart of Service-Oriented Manufacturing Industry

The research on Manufacturing Servitization at home and abroad is mainly focused on five aspects: theoretical research, corporate performance, motivation and path, green and low carbon and business model innovation.

The first aspect is the theoretical research on the service-oriented manufacturing industry. Vandermerwe & Rada (1988) emphasized the importance of services, more and more companies are adding value to their core products through services, and the manufacturing industry is in the process of transition from providing products only to providing products plus services; Xiaowei Gao, Lei Lin, & Guisheng Wu (2008) defines the research scope, research boundaries and basic contents of the research on service enhancement in the manufacturing industry. Baines, Lightfoot, Benedettini, & Kay (2009) defines the concept of service, explains the origin, characteristics and driving factors of service, as well as the application examples and future research challenges of service; Yanchun Zhou & Shouguo Zhao (2010) combs the related concepts and theoretical basis of manufacturing service.

The second aspect is the research on the relationship between manufacturing service and enterprise performance. Chaping Hu & Tao Wang (2013) elaborated that the service-oriented manufacturing industry is not a direct stimulating factor of enterprise performance and needs its influence under fixed conditions such as strategic choice; Visnjic Kastalli & Van Looy (2013) expounds that it provides an effective way for manufacturing enterprises to achieve sustainable growth through service-oriented. Ting Xiao, Qunhua Nie, & Hua Liu (2014) aiming at the problem of "service dilemma", through empirical research, it is found that there are significant differences in the degree to which enterprise performance in different manufacturing industries is affected by service.

The third aspect is the research on the motivation and path of manufacturing service. Xiaoyuan Yao (2014) put forward that the service transformation of manufacturing industry can be promoted from three aspects: advanced manufacturing industry, product added value and profit focus. Zhenxin Xu, Changwei Mo, & Qilin Chen (2016) A more realistic exposition is made on the definition, motivation and upgrading path of manufacturing service. Rymaszewska, Helo, & Gunasekaran (2017) discusses the intersection between digitization and servicealization in manufacturing, and how organizations can improve their service delivery by using digitization. Ardolino et al. (2018) through the data-information-knowledge-intelligence (data-information-knowledge-wisdom, DIKW) model, this paper discusses how the Internet of things (IoT), cloud computing (CC) and predictive analysis (PA) transform underlying entities such as data into information and knowledge to support the service transformation of manufacturers.

The fourth aspect is the research on the service-oriented manufacturing industry and the impact of green low-carbon. Jingdong Liang & Jingdong Huo (2017) through empirical research, it is found that manufacturing service can effectively promote manufacturing energy saving and emission reduction. Xiangjin Wang, Laike Yang, & Zhiquan Qian (2018) with the help of GVC, this paper constructs the model of manufacturing service on carbon emission effect, and draws the conclusion that manufacturing service transformation and upgrading can effectively reduce carbon emissions. Doni et al. (2019) illustrates that servicealization can improve energy consumption, thereby improving environmental performance. However, servicealization has no impact on corporate sustainability disclosure and other environmental policies (such as environmental assurance, emission reduction policies and environmental supply chain management). Seclen-Luna, Moya-Fernandez, & Pereira (2021) Survey data show that product and process innovation, especially product and service innovation, has a positive impact on manufacturing productivity and environment.

The fifth aspect is the research on the innovation of service-oriented business model in manufacturing industry. Robinson, Chan, & Lau (2016) within the framework of activity theory, this paper discusses how organizational change makes multinational construction companies change their business models to pursue service; Qingxiu Piao, Xinbo Sun & Yu Qian (2020) points out that technological innovation and business model innovation play a strong role in promoting the service-oriented manufacturing industry, and the key to business model innovation in the service-oriented manufacturing industry is the innovation of transaction channels. Junfeng Jiang & Yanying Shang (2022) through the framework of business model innovation, this paper puts forward the effect path of data enabling on manufacturing service.

