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The Effect of Failure-based Learning on Servitization Strategy -- Based on the Mediating Effect of Innovation Capability

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Abstract

From the perspective of resource-based view and the theory of company's capacity, this paper discusses the relationship between Failure-based learning and servitization strategy and the mediating effect of innovation capability. Through the analysis of 307 sample data of manufacturing enterprises in China, it gets these results as the follow. Failure-based learning has a significant positive impact on servitization strategy. Innovation ability plays a mediating role in the impact of Failure-based learning on servitization strategy. In the path of Failure-based learning affecting servitization strategy, exploratory innovation capability can promote exploitative innovation capability.

Keywords

Servitization Strategy; Failure-based Learning; Innovation Capability; Manufacturing Enterprise.

1. Introduction

With the development of economic globalization and the acceleration of technological innovation in manufacturing industry, the competition among manufacturing enterprises has become especially fierce, and the homogeneity of products has become increasingly serious. In order to improve this situation, some manufacturing enterprises have undergone a service transformation in order to meet the rich demand of consumers, help them gain the competitive advantage of differentiation, and improve their overall performance [1]. But the service process of manufacturing enterprises is not plain sailing, some enterprises will encounter service difficulties or even service failure. Failure may cause the enterprise to suffer the huge loss, as well as damages the enterprise reputation and so on each kind of negative influence. But there are also valuable opportunities in failure, and they are an important source of improvement and innovation for companies [2]. Therefore, it is particularly important for companies to learn from failures, to think about the causes of failures and to explore new opportunities. According to the resource-based theory, the enterprise's heterogeneous resources can promote the enterprise's competitiveness and keep the enterprise's competitive advantage. Studies such as Eric et al [3] show that surplus firm resources can positively promote service-oriented performance. As a unique resource accumulated by enterprises, it is urgent to study whether Failure-based learning can help manufacturing enterprises to complete servitization. Previous studies on Failure-based learning have either studied the impact of Failure-based learning on enterprises from the perspective of entrepreneurship, or divided it into individual, group and organizational Failure-based learning according to different levels of research [4], to study its impact on corporate strategy, performance and so on, ignoring the possible differential impact of Failure-based learning from different sources. Based on this, this paper divides Failure-based learning into internal Failure-based learning from internal organization and external Failure-based learning from external organization to test their influence on servitization strategy separately.

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According to the theory of enterprise capability, various heterogeneous resources created and accumulated by an enterprise in the course of its development are the source of the gradual development of enterprise capability, at the same time, these heterogeneous resources are also an important basis for enterprises to build their own competitiveness. In addition, the study of enterprise capability theory also holds that the key to the success of an enterprise lies in its special ability to collocate, develop and utilize resources. Only by virtue of these special abilities can it make full use of the heterogeneous resources of an organization and bring into play the value of these resources, to stay ahead of the competition [5]. It is obvious that ability is the decisive factor that affects the heterogeneity of the enterprise, and is also one of the key factors that make the enterprise goal, carry out the strategy and finally form the competitive advantage. As an exploratory innovation behavior, servitization strategy is not only the innovation of process or product combination, but also the change of business model and organizational culture. Manufacturing companies develop servitization strategy and through Failure-based learning, they need not only to explore new service and product combinations in line with consumer demand and other market conditions in order to align their value proposition with the market environment, but also to improve their service processes and optimize their resource allocation in order to continuously improve their performance. However, how does Failure-based learning as a valuable resource affect servitization strategy? Are there differences in the effects of Failure-based learning in different modes on servitization strategies? How does the innovation capabilities affect the relationship between Failure-based learning and servitization strategy? These problems have not been paid enough attention in the past research. Based on the resource-based view and enterprise capability theory, this paper explores the relationship between Failure-based learning and Service Strategy from the resource-capability-strategy perspective, and the intermediary mechanism of innovation capability. Based on the resource-based view and enterprise capability theory, this paper explores the relationship between Failure-based learning and servitization strategy from the resource-capability-strategy perspective, and the intermediary mechanism of innovation capability.

