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Relationship Management Capability and Service Innovation Performance: The Joint-Effect of Relationship Learning and Competitive Intensity

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Abstract: Relationship management capability is a significant factor in promoting a firm's service innovation performance. Although there is a rich body of study on the role of relationship management capability in performance of firms, scant attention has been paid to the joint effect of relationship learning and competitive intensity. Drawing on the service innovation, network capability and relationship learning theories, this paper establishes a relevant conceptual model, and adopts a hierarchical regression analysis to examine the model with a data set of 298 firms from China. Results show that relationship management capability positively affects the service innovation performance of firms; however, relationship learning partially negatively moderates the relationship between relationship management capability and service innovation performance. The three-way interaction effects of relationship management capability, relationship learning and competitive intensity are partially significant. This paper extends the existing literature on service innovation, network capabilities and relational learning in a service-centered economy. The findings further clarify the process mechanism of the impact of relational management capabilities on enterprise service innovation performance, and should help enterprises utilize relational learning and competitive intensity to break through resource limitations rapidly. The paper offers some enlightenment on promoting service innovation.

Keywords: service innovation; relationship management capability; relationship learning; competitive intensity; service innovation performance

1. Introduction

The global economy has gradually shifted from the traditional production-centered economy to a service-centered economy during the past few decades, which is a dramatic change for the world [1,2]. The service sector now accounts for more than 70% of the global economy, and has already occupied a leading position in global economic development [1]. In the current era of service-centered economies, the service innovation of enterprises plays a vital role in the improvement of the service economy, which can also drive a lot of cities' transformation from traditional city to innovation city. Obviously, an innovative city is an important way to build the sustainable development of economy and society [3,4], which will be beneficial to citizens in the innovative cities, including customers, retailers, suppliers and so on [5]. Therefore, more and more product-centric companies have begun to package products and services into "bundled products" to provide a complete value-added solution program, thereby aiming to obtain high performance service innovation (PSI) [6]. In practice, service innovation is not only the focus of the service industry, but is also an effective way for manufacturing companies to get rid of low-end locking of the value chain, enabling development of new business fields. It plays a crucial role in improving the performance of both service-based firms and manufacturing companies [6]. Therefore,

how to promote service innovation has become the focus of discussion in business and academic circles.

In principle, service innovation, from being narrowly defined only as referring to service products and process innovation, has gradually transformed into the broader concept of "bundled product" innovation including products, processes, models and services [7]. It has become an effective way for firms to improve service quality, achieve innovation performance and enhance competitive advantage. Researches show that the influencing factors of service innovation are information, knowledge, and the ability to acquire such knowledge; the service-dominant logic proposed by Vargo and Lusch [8] notes that operational resources, including skills and the ability to acquire knowledge and skills, support service innovation performance. Thanasopon [9] and Kang [10] verified through empirical research that the openness capability (searching capability, coordination capability, common understanding and absorptive capability) and external knowledge acquisition capability of enterprises are both achieved by combining external knowledge with information internalization, which then promotes service innovation performance. It can be seen that the existing literature has paid attention to the impact of external knowledge search and absorption on service innovation. However, the acquisition of external knowledge, such as customer preferences, market trends, and technology, is mostly based on the key factor of the relationship between two parties. Therefore, the ability of the enterprise to manage the cooperative relationship between the enterprise and an external organization has gradually become the key to the success of service innovation.

Network capability theory posits that relationship management capability (RMC) enables firms to achieve high PSI through developing, utilizing, managing, and coordinating the relationships of an external network [11], which helps the firm to acquire key valuable resources such as know-how, knowledge and technology [12]. It can effectively improve the network location of the firm and guide changes in the network [13].RMC is closely related to the performance of firms. Previous research has focused on the impact of RMC on product innovation, firm technology capability, business model and organizational performance [14,15], etc. However, empirical research should be exerted regarding relationship between RMC and PSI.

As a capability of relational management, relational learning is consistent with the interaction perspective on relationship building, wherein two parties cooperate to enhance mutual trust to ensure or improve their economic performance. Relationship learning refers to sharing of information between partners; it also involves common understanding and integrates this commonality into the specific memory of the shared relationship domain [16,17]. In the case of relationship cooperation, relationship learning accelerates the processes of sharing information, common understanding, and formation of a special relationship memory. Then, the cooperative relationship between the two parties is further promoted by the increasing frequency of communication and flow of information. Obviously, relationship learning tends to change conditions among cooperative partners. When the conditions of cooperative relations change, the effect of RMC on performance of firms will also change. Hadid argued that performance is the market's behavioral response to a company's business strategy, and the most direct consequence of learning should be changing the behavior or potential of the firm, which affects the generation of performance [18]. So, relationship learning may have a moderating effect on the relationship between relationship management ability and service innovation performance.

