Research on the Relationship between Network Capability, Strategic Flexibility and Service Performance of Manufacturing Enterprises

Qingqing Zhou^{1, a}, Wenping Zhao^{1, b} ¹School of Xidian University, Xi'an 710000, China; ^a1577100144@qq.com, ^bzwp210@163.com

Abstract

The ability of manufacturing companies to manage and develop external networks plays an important role in their strategic flexibility and service-oriented performance. Through questionnaire survey and structural equation model analysis of 450 manufacturing companies undergoing service-oriented transformation in Shaanxi, Zhejiang and other places, it was found that: the ability of network relationship has a significant positive effect on the resource flexibility and coordination flexibility of enterprises; the ability of network vision ability Flexibility has a significant positive effect, but not a significant positive effect on coordination flexibility; resource flexibility and coordination flexibility have a significant positive effect on the service performance of manufacturing enterprises.

Keywords

Network capability; Strategic flexibility; Manufacturing service-oriented; Service-oriented performance.

1. Introduction

In the context of the information technology revolution and economic globalization, major changes have taken place in the economic environment in which manufacturing companies are located. In the 1990s, the rise of the knowledge economy made traditional manufacturing companies' competitive advantages no longer exist [11]. In order to obtain sustainable competitiveness, manufacturing companies have restructured their vitality and have begun to transition to a service-oriented model. The International General Business Corporation (IMB) suffered losses of more than 10 billion in the early 1990s. In order to save the losses, the IMB transformed from a pure hardware manufacturer into a "problem solution provider". The most profitable company in the world [12]. However, there are also a large number of research cases showing that the performance of the implementation of manufacturing service-oriented strategies is still unstable [13]. According to survey data provided by Bain & Company, only 21% of companies have successfully implemented service transformation [14]. Gebauer [15] and other scholars have found that manufacturing companies may fall into a "service-oriented trap" during the process of service-oriented transformation. The "service-oriented trap" refers to the fact that service-oriented does not bring revenue growth to the enterprise, but will inhibit the performance of the enterprise to a certain extent. Therefore, how to promote the successful transformation of manufacturing enterprises and improve service-oriented performance has become an important subject in academia.

MB Cook [8] and other scholars believe that the service-oriented transformation of manufacturing companies is risky. It requires companies to not only master more specialized knowledge, but also to readjust their own resource allocation. This also means that companies must be service-oriented. In the process, a large amount of capital, time and other costs were invested for reform. Studies by Elif Bascavusoglu and Bruce Tether [9] have found that the resources owned by an enterprise have an important impact on the effect of service-oriented enterprises. It can be seen that manufacturing companies are often constrained by the internal resources of the organization, and it is difficult to meet the various inputs required in the service-oriented transformation process. Therefore, it is necessary to establish network relationships with external organizations such as scientific research

institutes, suppliers, major customers, and competitors. It seems crucial. Adler PS and Kwon S. W [16] have pointed out that social network relationships can help companies obtain external knowledge, technology, and funds. Based on previous research, this article makes in-depth research on manufacturing companies' network vision capabilities, network construction, portfolio management and relationship management capabilities, and their impact on the strategic flexibility and service-oriented performance of manufacturing companies, and strives to provide manufacturing The issue of enterprise service transformation provides new ideas for reference.