2. Theories and Hypotheses

2.1. Failure-based Learning and Servitization Strategy

The servitization strategy is to examine the service transformation of the manufacturing enterprises from the strategic perspective, which means that the enterprises no longer tend to provide only a single product, but turn their focus to provide product-service combination, and gradually expand the services related to products, a strategic shift that makes services increasingly dominant throughout the portfolio. Failure-based learning is to solve problems or prevent potential problems, while achieving the original goal, individuals, teams and organizations begin to explore the causes of failure and learn from the experience, learn from them to prevent failure from happening again. It is not uncommon for manufacturing enterprises to encounter service dilemma or servitization failure in the process of implementing service strategy. Through Failure-based learning, enterprises can recognize their own limitations, identify traps, understand the knowledge, human and technical resources needed for servitization, and take corresponding measures to improve. This is of great significance to follow-up servitization, and it is a valuable knowledge resource for enterprises. To some extent, the resources and capabilities possessed by an enterprise also determine its strategy implementation. Resources can create favorable conditions for an enterprise to deal with external shocks. The more resources an enterprise has, the more strategies it can choose, it can be said that the type and quantity of resources that an enterprise owns determines the direction and speed of its future development. Manufacturing enterprises learn from the failure

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of their own or other enterprises' experiences of servitization, absorb and accumulate unique knowledge resources, which help them to find their own suitable path of servitization and successfully implement their servitization strategies. By integrating internal and external experiences and learning from failures, enterprises can extract and create their own unique knowledge, which includes knowledge on service innovation, service process optimisation and market sniffing. Based on this, guiding the development of servitization, creating competitive products, rational service processes and accurate insight into market needs can help companies to successfully carry out their servitization strategy. Accordingly, the following assumptions are made:

H1a: Internal Failure-based learning has a positive impact on servitization strategy.

H1b: External Failure-based learning has a positive impact on servitization strategy.

2.2. Failure-based Learning and Innovation Capabilities

2.2.1. Internal Failure-based Learning and Innovation Capabilities

The ability of an enterprise is a comprehensive system composed of knowledge, special skills and related resources accumulated gradually in the long-term development of an enterprise, and it is gradually embodied as the ability of an enterprise, it can be seen that all kinds of resources are the basis of the formation of enterprise capabilities. Innovation is regarded as an individual and collective learning process, aiming at finding new ways to solve problems, so the innovation ability of enterprises depends on the ability of acquiring new knowledge. The acquisition of new knowledge is the source and foundation of enterprise innovation, which can promote enterprise innovation capability and thus promote innovation performance. Organizations develop new products, services, technologies, etc. by integrating internal knowledge and resources and creating new knowledge through internal Failure-based learning, this will allow for a shift from learning and knowledge creation in specific areas to sustainable innovation [6]. On the one hand, enterprises focus on the existing knowledge through internal Failure-based learning, emphasizing the improvement and integration of the existing knowledge, resources and skills of enterprises, which can effectively promote exploitation innovation capability; on the other hand, enterprises learn from internal failure, rethinking existing knowledge to create new knowledge, as a source of innovation, can promote exploration innovation capability. In addition, enterprises carry out Failure-based learning from their own knowledge streams, and promote knowledge sharing and interaction within the enterprise, which creates a good emotional and cultural atmosphere for the common innovation goals of the organization. A culture of sharing and shared goals encourages employees to share their knowledge and opinions with each other, which contributes to organizational innovation. The positive communication, Failure-based learning, mutual thinking and new inspiration among the main bodies of an enterprise are conducive to the birth of innovation, which has a great impact on the improvement of the innovation ability of an enterprise. On this basis, we propose the following assumptions:

H2a: Internal Failure-based learning has a positive effect on exploration innovation capability.

H2b: Internal Failure-based learning has a positive effect on exploitation innovation capability.