The research on manufacturing service has a wide range of topics and a variety of research methods, but there are relatively few domestic literature reviews. Based on the journals in China's CNKI database, and selecting the journals of "A Guide to the Core Journals of China" and "Chinese Social Sciences Citation" as data sources, this paper summarizes the literature on manufacturing service, mainly around five aspects: concept research, development stage research, motivation research, path research and effect research. Focus on solving the following two problems.

RQ1: what are the main research trends of service-oriented manufacturing in China?

RQ2: what are the main research contents of manufacturing service in China?

The rest of this paper is organized as follows. The second section introduces the methods and materials of this paper, the third section puts forward the different directions of manufacturing service literature research according to the literature research results, and the fourth section discusses our analysis and summary of manufacturing service. We will focus on five aspects: concept research, development stage research, motivation research, path research and effect research. In the last part, we will introduce the research conclusions and our

views on the future research direction, which is of great significance and long-term impact on the development of manufacturing service research.

II. METHODS AND MATERIALS

2.1 Methods

Systematic Review Methodology uses Internet technology, different databases and a variety of retrieval and analysis techniques to comprehensively and accurately grasp the research progress of a certain topic, and draw and test the research conclusions of standardized literature research methods. Jingru You & Fuquan Huang (2017) systematic literature review is mainly composed of four steps: theme determination, literature selection, screening and evaluation, analysis and summary, which can effectively avoid the author's subjective bias. it can also ensure the scientific and rigorous nature of innovation to the greatest extent, and it can be divided into two types: qualitative and quantitative. This paper mainly uses qualitative systematic literature review.

2.2 Materials

In the course of our research, we use CNKI for advanced retrieval, and its database has the characteristics of large quantity, wide range and great influence. In order to carry out the research more accurately, the title retrieval method is adopted, and the literature type is selected as "A Guide to the Core Journals of China" and "Chinese Social Sciences Citation". Finally, using "Manufacturing Servitization" as the title, a total of 231 records were retrieved. The search results show that the number of journals showed an overall upward trend from 2006 to early 2023, of which the number of articles reached 31 in 2019. After careful screening and excluding the literature with low correlation, 78 articles are selected for content analysis and systematic review, in order to make a comprehensive review of the research on manufacturing service.

III. RESULT

Since the 1980s, after the concept of manufacturing service was first put forward Vandermerwe & Rada (1988), the research on manufacturing service in China began to emerge one after another. Many scholars have carried out many aspects of research based on this. This paper summarizes the selected literature. We summarizes the retrieved literature from the motivation, implementation and effect, and finds that there are mainly the following aspects. Below, we will introduce five aspects: concept research, development stage research, motivation research, path research and effect research.

3.1 The Concept of Manufacturing Servitization

Jiexiong Chen (2010) taking the equipment manufacturing industry and automobile as the research object, this paper puts forward the definition of "service". As one of the many business models of enterprises, service is the inevitable law to meet the market demand and development. the degree of service needs to be adjusted according to the situation of the enterprise. once beyond the scope of the enterprise itself, it will be counterproductive, resulting in the phenomenon of "service paradox".

Chaping Hu & Tao Wang (2014) proposed that the traditional manufacturing industry should not only manufacture products, but also be service providers. Xiaoyuan Yao (2014) expounds the concept of service-oriented manufacturing industry and introduces the integration mode of manufacturing industry and service industry. Due to the integration of advanced manufacturing industry and modern service industry, at the same time, it also derives two new concepts of "service-oriented manufacturing" and "manufacturing service". Finally, the author expounds and distinguishes these concepts one by one.

Tianzhu Li, Xiaoqin Liu, & Xiaoxiao Li (2018) summarizes the connotation of manufacturing service, and on this basis emphasizes three key points of "manufacturing service". The first is that the basis of products should not be ignored in the process of emphasizing manufacturing services; second, services without value innovation should not be defined as manufacturing services. The third is that input service and output service should receive the same attention.