2. Literature review and theoretical assumptions

2.1 Definition of related concepts

2.1.1 Network capability

Due to the advancement of science and technology and the deepening of global integration, the living environment of enterprises is increasingly networked, forcing companies to develop and use network relationships to obtain effective external resources, thereby creating value and enhancing their competitive position. This practical issue has attracted widespread attention in the academic community. Hakansoon [1] first proposed the concept of networked capabilities. He believed that networked capabilities refer to the ability of an enterprise to improve its network location by processing specific relationships. With the further study of scholars, the concept of networked capabilities is gradually transformed into network capabilities. According to the needs of their research, scholars have given different definitions and divisions to the connotation and dimensions of network capabilities. Gemunden and Ritter [2] believe that network capability is a dynamic capability for enterprises to initiate, maintain, and use relationships between networks, which helps companies form their own competitive advantages. Network capabilities include two dimensions, namely task execution and qualification conditions [3]. Scholars Möller and Helinen [17] believe that network relationships can be constructed and managed from the four levels of enterprise, industry, single relationship and relationship set, and the network ability is divided into network vision ability, network management ability, combination management ability and relationship management ability. Dimensions. Scholars Xu Jinfa, Xu Qiang, and Wang Yong believe that companies develop network cooperation relationships in accordance with three levels of strategy, relationship, and process. Therefore, the dimensions of enterprise network capabilities should correspond to the above three levels one by one, which are network conception capabilities, Network role management ability and network relationship combination ability. Ni Yuan, Fan Hui [34] and other scholars in their research defined network capabilities as the ability of enterprises to maintain their network status by maintaining and developing external network connections, and divided network capabilities into network relationship management capabilities and network configuration capabilities. Based on the research of Möller, Ni Yuan and other scholars, this paper defines network capabilities as the enterprise's survival through the construction, management, and effective use of network relationships at all levels, identifying network values and opportunities for cooperation, and obtaining external scarce resources to achieve business survival. A dynamic ability to grow and grow and decompose it into network vision ability and network relationship ability. Network vision capability is a strategic ability for an enterprise to identify development opportunities by predicting and judging the overall situation of network development. Network relationship capability refers to the ability of an enterprise to construct, guide, coordinate and control the entire relationship network, and to manage organizations and specific groups in network relationships.

2.1.2 Strategic flexibility

Starting from a resource-based perspective, Sanchez [6] defined strategic flexibility as the ability of an enterprise to respond to changes in the external competitive environment. It includes resource flexibility and coordination flexibility. Resource flexibility needs to be understood from three aspects. First, the effective use of resources in the organization is relatively broad, indicating that its resources are more flexible. Second, the cost of converting resources from one use to another is low, and it is considered to have strong resource flexibility. Third, the shorter time required for a resource to switch

from one use to another indicates that its resources are more flexible. Coordination flexibility refers to the ability of an enterprise to utilize resources. It involves the three processes of clarifying an enterprise's product strategy, forming a resource chain that the enterprise needs in development, manufacturing, distribution, and marketing, and allocating resources to support the product strategy. According to these three processes, resource flexibility can be measured from the perspective of adjusting product strategy, resetting the resource chain, and reallocating resources. Zhang Hongbing [18] believed that strategic flexibility refers to the ability of an enterprise to put resources into a new environment according to changes in the external environment, and according to the theory of dynamic capability school, strategic flexibility is divided into capacity flexibility and resource flexibility. Han Chen and Gao Shanxing pointed out that strategic flexibility is the ability of an enterprise to change its existing strategy to cope with market competition. It is determined by the inherent flexibility of the disposable resources and the ability to dominate the resources [19]. Based on the research of scholars such as Sanchez, Zhang Hongbing, and Han Chen, this paper considers that strategic flexibility is a forward-looking ability for enterprises to respond to environmental changes by changing strategic behavior and coordinating resource allocation. Two indicators. Resource flexibility indicates the applicability of enterprise resources, and coordination flexibility is the ability of an enterprise to allocate resources.

2.1.3 Performance of manufacturing enterprises as a service

Manufacturing service-oriented was first proposed by scholars Vandermenwe and Rada [20]. In short, they believe that service-oriented is a "service package" that only provides goods and services to manufacturing enterprises in order to achieve value-added. change. Szalavetz [21] divided the manufacturing service into two cases in the research. One is internal service, that is, from internal product development, design, pre-job training and extended training of employees to human resource management of the organization. , Accounting, legal, financial services and other functions. The second is external service, which refers to the increasingly complex and important services provided to customers, which include not only product maintenance, but also some intangible services such as product transportation, installation, and technical support. Scholar Hu Chaping [22] believes that the core of the definition of manufacturing service-oriented is the provision and development of services on the basis of products, and service provision is a key part of the transformation and upgrading of manufacturing enterprises to service-oriented. According to the research results of previous scholars, we can see that the manufacturing service is divided into two levels. One is service-oriented, which emphasizes the importance of internal service elements in the production process of enterprises. The other is the input of output, emphasizing that it is increasingly important for companies to provide customers with a "product + service" package in the output. In summary, this article defines manufacturing service as a process in which manufacturing companies integrate products and services innovatively in order to increase economic benefits and gain competitive advantage based on customer needs. Manufacturing service-oriented performance is the effect caused by manufacturing companies implementing service-oriented transformation.