2.2.2. External Failure-based Learning and Innovation Capabilities

The heterogeneous knowledge resources obtained from the outside are the resource guarantee for the organization to implement various innovations, and the improvement of the organization's innovation ability depends on the organization's learning and using these knowledge resources. As a process of learning and inspiring inspiration, external Failure-based learning has many effects on innovation ability. The long-distance heterogeneous information obtained by enterprises from channels is conducive to the emergence of innovation, especially the breakthrough innovation. Specifically, when an enterprise is learning from external failures,

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it can collide with the enterprises in different positions of the industrial chain or even in different industries, so that the knowledge in different fields can be fed interactively, and then combined and reconstructed, to generate new heterogeneous knowledge; in addition, by learning from external failures, firms are able to recognize the knowledge gap between themselves and external firms or organizations, prompting them to work harder to absorb different knowledge, to make up for their own lack of knowledge resources, for the enterprise to lay a solid foundation for innovation. In this way, companies can integrate knowledge under different perspectives and logics, which can burst new inspirations, discover important innovation elements and finally achieve innovation. Accordingly, this paper proposes the following hypothesis:

H3a: External Failure-based learning has a positive effect on exploration innovation capability.

H3b: External Failure-based learning has a positive effect on exploitation innovation capability.

2.3. Innovation Capabilities and Servitization Strategy

Strategy is a long-term development strategy made by an enterprise based on its own resources and capabilities, taking into account changes in the external environment and threats to the industry environment, in order to maintain a competitive advantage and achieve corporate goals, which shows the important impact of corporate capabilities on the implementation of corporate strategy. The acceleration of global competition, the shortening of product cycles, and the growth in the number of new entrants have led current manufacturing firms to choose to implement servitization strategy to address existing threats [7], and innovation capability is a key driver of servitization transformation for manufacturing firms and one of the indispensable capabilities on their path to development. On the one hand, exploration innovation capability drives organizations to explore new knowledge and develop new skills, helping them to create new service-product combinations and service models to open up new markets and satisfy new customers. Developing new service and product portfolios and opening up new markets can bring new profits and opportunities for companies, as well as enhance customer satisfaction and contribute to the implementation of servitization strategy. On the other hand, by exploitation innovation capability to improve and optimize existing service designs and processes, companies can satisfy existing customers and market needs and strengthen their market position. The improvement of existing products and services can increase user stickiness and maintain the existing development trend of the company, which is the basis for the implementation of servitization strategy. For manufacturing companies, implementing a servitization strategy can improve consumer satisfaction, while finding new profit growth points for the company, which is a path of exploration in a competitive environment. Innovation capability can help companies find their unique strengths from existing resources and turn them into innovations to improve or create new service models beyond the limitations of existing ones. Accordingly, this paper proposes the hypothesis that:

H4a: Exploration innovation capability has a positive effect on servitization strategy.

H4b: Exploitation innovation capability has a positive effect on servitization strategy.

2.4. Exploration Innovation Capability and Exploitation Innovation Capability

Most studies consider that exploration innovation capability and exploitation innovation capability conflict with each other. Constrained by the environment, resources, capabilities and strategies, organizations have little chance of fully exploiting both at the same time, while exploiting both dynamically can lead to sustainable competitive advantage for firms [8]. For manufacturing companies undertaking servitisation, exploration innovation capability can positively influence exploitation innovation capabilities. At the beginning of a servitization strategy, this is a very experimental path, and it is more important for companies to rely on exploration innovation capability to explore the initial routes of servitization; when

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servitization has been carried out to a certain extent, companies have accumulated some experience and no longer focus on the exploration of servitization models, but rather on the need to improve and optimize the product-service mix, processes, etc. at this stage [9]. Based on this, this paper proposes the hypothesis that:

H5: Exploration innovation capability has a positive effect on exploitation innovation capability.