Suyun Wang & Guilong Shen (2019) it is proposed that under the influence of technical support, competition mode and consumer market changes, the core of manufacturing industry has changed to "product + service", and the core of product value has also shifted from product manufacturing to service. At the same time, the author divides the service-oriented manufacturing industry into three stages: primary, intermediate and advanced.

Jichao Liu (2022) elaborated the concept of service-oriented manufacturing industry, the output changed from only providing products or product accessories to providing a complete set of solutions of "products + services". In the input stage, in order to meet the needs of consumers, inject more service elements; in the output stage, the income from services accounts for a higher proportion than that from products.

3.2 The Development Stage of Manufacturing Servitization

Lei Lin (2008) put forward the four stages of service-oriented development of the manufacturing industry, service as the subsidiary, promotion, deepening and main body of the manufacturing industry. In the subsidiary stage, service is an accessory to the deficiency of supplementary products; in the promotion stage, service is an effective means to improve customer satisfaction; in the deepening stage, service becomes the same indispensable part as products; in the main part, service becomes the main body of enterprise profits.

Jinghua Li, Li Lin, & Weitao Yan (2017) put forward four stages of service-oriented development of manufacturing industry, which are the initial stage, the primary stage, the intermediate stage and the advanced stage. In the initial stage, the product is the main, and the service is the subsidiary; in the primary stage, the service is separated from the product; in the intermediate stage, the service is gradually produced and provided to consumers with the product as the carrier; in the advanced stage, integrate core products and services.

Zongshui Wang, Lianzhong Qin, Hong Zhao, & Jian Zhang (2018) put forward the four stages of manufacturing service, which are product only stage, product and additional service stage, product and service package stage and service only stage. In the stage of providing products only, the importance of products is emphasized; in the stage of products and additional services, products are taken as the core, and services are provided to consumers as after-sales or other forms; in the stage of products and service packages, products and services play the same important role; in the stage of providing services only, the core of value creation shifts from products to services.

Suyun Wang & Guilong Shen (2019) put forward three stages of manufacturing service, which are primary, intermediate and advanced respectively. In the primary stage of manufacturing service, service is provided to consumers as a subsidiary part of the product; in the intermediate stage of manufacturing service, service, as the value-added part of the product, plays a very important role; in the advanced stage of manufacturing service, service and product achieve the final integration.

Keqing Dai (2021) put forward the three stages of manufacturing service, which are the initial stage, the development stage and the mature stage. In the initial stage, achieve technological breakthroughs and move towards the product-oriented service stage; in the development stage, integrate into the industrial Internet to achieve value-added; in the mature stage, the formation of service-oriented modularization and ecology.

3.3 Motivation of Manufacturing Servitization

Shaojie Chen (2010) on the one hand, it introduces the reasons for the service-oriented manufacturing industry, which mainly includes five reasons: market development, differentiation strategy, enterprise competitiveness, environmental effects and profits. On the other hand, it expounds the dynamic mechanism of service-oriented manufacturing industry from both internal and external aspects. the internal motivation mainly comes from the pursuit of rich profits by the manufacturing enterprises themselves, and the external power is mainly influenced by the government, consumers and competitors.

Jinhua Shao (2011) based on the value chain theory, this paper analyzes the motivation of manufacturing service from four aspects. the first aspect is that the extension of manufacturing value chain brings consumers' market demand for services. at the same time, service has become a part of value added; the second aspect is that with the increasingly fierce market competition, product diversification and customer demand personalization, the status of service is becoming more and more prominent. The third aspect is the rapid development of science and technology, and the use and later maintenance of high-tech products and equipment require enterprises to provide corresponding services; the fourth aspect is that the problems of environmental pollution and shortage of resources can not be ignored. the demand for saving resources and protecting the environment has led to the transformation of services into the general trend.