In addition to the factors mentioned above, firms' activity cannot escape the influence of the external environment. The competitive intensity of environmental characteristics is closely related to innovation practice within or between firms. There are two different views on the relationship between competitive intensity and innovation of firms in the existing literature. Some scholars have emphasized that opportunity and competition coexist. External competition provides continuous motivation for corporate innovation and is a vital scenario variable for innovation. Competitive intensity has directly or indirectly affected the technological innovation of firms, innovation diffusion efficiency, product

innovation performance, and corporate performance [19,20]. Other scholars have argued that increasing competitive intensity augments the risks of innovation, such as innovation failure and rapid imitation of innovative products by competitors [21]. Thus, the role of competitive intensity in the innovation practice of firms should be discussed deeply.

For the above-mentioned reasons, this study attempts to address existing literature gaps. To do so, it examines, first and foremost, the effect of relationship management capability on firms' service innovation performance. According to the logic proposed by Black and Boal [22], the interaction of firm capabilities and resources can have either enhancing or suppressing effects. Thus, the effect of relationship management capability is likely to vary across different external conditions, such as relationship learning and competitive intensity. Consequently, more thorough exploration of the conditions under which relationship management capability enhances a firm's service innovation performance may require a contingent perspective that emphasizes the importance of relationship learning and competitive intensity.

The following sections present the theoretical background and the development of hypotheses. Next, the research method is described, and is followed by the results of data analysis. Discussions and implications are taken up in the final sections of the paper.

2. Theoretical Background and Hypotheses

2.1. Service Innovation and Its Performance

Service innovation is the process by means of which the firm improves service quality and creates new market value by changing service elements, reforming the service system, or applying the service plan formulated for specific customers to general customers [23]. Although service innovation is clearly distinguished from technological innovation and product innovation, it occurs in both manufacturing and service industries and can be radical, and very often, incremental [24]. Scholars define service innovation from the perspective of its characteristics and value. Service innovation from the perspective of value is defined as a kind of enterprise that uses new ideas, new concepts or new technologies to improve and change service processes and service products in order to meet the diversification of customer needs, thereby improving the quality of products and services [25]. It is a value improvement process, which creates value for customers, employees, businesses, alliance partners and communities [26,27]. Service innovation from the perspective of characteristics is defined by scholars according to the essence of service innovation. For example, Den Hertog [25] defines service innovation as a broad-based innovative behavior and process that includes four dimensions: service concept, relationship between service providers and users, service delivery system, and technological change. Therefore, service innovation no longer refers only to innovation in the service industry, but covers innovative behaviors and processes including service concept, service provider and user relationship, service delivery system, and technological change [28].

Service innovation performance is an important part of service innovation. However, evaluating the innovation performance of service enterprises is more difficult than evaluating the performance of traditional tangible products [29]. As service is intangible, indivisible between production and consumption, heterogeneous and fugitive [30], measurement of service innovation performance is not easy. Some scholars divide service innovation performance into process performance and result performance from the perspective of innovation process and effect. In addition to cost, Voss et al. [31] emphasize the effectiveness and speed of service innovation, while Hsueh et al. [32] place more emphasis on the optimization and efficiency of the service innovation process. There are also some scholars who divide service innovation performance into financial performance and non-financial performance from the economic and non-economic benefits brought by service innovation [9,24,33,34]. The former includes whether the new service is profitable, whether it has achieved the expected market share and profit goals; the non-financial performance mainly covers customer satisfaction, product or service quality, and strategic goals. Torey and Kelly [35] proposed to study innovation performance from three aspects: financial

index, customer index and enterprise internal index [10], using the number of new product developments and the ratio of new products to total sales [3] to measure service innovation performance. So far, there is no unified standard for the measurement of service innovation performance in academia.