2.5. The Mediating Role of Innovation Capability

Servitisation is a shift from a focus on products to a focus on service provision in order to meet the individual needs of consumers, expand into new markets and gain a competitive advantage. The innovation capability plays a vital role in the process of servitisation. On the one hand, innovation capability is the basis for companies to improve service coverage, optimize service processes and develop and design new service models. On the other hand, with innovation capability, companies integrate and allocate the valuable resource of Failure-based learning to optimally expand existing services and create new services to match the turbulent environment and changing market needs, which helps to effectively transform the valuable resource of Failure-based learning into a servitization strategy. Based on this, the following hypotheses are proposed:

H6a: Exploration innovation capability partially mediates between internal Failure-based learning and servitization strategy.

H6b: Exploration innovation capability partially mediates between external Failure-based learning and servitization strategy.

H7a: Exploitation innovation capability partially mediates between internal Failure-based learning and servitization strategy.

H7b: Exploitation innovation capability partially mediates between external Failure-based learning and servitisation strategy.

H8a: Exploration and exploitation innovation capabilities act as a chain mediator between internal Failure-based learning and servitization strategy.

H8b: Exploration and exploitation innovation capabilities act as a chain mediator between external Failure-based learning and servitization strategy.

The theoretical model is shown in Figure 1 below.

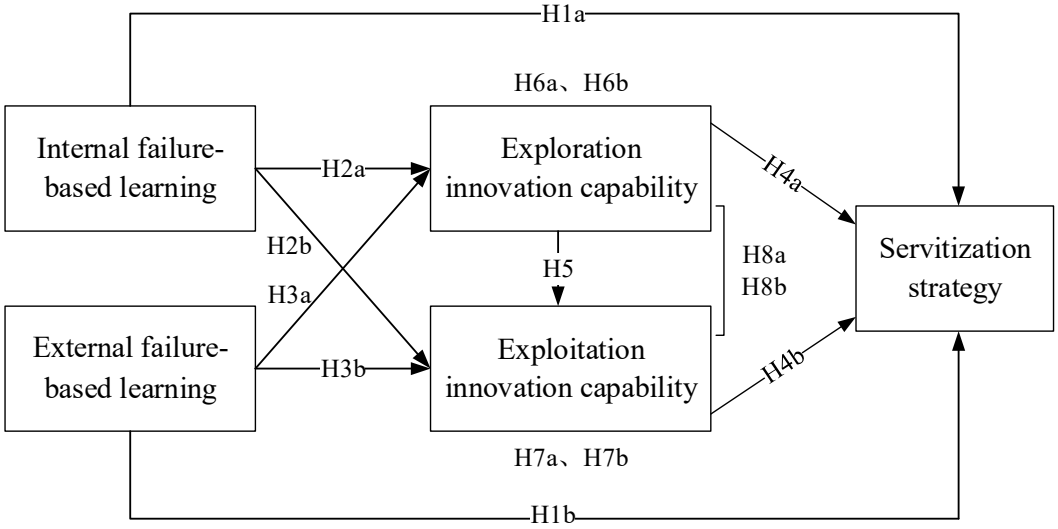

Figure 1. Theoretical model

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3. Methods

3.1. Sample and Data Collection

This study used a questionnaire to obtain data. The subject of this paper is manufacturing companies, so this research was conducted mainly with middle and senior management within manufacturing companies. Firstly, we contacted manufacturing companies across the country through personal contacts and distributed 80 questionnaires to conduct a small sample test, and based on the test results combined with expert corrections, we modified and adjusted the language expression of the relevant questions. In the formal investigation, we commissioned a third-party network platform to issue questionnaires to domestic manufacturing enterprises, with the manufacturing enterprises as the survey unit. Each manufacturing enterprise is limited to one middle and senior management person to fill in the questionnaires, manufacturing Enterprises involved in the metal products industry, food manufacturing, communications equipment and computer and other electronics, transportation equipment manufacturing industries. A total of 5288 questionnaires were distributed, 760 questionnaires were collected, and 307 valid questionnaires were collected, with an effective recovery rate of 5.8%.