2.2 The relationship between network capabilities and strategic flexibility

Among network capabilities, the network vision capability is a high-end management capability at a strategic level. It requires companies to consider their own development issues and predict the direction of network evolution, and efficiently identify the strategic opportunities contained in external networks. Enterprises need to adjust the corresponding strategy in time, in order to obtain various key information and knowledge, and tap the existing or potential value in the network [23]. Based on the research of previous scholars, it is not difficult to find that the ability of network vision emphasizes that enterprises must seize the opportunity to join new innovative networks. The problems caused by stale knowledge and low information value, on the other hand, emphasized that enterprises should constantly adjust their development strategies and adjust their ability to use resources in accordance with external dynamic environments. Network relationship capability is an enterprise capability that positions the enterprise as a whole, formulates various network management tasks according to strategic goals, and executes them to promote network transformation and obtain the

best benefits. Specifically, it includes four dimensions: network development, network connection, network learning, and network control [24]. Network development requires enterprises to actively contact potential partners with resources. Network connection refers to the establishment of cooperative relationships through the deployment of effective personnel activities. Network learning means that companies value the accumulation and feedback of knowledge and experience in the process of cooperation. Orientation and internal orientation control the results of network cooperation. Network construction emphasizes that the enterprise performs various management tasks of coordinating and controlling the network, thereby guiding the network to evolve in a direction beneficial to itself and enabling the enterprise to occupy an advantageous position in the network [25]. Occupying an advantageous position or network center position will help enterprises to obtain more information sources and make better use of partners' resources, and it can be considered that the resources of enterprises are more flexible. At the same time, companies in an advantageous position can establish their own competitive rules and standards, and have greater power in bargaining, which makes them more flexible in coordinating and allocating resources [26]. Based on the above theoretical analysis, this article makes the following assumptions:

H1: Network capability has a significant positive effect on resource flexibility

H1a: Network vision capability has a significant positive effect on resource flexibility

H1b: Network relationship capability has a significant positive effect on resource flexibility

H2: Network capabilities have a significant positive effect on coordination flexibility

H2a: Network vision capabilities have a significant positive effect on coordination flexibility

H2b: Network relationship capability has a significant positive effect on coordination flexibility

2.3 Network Capabilities and Manufacturing Service Performance

In order to improve the competitiveness and performance of traditional manufacturing enterprises, traditional manufacturing enterprises have expanded their business from pure product areas to service areas and transformed them into services. However, in the research of scholars, it is found that service-oriented is a double-edged sword, which has a favorable side. At the same time, in the process of enterprise transformation and upgrade, it will also bring a substantial increase in operating costs and management difficulties [30]. In the case of China's incomplete market system, in order to reduce the transaction costs incurred in the service-oriented process, reduce the risks in the business process, and obtain the resources required for market competition and its own growth, companies may establish network relationships with the outside society [31]. In other words, in the current market environment, the ability to plan, build, and manage an enterprise's external network is of great significance to companies in service transformation. Maintaining a good interactive relationship with external networks helps manufacturing companies and other institutions to collaborate on various resources such as technology, funds, and personnel, enabling them to respond quickly to market changes, opening up new market growth opportunities, and Improve the market competitiveness of enterprises [5]. Parida V, Pesämaa O, and Wincent J [3] proposed that network capabilities have an irreplaceable effect on the competitiveness of high-tech startups and the improvement of corporate performance. From the perspective of tacit knowledge acquisition, Fan Jun and Wang Jinwei have analyzed the ability of network capabilities to The impact of entrepreneurial growth performance. Zhu Xiumei [32] and others constructed a relationship model of network capability, resource acquisition and new enterprise performance, and explained how to improve enterprise performance by constructing and managing external networks. Based on the above theoretical analysis, this article makes the following assumptions:

H3: Network capabilities have a significant positive effect on service performance of manufacturing companies

H3a: Network vision capability has a significant positive effect on the service performance of manufacturing enterprises

H3b: Network relationship capability has a significant positive effect on the service performance of manufacturing companies.