At present, academic circles have a certain foundation in the research on the influencing factors of service innovation performance. From the observation of internal factors, specialized innovation R&D departments at the organizational level can promote the generation of service innovation performance, as observed by Blindenbachdriessen, for example [4,36]. The strategic orientation (customer orientation and competition orientation) of an enterprise can also significantly affect service innovation performance [34]. According to the service-dominant logic [8], the knowledge and ability within the organization are the fundamental source of the performance of enterprise service innovation. Empirical research shows that market capital, service delivery capital, interactive capital and learning capital, as operational resources of enterprises, all have significant effects on service innovation performance [37]. It is also found that enterprises' acquisition of external knowledge through network capabilities affects the generation of service innovation performance [38]. From the perspective of external factors, external knowledge and knowledge networks, value co-creation between customers and partners, and the competitive environment can promote service innovation. Kang [10] found that different knowledge acquisition methods adopted by organizations have different effects on service innovation [9]. Li and Liu [39] proposed through empirical research data on large enterprises in Taiwan that the feedback and support of customers and partners can promote the service innovation behavior of enterprises. Ramendra and Dena [34] believe that a fiercely competitive environment will make enterprises pay more attention to the needs of customers, and then develop innovative service products to maintain a leading position.

Based on service-dominant logic [8], service innovation relies more on intangible intellectual resources and skills than product innovation, and succeeds more often by utilizing external knowledge and capabilities embedded in the relationship network [24]. Thus, one important task of service innovation is gathering, absorbing and integrating external knowledge for innovation [40]. In fact, relationship management capability is quite important to service innovation and its performance. In instances of high relationship management capability, firms effectively obtain diverse, scarce, and valuable information and resources from external relationship networks, thereby improving their service innovation performance and gaining competitive advantage.

2.2. Relationship Management Capability

The relationship management capability in the innovation network is also called network capability, relationship capability, synergy capability, etc. It refers to an ability to obtain technology, knowledge and other resources and leading changes to the network by development, utilization, management and coordination of each member relationship in the external innovation network [41]. Relationship management ability determines the role and development of an enterprise, and has an important impact on the service innovation, process and result status of its involved innovation network. Ritter believes that enterprise network capabilities are the network management qualifications and task execution capabilities that enterprises have when dealing with external organizations, and can improve network management qualifications in the process of performing network tasks [42]. An enterprise with network relationship management capability in the innovation network can stimulate new ideas and ideas in the process of absorbing, accumulating, internalizing and applying the knowledge of external member enterprises, thereby stimulating exploratory cooperative innovation [43].

At present, scholars are most concerned about supply chain relationship management and customer relationship management. Based on a supply chain relationship management perspective, Forkmann [44] conceptualized relationship management capabilities as the unique capabilities of organizational processes and practices developed and implemented

by companies, including the development of relationships and the termination of relationships with suppliers. With a good relationship network, enterprises can obtain relevant resources (experience, knowledge and skills, etc.) from the relationship to improve enterprise performance [44]. Based on the perspective of customer relationship management, Battor [45] proposed that based on the perspective of customer relationship management, relationship management capability is a valuable and difficult to imitate resource that can bring outstanding value to enterprises.

Due to different research focuses, scholars have different views on the dimensional division of relationship management capabilities. Some scholars believe that relationship management ability is a comprehensive ability, so they think it should be measured from multiple dimensions. For example, Lintukangas [46] proposed that relationship management capability is an extremely complex capability, which should be comprehensively evaluated from five dimensions: relationship operation, trust, commitment, communication and ethics. When Battor [45] studied customer relationship management, starting from the characteristics of relationship management, relationship management capabilities were divided into three dimensions: relationship orientation, configuration and customer information. Moshtari [47] believes that relationship management ability includes three elements: coordination ability, communication ability and bonding ability. Although some scholars measure relationship management ability as a single dimension, the scale reflects all aspects of relationship management ability. Scholars such as Moller and Halinen [48] and Forkmann et al. [44] believe that relationship management capability is "the ability of an organization to create, manage and terminate cooperative transaction relationships", and measure it as a single dimension, including relationships initiation ability, relationship development ability and relationship termination ability.

RMC is an ability to handle and coordinate direct or indirect partners in external network relationships [47], which is affected by many factors. The internal factors of the organization, such as an open culture, can give the enterprise a cultural heritage supportive of outward relationship building [49]. A good RMC also requires the cooperation and support of senior managers, and more importantly, that border employees have the willingness and ability to establish and maintain satisfactory relationships [50]. Akgun et al. [51] found through empirical research that the organizational learning ability of enterprises can also affect the formation of relationship management ability.