3.2. Research Variables

The scales used in this study are the more established scales in the existing literature, both nationally and internationally, and then suitably modified to ensure the reliability of the measurement instrument in relation to the purpose of this study. Specifically, the Likert 5-point scale was used to measure the variables of interest, with 1 indicating strong disagreement and 5 indicating strong agreement. Independent variables: drawing mainly on Hirak's [10] and Bledow's [11] research on internal and external Failure-based learning as a theoretical guide, the items reflecting the characteristics of the two Failure-based learning models were listed as comprehensively as possible, three items each, and after exploratory factor analysis, the insignificant items were removed, resulting in three items each for internal and external Failure-based learning . Mediating variables: Drawing on the study by Yalcinkaya.G et al [8], innovation capability was measured with eight items initially, and then exploratory factor analysis was conducted on the items to remove insignificant ones, leaving five items at the end. Dependent variable: Most of the previous scales considered servitization strategy from the perspective of definition and connotation, focusing more on the theoretical level and less on the realistic factors in the implementation process of enterprises' servitization strategy. There is also no unified standard for the measurement of servitization strategy in academia. Therefore, in order to measure servitization strategy as accurately as possible, the servitization strategy scale was determined on the basis of previous studies, the results of field visits to manufacturing enterprises and expert discussions, with a total of 3 dimensions and 12 question items, and after exploratory factor analysis, 9 question items were finally left.

3.3. Reliability and Validity Tests

In this study, the reliability of the scale was tested using Cronbach's alpha coefficient, where the Cronbach's alpha coefficients for Failure-based learning, innovation capability and servitization strategy were 0.731, 0.726 and 0.824 in that order, all of which were greater than 0.7, indicating that the scale had a good level of reliability. In order to verify the discriminant validity between the factors of the model, a validation factor test was conducted by AMOS 24.0, and then the fit of the five-factor, four-factor, three-factor, two-factor and one-factor models were compared. As shown in Table 1, model 1 (five-factor model) had the best fit ($\chi 2/df=1.508$, RMSA=0.041, GFI=0.928, CFI=0.960, IFI =0.961), and the discriminant validity of the model was good in the overall analysis.

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Table 1. Confirmatory factor analysis for discriminant validity (N=307)

Model	Factor	χ^2/df	RMSA	GFI	CFI	IFI
Model 1 (five-factor model)	A,B,C,D,E	1.508	0.041	0.928	0.960	0.961
Model 2 (four-factor model)	A+B,C,D,E	1.621	0.045	0.919	0.950	0.951
Model 3 (three-factor model)	A+B,C+D,E	1.678	0.047	0.915	0.944	0.945
Model 4 (two-factor model)	A+B+C+D,E	1.93	0.055	0.901	0.923	0.924
Model 5 (one-factor model)	A+B+C+D+E	2.262	0.064	0.886	0.894	0.896

4. Analysis

4.1. Overall Structural Equation Model Testing

AMOS 24.0 was used to analyse the relationships between the role of internal Failure-based learning, external Failure-based learning, exploration innovation capability, exploitation innovation capability and servitisation strategy. The following goodness-of-fit tests were selected: cardinality ratio degrees of freedom (χ2/df), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and value-added fitness index (IFI). The final test results were: χ2/df = 1.967<2, RMSEA = 0.056< 0.08, GFI=0.912>0.9, AGFI=0.883>0.8, CFI=0.923>0.9, IFI=0.925>0.9. Combining the above indicators, it can be concluded that the measurement model fits the actual data relatively well, and the overall fitness of the model is good.