2.4 Strategic Flexibility and Service Performance of Manufacturing Enterprises

Manufacturing enterprises must have certain conditions to successfully implement service-oriented transformation and improve corporate performance. First of all, manufacturing enterprises should pay close attention to market dynamics, and the services provided should be the services most urgently needed in the market environment at that time. Second, companies need to coordinate internal and external resources, such as manpower deployment, to serve the service-oriented transformation. At the same time, the service of enterprises should be based on existing knowledge storage, technical experience and resource allocation. This can reduce the cost of transformation and operational risks to a certain extent [32]. Obviously, the improvement of service-oriented performance is inseparable from the efficient use of resources and the ability to coordinate resources. Strategic flexibility emphasizes acquiring flexible resources and coordinating the use of flexible resources to cope with the changing competitive environment. The high flexibility of the enterprise's resources means that the enterprise can expand the scope of resource use and reduce the cost of resource use. Then the enterprise can change its business strategy with less cost and less time. Land can increase the effectiveness of the business. The higher the coordination flexibility of an enterprise, it means that when the service environment changes, the enterprise can use its ability in resource coordination and allocation to respond, and the competitive advantage is stronger [33]. Lu Yanqiu's research on enterprises in Northeast China found that the stronger the strategic flexibility, the higher the innovation performance of the enterprise. Wang Yonggui and other scholars studied the relationship between strategic flexibility and competitive performance, and found that strategic flexibility is an important factor affecting the performance of Chinese enterprises. In summary, this article makes the following assumptions:

H4: Strategic flexibility has a significant positive effect on the service performance of manufacturing companies

H4a: Resource flexibility has a significant positive effect on manufacturing service performance

H4b: Coordination flexibility has a significant positive effect on manufacturing service performance

2.5 Model Construction

Based on the above theoretical analysis and research assumptions, this paper builds a conceptual model for the study of the impact of network capabilities on the strategic flexibility and service performance of manufacturing enterprises, as shown in Figure 1:

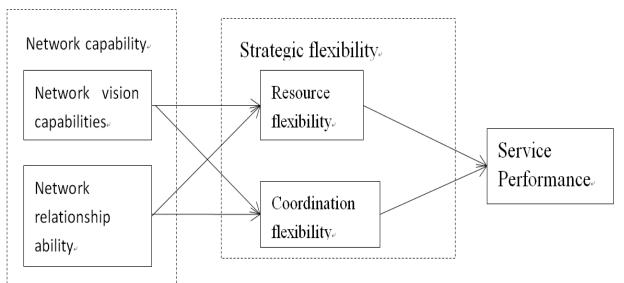


Fig. 1 Conceptual model

3. Research Design

3.1 Data collection

During the January-April 2019 period, field surveys, mailings, and e-mails were used to survey midlevel and above managers of 450 companies in Shaanxi, Henan, and Shenyang. A total of 600 questionnaires were distributed and 530 were recovered. The recovery rate was 88.33%, 494 valid questionnaires, and the effective rate was 93.21%. Among them, invalid questionnaires were eliminated due to incomplete filling or too many default values. The sample data all passed the T test. There were no significant differences in the items such as the size of the enterprise, the type of enterprise, and the life cycle of the enterprise, indicating that there were no differences in the answers. Among all the interviewees, middle and senior managers accounted for nearly 80%. Among the interviewed enterprises, most of them are non-state-owned.

3.2 Research Scale

This paper mainly draws on and uses the existing scales in the existing literature at home and abroad, and then corrects the measurement problems through the steps of pre-investigation and in-depth interviews with senior personnel of the enterprise, and finally forms a formal measurement scale.

Network capabilities are mainly referenced from MOLLER and other scales, such as Ren Shenggang, and are measured from four dimensions: network vision capability, network construction capability, relationship management capability, and combination management capability. There are 19 measurement items.

Strategic flexibility mainly refers to the scales of Sanchez (1995), Kevin and Fang (2010). It divides strategic flexibility into two dimensions of resource flexibility and coordination flexibility, forming 8 measurement items. Manufacturing service-oriented performance mainly refers to scales such as Antioco et al. (2008) and Aifang Guo et al. (2015). The measurement content mainly includes financial performance and non-financial performance. There are 7 measurement items.

Control variables. In order to focus on the relationship between the above core variables, this article lists factors such as the size, nature, and life cycle of enterprises that may affect the performance of manufacturing services as control variables. The impact of enterprise scale on manufacturing service has been confirmed by many research institutes and has been included in the control variable. This article measures the enterprise size by the number of employees according to the "Statistics for the Classification of Large, Medium, Small, and Small Enterprises in Statistics" issued by the National Bureau of Statistics of 2011. The research on the nature of enterprises in this paper is mainly divided into two categories: state-owned enterprises and non-state-owned enterprises. Generally speaking, state-owned enterprises have a relatively solid organizational structure, and they cannot flexibly change the external market environment like non-state-owned enterprises. Therefore, under the strategic environment of service-oriented transformation, state-owned enterprises are not as advantageous as non-state-owned enterprises