RMC determines the network location and resource acquisition of a firm and has an essential impact on the practice and performance of firms' service innovation [52]. Service innovation aims to provide customers with new solutions and service processes, and it enhances the customer experience; thus, considerable resources related to customer preferences and demands are required. At the same time, in order to prevent imitation or duplication, it is necessary for firms to promote service innovation continuously [53]. By using external resources effectively in service innovation practice, firms achieve excellent service innovation performance and obtain competitive advantages.

2.3. Relationship Learning

Selnes and Sallis proposed the concept of relationship learning and defined it as a joint activity between suppliers and customers, in which both parties share information and then jointly understand and integrate it into the specific memory of the shared relationship [16]. Further, the scope and likelihood of a potentially specific relationship behavior are changed. Joint learning with external partners has become the primary means for firms to obtain knowledge and resources from the outside [54,55]. This is not only a joint activity among partners, but also a distinct learning process for long-term cooperation.

Based on the learning process and results, Selnes and Sallis divided relationship learning into three dimensions: information sharing, common understanding and relationship memory [16]. Information sharing refers to the willingness of partners to share information about consumer needs, products, and operations [55]. Common understanding within the relationship constitutes a relationship-specific element of interpretation or sense making

(i.e., knowledge development) of the shared information [16]. Relationship memories manifest in physical artifacts, such as documents, computer memories, and programming. The unique element of relationship memory is that retention facilities may be external to the organization but internal to the relationship [16].

Existing studies have found that relationship learning has a positive impact on enterprise performance, innovation performance and innovation ability. Selnes and Sallis [16] found that relationship learning can promote the relationship performance among channel members when studying the relationship between suppliers and customers, and the promotion effect can be strengthened by trust. Yiu [56] examine the effects of service-dominant orientation (SDO), knowledge sharing, and external network on innovation performance, and found that relationship learning mediates the relationships of SDO to innovation performance, knowledge sharing to innovation performance, and external network to innovation performance. Chen et al. [57] revealed through empirical research on Taiwanese manufacturing enterprises that relationship learning can enhance the competitive advantage of cooperation by promoting the innovation ability of enterprises. Cheung [58] found that relationship learning between suppliers and customers can positively affect relationship value through the analysis of buyer and seller data from cross-border product surveys. The stronger the environmental uncertainty and environmental complexity, the more effective is relationship learning, and the stronger is the promotion of relational value.

Relationship learning fosters support of resourcing options, which, in turn, strengthens the positive relationship between relationship management capability and innovation performance. Through relationship learning, a firm can acquire resources from an ongoing cooperative relationship. Building on the logic proposed by Black and Boal [22], the interaction of firm capabilities and resources can culminate in either enhancing or suppressing effects. So, it is suggested that firms with high relational learning can be more effective if they take advantage of their relationship management capability. For example, relationship management capability provides firms with rules for managing multiple relationships [59]. This frequently results in firms favoring initiation of several service innovation programs to explore new services. In this condition, with crucial external resources acquired through relationship learning, the effect of relationship management capability on service innovation performance would be amplified. Thus, relationship learning combined with relationship management capability can have an interactive impact on the firm's service innovation performance.

2.4. Competitive Intensity

Competitive intensity is defined as the degree of competition that a firm confronts, which has been purported to moderate the influence of the firm's capabilities or joint activities between partners on firm performance. On the one hand, the intensity of competition has a direct impact on a firm's behavior and its performance. Tang [60] divided competition intensity into four dimensions: the difficulty of product substitution, the speed of the emergence of new competitive products, the speed of product elimination, and the speed of product technological change. The degree of ease of production has a negative impact on the product innovation output and process innovation output of the enterprise. On the other hand, competition intensity can moderate the relationship between firm behavior and firm performance. Tsai [61] found that the effect of firm innovativeness on business performance varies across the different configurations of market turbulence and competitive intensity. Hou [62] also empirically confirmed that competition intensity plays a moderation role between the entrepreneurial orientation and firm performance.

The competitive environment is the driving force and opportunity for the development of enterprises. However, there is no unified conclusion in academic circles on how to measure the intensity of competition. Jaworski and Kohli [63] were among the first to put forward a measurement method of competition intensity, and the study formulated six measurement items from four aspects: overall competition, competitor behavior, competitor resources and competitor capability: "The competition in our industry is violent", "There

are often promotional wars in our industry", "All products offered by competitors can be quickly imitated by other businesses", "Price competition is the hallmark of our industry", "New competitors often enter" and "We competitors are relatively weaker" and later studies were often a development of this line of research [63].