4.2. Path Test of Direct Effect

This paper tests the main hypothesis with the help of AMOS 24.0 and structural equation modelling, and the results of the direct effect obtained (see Table 2), which shows nine paths between the five latent variables. Hypothesis H1a proposes that "internal Failure-based learning has a positive effect on servitization strategy" and the test results show that the regression coefficient of internal Failure-based learning on servitization strategy is 0.183 ($p<0.100$), therefore, hypothesis H1a is supported. Hypothesis H1b proposes that "external Failure-based learning has a positive effect on servitization strategy". The results show that the regression coefficient of external Failure-based learning on servitization strategy is 0.317 ($p<0.05$), therefore, hypothesis H1b is supported. Hypothesis H2a, which posits that "internal Failure-based learning has a positive effect on exploration innovation capability ", shows that there is a significant positive relationship between internal Failure-based learning and exploration innovation capability ($\beta=0.434$, $p<0.01$), therefore, hypothesis H2a is supported. Hypothesis H2b, which suggested that "internal Failure-based learning has a positive effect on exploitation innovation capability", showed that there was no significant relationship between internal Failure-based learning and exploitation innovation capability ($\beta=0.160$, $p>0.1$), and therefore, hypothesis H2b was not tested. Hypothesis H3a, which proposed that "external Failure-based learning has a positive effect on exploration innovation capability", showed that there was a significant positive relationship between external Failure-based learning and exploration innovation capability ($\beta=0.550$, $p<0.01$), and hypothesis H3a was supported. Hypothesis H3b, which proposed that "external Failure-based learning has a positive effect on exploitation innovation capability", showed that there was no significant relationship between external Failure-based learning and exploitation innovation capability ($\beta=0.086$, $p>0.1$), and hypothesis H3b failed the test. Hypothesis H4a, which proposes that " exploration innovation capability has a positive impact on servitization strategy", shows that the relationship between exploration innovation capability and servitization strategy is not significant ($\beta=-0.083$, $p>0.1$) and hypothesis H4a is not supported. Hypothesis H4b, which proposed that " exploitation innovation capability has a positive impact on servitization strategy", showed that exploitation innovation capability has a significant positive relationship with servitization strategy

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(β=0.487, p<0.05), and hypothesis H4b was tested. Hypothesis H5 suggested that " exploration innovation capability has a positive impact on exploitation innovation capability" and the results showed that exploration innovation capability was significantly positively related to exploitation innovation capability (β=0.635, p<0.01), and hypothesis H5 was supported by the data.

Table 2. Direct effects test results

Direct path	Standardized path coefficients	S.E.	P-value
H1a:internal Failure-based learning→servitization strategy	0.183	0.064	0.089*
H1b:external Failure-based learning→servitization strategy	0.317	0.073	0.019**
H2a:internal Failure-based learning→exploration innovation capability	0.434	0.090	0.000***
H2b:internal Failure-based learning→exploitation innovation capability	0.160	0.131	0.206
H3a:external Failure-based learning→exploration innovation capability	0.550	0.092	0.000***
H3b:external Failure-based learning→exploitation innovation capability	0.086	0.138	0.558
H4a:exploration innovation capability→servitization strategy	-0.083	0.148	0.684
H4b:exploitation innovation capability→servitization strategy	0.487	0.113	0.013**
H5:exploration innovation capability→exploitation innovation capability	0.635	0.262	0.002***
χ^2=310.842, df=158, χ^2/df =1.967, GFI=0.912, AGFI=0.883, IFI=0.925, CFI=0.923, RMSEA=0.056			

Note: *p < 0.1, **p < 0.05,***p < 0.01, same as below.

4.3. Path Test of Mediating Effect

Bootstrap test was used to test the mediating effect. The sample is sampled 3,000 times, the confidence interval is set at 95% , and the test results are shown in table 3, the intermediary effect of “internal Failure-based learning→exploration innovation capability→exploitation innovation capability→servitization strategy” and “external Failure-based learning →exploration innovation capability→exploitation innovation capability →servitization strategy” is significant, the confidence intervals for indirect effects at the 95% confidence level are [0.008,1.001] and [0.008,0.888] , which do not include zero, it shows that exploration innovation capability and exploitation innovation capability have mediating effect in the relationship of internal and external Failure-based learning and servitization strategy, respectively, the internal Failure-based learning and the external Failure-based learning have indirect influence on the servitization strategy through the chain mediation of the exploration innovation capability and the exploitation innovation capability. The hypothesis H8a and H8b are tested. Other mediating paths are not significant, Hypothesis H6a, Hypothesis H6b, Hypothesis H7a, Hypothesis H7b are not supported.