3.3 Reliability and validity analysis

Before the hypothesis test analysis, the exploratory factor analysis was first performed on network capabilities, strategic flexibility, and service performance of manufacturing enterprises. Their KMO values were greater than 0.8, and the significance probability of the Bartlett sphere test was 0.000, indicating that the validity of the content of the measurement scale is relatively high. OK, see Table 1. After exploratory factor analysis, confirmatory factor analysis was performed on the sample data to verify the convergence validity of the variables, and discriminant validity tests were performed on all variables based on the calculated average variation extraction.

| variable | Dimension | Number of items | Alpha co | oefficient |
|----------|-----------|-----------------|----------|------------|
| NC | NVC | 7 | 0.914 | 0.913 |

Table 1 Exploratory sample analysis and Bartlett's test of sphericity

| | NRC | 8 | | 0.912 |
|----|-----|---|-------|-------|
| | RF | 3 | | 0.806 |
| SF | CF | 5 | 0.821 | 0.869 |
| SP | | 7 | 0.897 | |

According to confirmatory factor analysis, all measurement questions of the same variable in the scale are distributed on the same factor. The factor load of the measurement items in each dimension is greater than 0.5, and the factor loads in other dimensions are less than 0.5, indicating the difference between validity and Convergence validity is better. Validity analysis of the variables found that the Cronbach 's α coefficients of each variable were greater than 0.8, indicating that the scale was stable and reliable overall and had good internal consistency.

 Table 2 Reliability test and exploratory factor analysis of each variable

| Latent variable | Measurement question | Factor load | alpha coefficient | | |
|-----------------|----------------------|-------------|-------------------|--|--|
| | A1 | 0.786 | 0.913 | | |
| NUC | A2 | 0.843 | | | |
| NVC | A3 | 0.800 | | | |
| | A4 | 0.794 | | | |
| | A5 | 0.754 | | | |
| | A6 | 0.821 | | | |
| | A7 | 0.749 | | | |
| | A8 | 0.717 | | | |
| | A9 | 0.819 | | | |
| | A10 | 0.722 | | | |
| NDC | A11 | 0.760 | 0.012 | | |
| NRC | A12 | 0.789 | 0.912 | | |
| | A13 | 0.766 | | | |
| | A14 | 0.769 | | | |
| | A15 | 0.813 | | | |
| | B1 | 0.852 | | | |
| RF | B2 | 0.842 | 0.806 | | |
| | B3 | 0.829 | | | |
| | B4 | 0.765 | | | |
| | B5 | 0.866 | | | |
| CF | B6 | 0.796 | 0.869 | | |
| | B7 | 0.781 | | | |
| | B8 | 0.811 | | | |
| | C1 | 0.770 | | | |
| | C2 | 0.797 | | | |
| SP | C3 | 0.771 | 0.897 | | |
| | C4 | 0.786 | | | |
| | C5 | 0.847 | | | |

| C6 | 0.781 |
|----|-------|
| C7 | 0.755 |

The correlation analysis results (see Table 3) show that the correlation coefficients between the four dimensions of network capabilities and the two dimensions of strategic flexibility and the service performance of manufacturing enterprises are between 0.228 and 0.654, indicating that there is a moderately low positive correlation between the variables The common variation among variables is low, which can further analyze the causal relationship between various dimensions of network capabilities, strategic flexibility and service performance of manufacturing enterprises.

| | | | 2 | | | | |
|----------|-------|--------------------|--------|--------|--------|--------|---|
| variable | Mean | Standard deviation | 1 | 2 | 3 | 4 | 5 |
| 1 NVC | 5.687 | 1.045 | 1 | | | | |
| 2 NRC | 5.765 | 1.132 | .424** | 1 | | | |
| 3 RF | 5.213 | 1.125 | .273** | .310** | 1 | | |
| 4 CF | 5.378 | 1.056 | .217** | .347** | 262** | 1 | |
| 5 SP | 5.054 | 1.425 | .419** | .423** | .430** | .323** | 1 |