Qunhui Huang & Jingdong Huo (2015) this paper expounds the driving force of integrated solution, which is one of the forms of service in manufacturing industry. the driving force is divided into two aspects: internal driving force and external driving force. the internal driving force mainly includes three aspects: improving customer satisfaction, improving enterprise competitiveness and obtaining profit income, and the external driving force mainly includes changes in customer demand and increasingly fierce competition.

Zhenxin Xu et al. (2016) summed up the motivation of service-oriented manufacturing industry, and on the basis of the ideas put forward by other scholars, put forward the influence of big data and the role of innovation. Big data's influence is mainly reflected in the era of big data, consumer demand is increasingly showing a diversified trend, big data can also create ways to meet consumers for service. The role of innovation is mainly reflected in the innovation of service links, enhance customer participation, and innovate the uniqueness of products and services.

Qiong Wang, Jun Tong, & Kai Wang (2019) proposed that the dynamic factors of service-oriented manufacturing industry should be summarized into internal and external aspects, which mainly include the promotion of service-oriented by enterprise managers and employees. And service can effectively improve the

problem of environmental pollution and resource shortage. The external power mainly includes four aspects: market changes, customer demand, competitive advantage and the value of the industrial chain.

Liangqun Qi, Jiaying Wu, & Qingxue Li (2022) taking the equipment manufacturing industry as an example, on the basis of empirical analysis of structural equation, it is analyzed that the dynamic factors of service-oriented manufacturing industry mainly include the threat of market competition, consumers' personalized demand, technological environment and policy environment, and enterprise resources.

Wei Pan & Keyin Shen (2022) taking the sporting goods manufacturing industry as an example, this paper expounds the motivation of service-oriented manufacturing industry from the macro, meso and micro perspectives. At the macro level, there are mainly two factors: "double cycle" development pattern and digital economy; at the meso level, there are two factors: industrial growth and industrial integration; at the micro level, there are mainly two factors: the change of consumption structure and product differentiation.

3.4 Development Path of Manufacturing Servitization

Yanlin Sun (2009) elaborated that the service-oriented manufacturing industry, as an important direction of future development, needs to be paid great attention to, and three strategic countermeasures are adopted to promote the development of manufacturing service-oriented. The first is to increase service awareness and service quality from the perspective of consumers; the second is to make use of services to create profits and extend business activities to the service field; and the third is to vigorously develop producer services and promote other industries.

Zhaoquan Jian & Zhuoshen Wu (2011a); Xiaoliang Li (2014); Jin Ning (2015); Bizhen Li, Qingchuan Li, Xuanyu Cheng, & Shaoxiong Yang (2017) based on the smile curve theory, the manufacturing service path is divided into four, mainly downstream industrial chain service, upstream industrial chain service, upstream and downstream industrial chain service and complete de-manufacturing. Downstream industrial chain service, mainly for products and marketing to provide customers with additional services; upstream industrial chain service, mainly aimed at product research and development design and consulting planning, to provide services for customers; upstream and downstream industrial chain service, is the integration of the above two paths; complete de-manufacturing, withdraw from the field of low value-added product manufacturing, and deepen the service of upstream and downstream industrial chain.

Qunhui Huang & Jingdong Huo (2013) based on the perspective of international comparison, this paper puts forward two main restricting factors of manufacturing service: internal and external, and puts forward four corresponding countermeasures. First of all, we should establish the concept of "two-wheel drive" of service-oriented manufacturing industry; secondly, we should focus on the development of promising manufacturing industry; then we should integrate "informatization" in the process of service-oriented manufacturing industry; finally, we should promote service innovation and improve the service-oriented ecology of manufacturing industry.

Chaping Hu (2016) put forward the conceptual implementation framework of service-oriented transformation of manufacturing industry, and summarized the implementation process of service-oriented manufacturing industry with the help of three enterprises as cases. integrate the concept of "customer value creation" into the framework process of cultural creation, management system construction, implementation management and business model.