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Table 3. Results of the mediating effect test

Mediating path	Standardized path coefficients	95% confidence interval		Significance
		Lower limit	Upper limit	
H6a:internal Failure-based learning→exploration innovation capability→servitization strategy	-0.036	-0.457	0.198	Not significant
H6b:external Failure-based learning→exploration innovation capability→servitization strategy	-0.046	-0.452	0.204	Not significant
H7a:internal Failure-based learning→exploitation innovation capability→servitization strategy	0.078	-0.076	0.250	Not significant
H7b:external Failure-based learning→exploitation innovation capability→servitization strategy	0.042	-0.147	0.175	Not significant
H8a:internal Failure-based learning→exploration innovation capability→exploitation innovation capability→servitization strategy	0.134	0.008	1.001	Significant
H8b:external Failure-based learning→exploration innovation capability→exploitation innovation capability→servitization strategy	0.170	0.008	0.888	Significant
χ^2=310.842, df=158, χ^2/df =1.967, GFI=0.912, AGFI=0.883, IFI=0.925, CFI=0.923, RMSEA=0.056				

Note: Bootstrap sample size 3000, confidence level 95%.

5. Conclusion

Using a sample of 307 questionnaires from middle and senior managers of different manufacturing companies, this paper empirically investigates the relationship between Failure-based learning, innovation capability and servitization strategy using structural equation modelling, in an attempt to clarify the question of whether and how Failure-based learning affects servitization strategy. The following conclusions were obtained: first, Failure-based learning has a direct and positive impact on servitisation strategy. The study found that both internal Failure-based learning and external Failure-based learning can positively contribute to servitization strategy, as shown in Table 2, the direct effects of both on servitization strategy are 0.183 and 0.317 respectively. Second, innovation capability can mediate Failure-based learning and servitization strategies. The indirect effect value for internal Failure-based learning to influence servitization strategy through exploration and exploitation innovation capability in turn is 0.134, while the indirect effect value for external Failure-based learning to influence servitization strategy through exploration and exploitation innovation capability in turn is 0.170. Third, in the pathway of Failure-based learning influencing servitization strategy, exploration innovation capability can promote exploitation innovation capability. As shown in Table 2, exploration innovation capability significantly and positively influences exploitation innovation capability (β=0.635, p=0.002<0.01), and Failure-based learning can also influence servitization strategy through exploration innovation capability and exploitation innovation capability in turn.

The theoretical contributions of this paper include: firstly, it considers Failure-based learning as an important resource influencing servitization strategy, and explores the factors influencing manufacturing firms' servitization strategy from the perspective of Failure-based learning and resource-based theory, enriching the research on the influencing factors of servitization strategy. While previous studies have considered the influence of organisational factors such as firm size, product characteristics, executive team characteristics and specific environmental factors on servitisation strategy, this paper investigates the influence of Failure-based learning as a knowledge resource on servitisation strategy from a resource-based perspective, enriching

resource-based theory and providing a new perspective on the influencing factors of servitisation strategy. Secondly, two paths through which Failure-based learning affects the servitization strategy of manufacturing firms are identified, namely the impact of internal Failure-based learning and external Failure-based learning on servitization strategy. While previous studies have examined the impact of Failure-based learning on organisational performance and so on from individual, team and organisational subjects at different levels, this paper further enriches the Failure-based learning theory by examining the impact of internal Failure-based learning and external Failure-based learning on servitisation strategy based on the different sources of experiential learning. Thirdly, in the context of manufacturing firms' Failure-based learning affecting their servitization strategy, it is found that exploration innovation capability has a significant impact on exploitation innovation capability, and that Failure-based learning affects servitization strategy in turn through the chain mediation of exploration innovation capability and exploitation innovation capability. Previous studies have considered exploration and exploitation innovation as two different sides in opposition to each other. We find a positive relationship between the two, providing an empirical basis for the balance and complementarity of dual innovation capabilities in the context of servitization of manufacturing firms, enriching and refining the theory of organizational dual innovation.

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