Table 3 Correlation analysis of various variables

| |] | Fable - | 4 Analysis result | s of the modified | model | | | | |
|--------------------|-------------|---------|-------------------------------------|-------------------|-----------|-----------|-----------|-----------|--|
| Hypothetical path | | | Standardized regression coefficient | | C.F | C.R. | | Р | |
| NVC→RF | | | 0.174 | | 2.42 | 2.425 | | 0.000 | |
| NRC- | →RF | | 0.293 | | 2.77 | 2.774 | | 0.003 | |
| NRC- | →CF | | 0. | 0.351 2.052 | | 52 | 0.000 | | |
| NVC→SP | | 0.260 | | 2.052 | | 0.000 | | | |
| NRC→SP | | 0.348 | | 2.05 | 2.052 | | 0.000 | | |
| RF→SP | | 0.332 | | 8.05 | 8.056 | | 0.001 | | |
| CF→SP | | 0.276 | | 7.473 | | 0.002 | | | |
| Fitting indicators | X2 | df | р | X2 /df | RMSE A | GFI | NFI | CFI | |
| specificvalue | 819.69 9 | 43 3 | 0.000 | 1.893 | 0.053 | 0.89 3 | 0.91 0 | 0.91 2 | |

**. Significant correlation at level 0.01 (two-tailed)

3.4 Structural equation model analysis

Hypothesis testing was performed using a structural equation model, and data analysis was performed using AMOS 23.0 software. In the initial test model, the path strength of the network vision capability to coordination flexibility did not meet the fitting requirements. After deleting the above path, the structural equation correction model and analysis results obtained are shown in Table 4 and Figure 5. The correction model The fit is good and has been improved compared to the initial model without further correction. The value of χ^2 of the model is 819.699 (df = 433), that is, the ratio of the chi-square value of the model to the degree of freedom is 1.893 and less than 2; the goodness-of-fit index GFI is close to 0.9; Reference values; the values of standard fitting indices NFI and CFI are greater than 0.9; the normalized regression coefficients between all explicit and latent variables are above 0.5, the corresponding CR values are greater than the critical value of 1.96, and the relevant normalization path is at least 0.05 The level of CR between all endogenous and exogenous latent variables is greater than 1.96, indicating that the relevant path is statistically significant at least at the level of P = 0.05. It can be seen that except for the assumption that H2a has not been verified, all other assumptions can be effectively verified.

4. Conclusion

4.1 Conclusion and discussion

The ability of network vision has a significant positive impact on the flexibility and coordination flexibility of manufacturing enterprises. Network vision capability is the strategic planning ability of an enterprise to identify and develop external network relationships, and is conducive to discovering valuable information and resources in the network organization system. Through network vision capabilities, in terms of service-oriented transformation, manufacturing enterprises can obtain high-quality information and resources. At the same time, it also provides guidance for the use of resources for the organization of service-oriented transformation that requires re-coordination of resources.

Network relationship capability has a significant positive impact on the flexibility and coordination flexibility of manufacturing enterprises. Network relationship capability guides the external network to change towards the development of the enterprise by formulating and executing various management tasks, helping the enterprise to place itself in the most valuable center of the network. The centrally located enterprises have the advantages of multiple links, which can not only obtain more information sources and professional knowledge about service-oriented, but also control the resources in external networks to flow to projects that are conducive to service-oriented upgrades, and improve manufacturing Corporate strategic flexibility.

Both resource flexibility and coordination flexibility have a significant positive impact on manufacturing service performance. The flexible resources obtained from the external network can reduce the risk of a service-oriented transformation strategy for manufacturing enterprise managers. Flexible resources have a low level of equipment dedicated to assets. On the one hand, tangible resources such as personnel and equipment have a certain scope of adaptation; on the other hand, the flexible characteristics of intangible resources such as supplier relationships and financing capabilities are also different. For example, harmonious partnerships can deal with various uncertainties in the financing process. Coordination and flexibility can help enterprises make the most of the utility of resources, thereby reducing the cost of service-oriented transformation. When the total amount of resources of an enterprise is constant, the stronger the coordination flexibility of the enterprise, the stronger its ability to use and allocate resources, so that limited resources can play the greatest role.

4.2 Management inspiration

Manufacturing enterprises should continuously strengthen their network capabilities and increase the utility and value of external networks. Good external network relationships can provide manufacturing companies with the knowledge, information, technology and capabilities needed for service-oriented transformation, thereby significantly improving their service-oriented performance. Specifically, the value of external networks can be enhanced from four aspects: First, companies should expand their external network scale, fully communicate with different industry organizations, and develop in the direction of diversified networks. The second is to evaluate and screen network cooperation partners, and establish contacts with those organizations that are very important to the enterprise and have irreplaceability. The third is to maintain and optimize the relationship with network objects, promote the trust of both parties, and thereby improve the quality of network cooperation. The fourth is to tap flexible resources embedded in the network through exchanges and cooperation with suppliers, research institutes and customers.