Zhe Liu & Yi Chu (2017) aiming at the northeast region, this paper puts forward three paths of manufacturing service, which mainly have obvious advantages of stripping productive services, introducing productive services and services. The stripping of productive services and the introduction of productive services need to match and integrate with the advanced manufacturing industry, and carry out limited and reasonable resource allocation.

Kerui Linghu & Zhaoquan Jian (2018) based on the perspective of service ecology, according to the combination of the degree of service and the degree of integration of social resources, three upgrading paths of manufacturing service are put forward. The first path is to improve the degree of service, the degree of integration of social resources remains unchanged, represented by Radio and Television Group; the second path is that the degree of service remains unchanged, and the degree of integration of social resources is improved, represented by Lego; the third path is to improve the degree of service, the degree of integration of social resources, represented by Haier.

Qiong He (2019) based on model setting and data calculus, it is proposed that the optimization path of manufacturing service should revolve around three angles: enterprise, government and society. Enterprises should control costs and optimize capital structure; the government should provide wheel-driven market environment and standardized policy environment; society should train talent teams.

Liangqun Qi et al. (2022) taking the equipment manufacturing industry as an example, using the structural equation for empirical analysis, it is concluded that the development of service-oriented equipment manufacturing industry first needs to encourage healthy competition in the market to form effective incentives;

secondly, it needs to build a knowledge sharing platform to enhance the relationship between different individuals; finally, it needs to strengthen financial support as a solid reserve force.

3.5 Effect of Manufacturing Servitization

Jiguo Liu (2006) through the demonstration and analysis of the relationship between the "input-output" and "output service" of manufacturing services and the new industrialization, it is pointed out that input-output can improve the scientific and technological content of products, reduce energy consumption and enhance innovation capability; output service is conducive to the improvement of economic benefits, competitive environment and environmental performance; both are conducive to the promotion of employment opportunities.

Yanying Chen & Liangzhu Ye (2009) the environmental effects of "product-based service", "result-oriented service" and "input service" are analyzed respectively. Product-based service can effectively improve the service life of products and reduce energy consumption; result-oriented service refers to providing exclusive services for consumers, which can effectively control the process, reduce costs and have certain ecological benefits; put into service, it can improve the work efficiency of enterprises and improve the production efficiency of resources.

Xuegang Shi, Ershi Qi, & Hong Jiang (2012) this paper introduces the effect of manufacturing service on manufacturing innovation from three aspects: professional advantages, customer participation and experience, and network collaboration. In terms of professional advantages, make use of professional advantages to explore new business models and achieve innovation; in the process of customer participation and experience, customer participation and design can provide new ideas for enterprise innovation; in the aspect of network cooperation, bring multiple subjects together to achieve effective communication and achieve innovation through division of labor and cooperation.

Ting Xiao et al. (2014) with the help of four industries, aiming at the problem of "service dilemma", through empirical research, it is found that there are significant differences in the degree to which enterprise performance in different manufacturing industries is affected by service. Ting Xiao & Jinfa Jiang (2016) in the initial stage of service, the enterprise develops to a certain scale to produce better income, and the enterprise performance will be improved; on the contrary, excessive development is easy to form industrial hollowing out and other problems, and enters the "service dilemma" stage. The impact on enterprise performance is not obvious.

Jingdong Liang & Jingdong Huo (2017) through empirical research, it is found that manufacturing service can effectively promote energy saving and emission reduction in manufacturing industry. Xiangjin Wang et al. (2018) with the help of GVC perspective, this paper constructs the model of manufacturing service on carbon emissions, and draws the conclusion that manufacturing services can effectively reduce carbon emissions in the process of transformation and upgrading.

Chuanzhong Du & Wenhan Jin (2020) it is pointed out that the increase of productive service factors in manufacturing industry is beneficial to improve enterprise performance, expand scale, create labor demand, and result in the expansion of employment scale. The stronger the technology is, the more obvious the effect is.