Manufacturing enterprises should make full use of network capabilities for service-oriented transformation. Different from the traditional production process of manufacturing enterprises, the collection and processing of consumer big data is the core link of service-oriented upgrading. Specifically, enterprises need both a comprehensive data source and professional big data processing talents and a comprehensive big data network platform. These resources are difficult to create only by the enterprise itself, and they are required to obtain them with the help of external networks. Therefore, manufacturing enterprises should make full use of network construction and portfolio management capabilities to establish mutually beneficial relationships with external network entities

such as suppliers, research institutes, competitors and customers, and strengthen cooperation in data resources and human resources, so as to continuously improve Service-oriented performance of enterprises.

Manufacturing companies should avoid excessive dependence on external network resources. It is true that external networks can bring rich resources to enterprises and help them transform into services. However, maintaining the network also requires a certain cost. If the benefits brought by the external network are less than the predicted target revenue, then the performance of service-oriented will be reduced and become a burden on the enterprise. Therefore, manufacturing companies must implement service-oriented transformation based on internal factor resources and conditions. In other words, the enterprise should strengthen the internal construction of the organization, so as to lay the foundation for the enterprise to coordinate and allocate resources.

4.3 Limitations and Prospects of Research

Due to the limited research conditions and capabilities, this study may have shortcomings or limitations in the following three aspects: First, a random questionnaire was used to conduct the survey in the study, and the sample types of the questionnaires were complex. The collection of samples from remote areas is collected on their behalf. The completeness and reliability of the questionnaire filling are challenged, and there is a certain degree of information distortion. The second is that this article mainly studies the relationship between network capabilities, strategic flexibility and service-oriented performance. It does not involve other factors and variables that may be affected. Future research will further discuss different enterprise ages, different geographical locations, and enterprise sizes. Under different conditions, is there any difference in the impact of network capabilities on strategic flexibility and service performance. In future research, the above issues should be fully considered, and the mechanism of the impact of network capabilities of manufacturing enterprises on strategic flexibility and enterprise service performance should be explored in the context of a more systematic, deeper, and broader knowledge theory.

References

- [1] Hakansson H. Industrial Technological Development: A Network Approach [M]. London: Crom Helm, 1987.
- [2] Ritter T, Gemunden H G. Network competence: Its impact on innovation successand its antecedences [J]. journal of Research , 2003,56(9):745-755
- [3] Paeida V, Pesämaa O, Wincent J, et al. Network capability, innovativeness, and performance: a multidimensional extension for entrepreneurship [J]. Entrepreneurship & Regional Development, 2017, 29(1-2):1-22.
- [4] Shu R , Ren S , Zheng Y . Building networks into discovery: The link between entrepreneur network capability and entrepreneurial opportunity discovery [J]. Journal of Business Research, 2018, 85:197-208.
- [5] Crozet M , Milet E . Should everybody be in services? The effect of servitization on manufacturing firm performance[J]. Journal of Economics & Management Strategy, 2017.
- [6] MollerK K, Halinen A. Business relationships and networks: Managerial Challenges of network era [J]. Industrial Marketing Management, 1999, 28(5):413 -427.
- [7] SANCJEZ R. Preparing for an Uncertain Future: Managing Organizations for Strategic Flexibility [J]. International Studies of Management & Organiza-tion, 1997,27(2): 71-94.
- [8] MB COOK, TA BHAMRA, M LEMON. The transfer and application of Products Service System: from academia to UK manufacturing firm [J]. Journal of clearner Production, 2006,(14): 1454-1465.
- [9] Elif Bascavusoglu-Moreau,Bruce Tether.Sevitization,survival and productivity [J]. Copenhagen Business School, Denmark, 2010, June 15-17.

- [10] Mathieu V. Serivice strategies within the manufacturing sector: Benefits, costs and partnership[J]. Int.J.Serv.Ind.Man-age, 2001(a),12(5):451-475.
- [11]OECD. Productivity Manual: A guide to the measurement of industry-level and aggregate productivity growth [R]. Paris:Statistics Directorate, Directorate for Science, Technology and Industry, 2001.
- [12] White A. Moving Base into High-value Integrated Solutions: a Value Stream approach [J]. Industrial and Corporate Change,2006.
- [13]Neely A. Exploring the financial consequences of the ser-vitization of manufacturing [J]. Operations Management Re-search,2009,1(2):103-118.
- [14]Baveja, J Gilbert, D Ledingham. From products to services:why it 's not so simple [J].Harvard Management Update,2004,9(4) : 3-5.
- [15]Gebauer H, Fleisch E, Friedli T. Overcoming the ser-vice paradox in manufacturing companies[J]. European Management Journal, 2005,23(5):14-26.
- [16] Adler P S,Kwon S W. Social capital: prospects for a new concept [J]. Academy of Management Review,2002,27(1):17-40
- [17] Moller K, Halinen A. Business relationships and networks: managerial challenge of network era [J].Industrial Marketing Management,1999,(28): 413-427.
- [18]Zhang Hongbing. The Mechanism of Knowledge Transfer on Alliance Firms' Innovation Performance——Taking Strategic Flexibility as the Medium [J]. Research Management, 2015, 36 (7): 1-9.
- [19] Han Chen, Gao Shanxing. Research on the relationship between strategic flexibility, strategic innovation and management innovation [J]. Management Science, 2017, 30 (2): 16-26.
- [20] VANDERMERWE S, RADA J. Servitization of Business: Adding Value by Adding Service[J]. Europ-ean Management Journal, 1988, 6 (4): 314-324.
- [21]SZALAVETZ A. Tertiarization of manufacturing industry in the new economy: experience in Hungarian companies [D].HungarianAcademy of Science Working Papers,2003(3).
- [22]Hu Chaping, Wang Tao, Zhu Liya. Generating Logic of Manufacturing Service Performance— —Based on the Perspective of Enterprise Capability Theory [J]. Scientific Research Management, 2018, V39 (5): 129-137.
- [23] Li Deqiang, Peng Can, Yang Hong. Impact of Network Capability on Dual Innovation Synergy: Moderating Role of Environmental Dynamics [J]. Science and Technology Management Research, 2017 (10).
- [24]Zhu Xiaoqin. Research on Network Capabilities of Chinese Manufacturing Enterprises— Based on Internal and External Perspectives [J]. Technology Economics and Management Research, 2012 (5): 65-69.
- [25]Fang Gang. Research on Network Capability Structure and Its Effect on Enterprise Innovation Performance [J]. Studies in Science of Science, 2011, 29 (3).
- [26] Rowley, T., Behrens, D. & Krackhardt, D. Redundant governance structures: An analysis of structural and relational embeddedness in the steel and semiconductor industries. Strategic management journal, 2000, 21(3): 369-386.
- [27] Xing Xiaoqiang, Tong Yunji, XINGXiao-qiang, et al. Network Capability: Analysis of Concept, Structure and Influencing Factors [J]. Studies in Science of Science, 2006, 24 (A02): 558-563.
- [28]Fan Jun, Wang Jinwei. Network Capability, Tacit Knowledge Acquisition and Growth Performance of Startups [J]. Studies in Science of Science, 2011, 29 (9): 1365-1373.
- [29]Carson, S., Madhok, A., Varman, R., et al. Information processing moderators of the effectiveness of trust-based governance in interfirm R & D collaboration. Organization Science, 2003, 14 (1), 45-46.

- [30]Xiao Ting. Re-demonstration of "Performance-Service Paradox" of Chinese Manufacturing Enterprises [J]. Science of Science and Technology Management, 2015, 36 (10): 123-134.
- [31]Chen Jiexiong. Empirical Test of Manufacturing Service and Operational Performance: Based on the Comparison of Chinese and American Listed Companies [J]. Business Economics and Management, 2010, 222 (4): 33-41.
- [32]Zhu Xiumei, Chen Chen, Cai Li. Empirical Research on the Relationship between Network Capability, Resource Acquisition and New Enterprise Performance [J]. Journal of Management Sciences in China, 2010, 13 (4): 44-56.
- [33]Lu Yanqiu. Organization forgetting and innovation performance: the mediating role of strategic flexibility [J]. Scientific Research Management, 2014, V35 (3): 58-65.
- [34]Ni Yuan, Fan Hui, Zhang Jian. Network Capability, Active Organization Forgetting and Proactive Business Model Innovation [J / OL]. Science and Technology Progress and Countermeasures: 1-7 [2019-05-09].