Hongsen Wang, Hui Zhou, & Dongni He (2022) through empirical analysis, this paper expounds that the service-oriented manufacturing industry can effectively reduce carbon intensity by improving labor productivity and optimizing industrial structure, improving carbon efficiency and reducing carbon emissions. In the expansion analysis, the strongest effect on carbon reduction is the low-tech manufacturing industry.

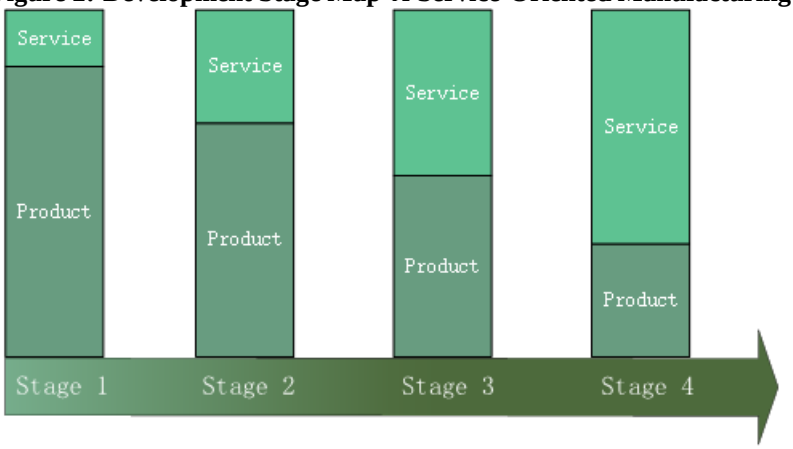
IV. DISCUSSION

According to the literature research on the service-oriented manufacturing industry, we can see that the service-oriented manufacturing industry is the general trend. It is found that the domestic research on the concept of service-oriented manufacturing industry is more a summary of the previous research. Few scholars discuss the concept research in depth or put forward new viewpoints. In the future, scholars can combine various disciplines to carry out the concept research of manufacturing service-oriented. In the study, it can be found that the cross-theoretical cross-studies of manufacturing services are more Jinhua Shao (2011); Bizhen Li et al. (2017); Xia Han & Xiangle Wu (2018); Xiang Dai, (2020); Dapeng Dou & Zengjie Kuang (2022) "value chain Theory" and Ting Xiao et al. (2014); Zhu Jiang & Ning Li (2015); Chang Liu & Yongjun Ma (2019). Chunming Chen & Chenran Jia (2021) "Enterprise performance Theory", and "Resource-based View" Jinghua Li, Li Lin, & Qianlan Li (2019), "smile Curve" Zhaoquan Jian & Zhuoshen Wu (2011a) and "Root Theory" Guofeng Tang & Dan Li (2022).

According to the definition of the service-oriented development stage of the manufacturing industry by most scholars, whether the service-oriented development stage of the manufacturing industry is divided into three stages or four stages, we can see that in the process of service-oriented development of the manufacturing industry, the degree of attention to the service is gradually deepening, and the product gradually changes from

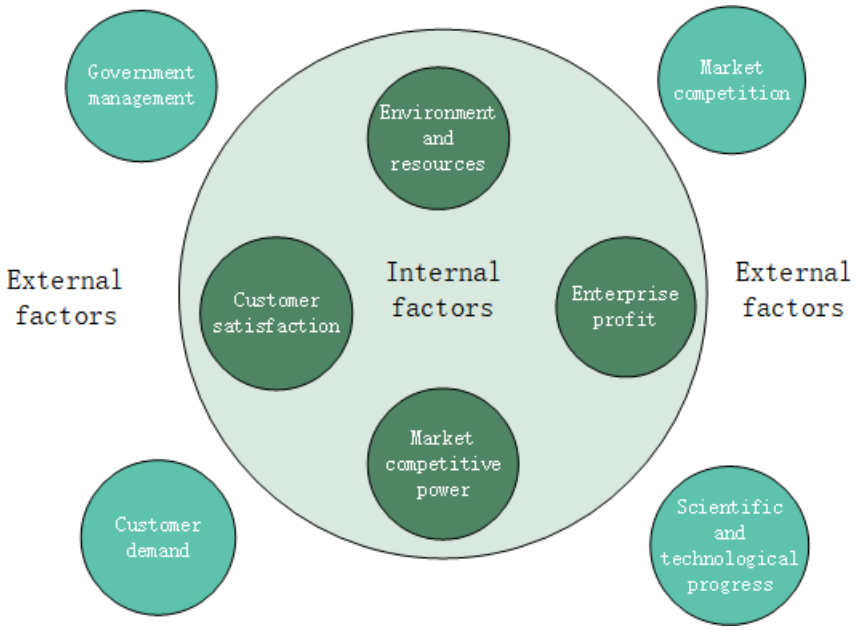
the dominant position at the beginning to the state of mutual checks and balances with the service, or reduced to the state of accessories. In this paper, according to the research summary of previous scholars, as shown in the figure, the development stage of manufacturing service is divided into four stages: germination, growth, formation and maturity. Service is provided to consumers as its accessories. In the growth period, the product occupies the core position, and the value of the service will be enhanced with it; in the formation period, the product becomes the carrier, checks and balances with the service, occupies an indispensable place and provides to the consumers together; in the mature period, the service gradually highlights its importance and will occupy the main position of the consumer purchase, while the product becomes its accessory to provide to the consumer.

Figure 2: Development Stage Map of Service-Oriented Manufacturing



According to the author's induction of the relevant scholars on the motivation of service-oriented manufacturing industry, as shown in the figure, the motivation of service-oriented manufacturing industry can be simply summarized into two key factors: internal and external factors. among them, the internal factors are mainly affected by the enterprise's own profit, the improvement of competitiveness, the response to environmental protection and resource conservation and customer satisfaction. External factors are mainly affected by the constraints of government departments, market competition, customer demand and scientific and technological progress.

Figure 3: Inductive Diagram of Service Motivation in Manufacturing Industry



As shown in the table, we summarize the research on the upgrading path of domestic manufacturing service, where "+" means there is a corresponding path, and "-" means there is no corresponding path.

Table 1: Manufacturing Service Path Induction Table

Paper	National level			Enterprise level			Social level		
	Policy	Tax	Environment	Idea	Profit	Technical	Talents	Customer	Competition
Jiguo Liu (2006)	+	+	+	—	—	—	—	—	—
Yanlin Sun (2009)	—	—	—	+	+	+	—	—	—
Shaojie Chen (2010)	—	—	+	+	+	+	—	—	+
Jiexiong Chen (2010)	—	—	—	+	+	+	—	—	—
Jinhua Shao (2011)	—	—	+	—	—	+	—	+	—
Lian Duan & Dehai Zhao (2011)	—	—	+	+	—	+	—	—	—
Zhaoquan Jian & Zhuoshen Wu (2011b)	—	—	+	—	+	—	—	+	+
Qunhui Huang & Jingdong Huo (2013)	—	—	+	+	—	+	—	—	+
Xiaojing Du (2014)	+	—	+	+	—	+	—	—	+
Xiaoyuan Yao (2014)	—	—	—	+	+	+	—	—	—
Ting Xiao et al. (2014)	—	—	—	+	—	+	—	—	—
Lin Lu, Yun Liu, & Ruibo Zhu (2015)	+	—	+	+	+	+	—	—	+
Xiaobo Wang & Jingwen Li (2016)	+	—	+	+	—	+	—	—	+
Gaofeng Zhu, Shoulian Tang, Ming Hui, Yan Li, & Yiwei Tang (2017)	+	—	+	—	+	—	+	—	—
Jingdong Liang & Jingdong Huo (2017)	—	—	+	+	—	+	—	—	+
Fengxia Lin & Renqing Liu (2017)	—	—	+	+	—	+	—	—	+
Yongqiang Zhao (2018)	—	—	+	+	+	+	—	+	+
Xianda Xie (2019)	—	—	—	+	+	+	—	+	—
Qiong He (2019)	+	—	+	+	+	+	+	—	—
Keqing Dai & Wanming Chen (2020)	—	—	+	+	—	+	—	—	+
Xiaodan Hu & Naihua Gu (2020)	+	—	+	+	—	+	—	—	—
Donghua Yu & Yanan Hu (2021)	—	—	—	+	—	+	+	+	+
Lin Li, Caihong Tian, & Jie Xu (2021)	—	—	+	+	—	+	—	—	+
Yuhua Li, Chengjun Liao, & Ziwei Xiang (2022)	—	—	—	—	—	+	—	+	+
Liangqun Qi et al. (2022)	—	+	+	—	—	+	—	—	+

To sum up, the upgrading path of service-oriented manufacturing industry is more from the national, enterprise and social levels to put forward countermeasures and suggestions, according to the scope or direction of the research, the suggestions are also different, in the process of carrying out the research, scholars more stand from the perspective of enterprises to provide opinions and suggestions for manufacturing services.

The effects of service-oriented manufacturing can be summarized into three aspects: first, Ting Xiao et al. (2014); Zhu Jiang & Ning Li, (2015) effectively improve enterprise efficiency, Chaping Hu & Keke Liang (2022) improve customer satisfaction, Chunming Chen & Chenran Jia (2021) make enterprises more profitable, Bo Yu & Chiping Chen (2022) enhance enterprise competitiveness. Secondly, it can Yanying Chen & Liangzhu Ye (2009); Donglan Xu & Xinkuo Zhang (2021) protect the environment and save resources Honson Wang et al. (2022); Zhenyang Li & Wenhan Jin, (2022) contribute to the realization of carbon neutralization and carbon peak; finally, Ting Xiao (2015); Jun Luo (2020) effectively promote employment, Chuanzhong Du & Wenhan Jin (2020) reduce the employment pressure for the society.

V. CONCLUSIONS

By using the method of systematic review, this paper takes the literature on manufacturing service published in the two databases of "A Guide to the Core Journals of China" and "Chinese Social Sciences Citation" in CNKI from 2006 to 2023 as the data source, uses the methods of content analysis and system review to screen, eliminate and analyze the data, the 78 most important literatures found are reviewed, and the trend and content problems of manufacturing service are analyzed. In order to provide opinions and suggestions for domestic scholars in the future.

5.1 New Findings

The research trend of service-oriented manufacturing industry is improving, and the hot spots continue to rise. the current research is mainly focused on the enterprise performance that enterprises pay most attention to and the environmental performance that the country focuses on. It also keeps pace with the times and combines "Internet+" with digitalization to carry out research. The research content of service-oriented manufacturing industry is mainly focused on concept research, development stage research, motivation research, path research and effect research, and scholars will carry out research on one or more of them.

5.2 Theoretical Significance

Through the review and analysis of the above literature on service-oriented manufacturing industry, it is found that the research hotspot of service-oriented manufacturing industry has never disappeared, and more and more attention has been paid to it in China, with a relatively wide range of research scope and outstanding achievements. however, the research perfection in the aspects of concept, development stage, motivation, path and effect still needs to be improved.

5.3 Practical Significance

Through the review and analysis of the above service-oriented manufacturing literature, it is found that the relevant research on manufacturing service-oriented has a far-reaching impact on China's realization of manufacturing transformation and upgrading and the construction of a manufacturing power, and provides reference and guidance for enterprises in the process of manufacturing service-oriented transformation.

5.4 Research Prospects

In the future research process, in the process of manufacturing service research, scholars should combine the current national and social concerns to carry out research, such as business model innovation, carbon peak and carbon neutralization and other related theories. In the process of manufacturing service path research, we should also consider the important role of more subjects in the manufacturing service process, consider different subject perspectives, and put forward more and better opinions and suggestions for manufacturing service transformation and upgrading.

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