As competitive intensity increases, a firm needs to have increasing capabilities or joint activities in service innovation practice. Therefore, in highly competitive environments, greater emphasis on joint partner activity is required for enhancing relationship management capability and relationship learning to ensure better performance.

In summary, drawing primarily on the theories of service innovation, network capability and organizational learning, we find that relationship management capability is a crucial determinant of firm's service innovation performance. Learning provides external resources for the firm's service innovation. Thus, relationship learning combined with relationship management capability can have an interactive impact on the firm's service innovation performance. Furthermore, such interaction would change due to fluctuations in competitive intensity. Hence, in this study, the theoretical framework is as presented in Figure 1.
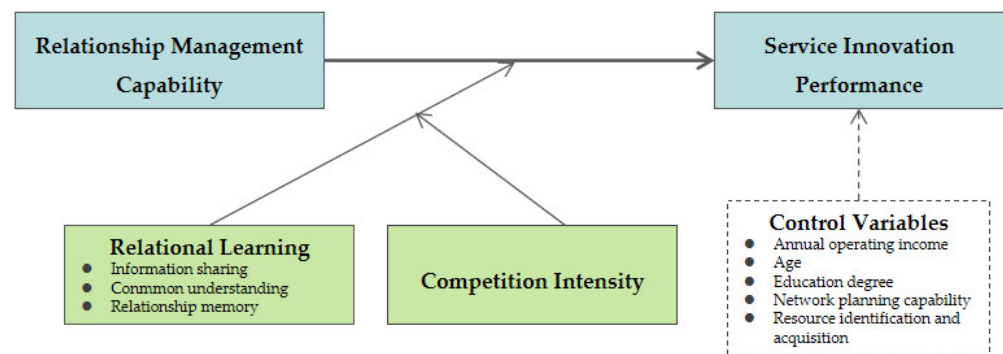

Figure 1. Theoretical framework.

3. Hypotheses

3.1. Relationship Management Capability and Service Innovation Performance

From a perspective of network capability, significant heterogeneous resources are embedded in a firm's external relationship network; and, the firm can effectively utilize these resources to improve performance of service innovation and maintain competitive advantage.

First of all, relationship management capability builds a strong connection between partners, which promotes tacit knowledge transfer for improving service innovation performance. Relationship management capability promotes interaction between firms and partners, for example by enhancing trust and reducing communication cost, which makes cooperative relationships closer and stronger. In this relationship, tacit knowledge is more easily encoded, decoded and transferred, so the efficiency and effectiveness of external tacit knowledge transfer is improved [64,65]. In service innovation practice, it is argued that tacit knowledge transferred from cooperative partners is a crucial determinant of service innovation performance.

Secondly, firms with relationship management capability can absorb operational resources to achieve service innovation performance. High relationship management capability enables firms to establish and broaden the network relationship with new customers or new partners, which makes it easier for them to obtain financial capital, social capital, customer capital and other operational resources [66]. Based on service-dominant logic (SDL) [8,67], operational resources play a vital role in developing innovative services.

Finally, through relationship management capability, firms can interact frequently with their partners, especially with customers [68]. The process of interaction with customers is a process of providing service, problem solving, and enhancing service experiences. Furthermore, in the process, new services would be generated and displayed gradually.

More importantly, interaction with customers will help firms enhance customer satisfaction and attract new customers, thereby increasing the performance of service innovation. Therefore, we predict that relationship management capability is likely to increase service innovation performance.

H1. *Relationship management capability is positively associated with service innovation performance.*

3.2. Moderating Role of Relationship Learning

Relationship learning, including the three dimensions of information sharing, common understanding and relationship memory, will strengthen the positive relationship between relationship management capability and service innovation performance [16].

In cases of greater shared information, the positive impact of relationship management capability on service innovation performance will be stronger. Firstly, shared information consists of information on consumer needs, products, and operations, which enables partners to obtain more resources such as knowledge and skills from the relationship network [54]. Through relationship management capability, these resources can be directly utilized for new product/service development to improve the firm's performance. Secondly, behavioral willingness to share information establishes a vehicle for information exchange, which helps partners to more thoroughly understand customer preferences, the attributes of products and modalities of operation. Therefore, partners can transform acquired information and knowledge into service innovation practice by utilizing their relationship management capability [55]. Finally, frequently shared information allows partners to sustain a more harmonious cooperative atmosphere, which provides good conditions for relationship management. Accordingly, partners can apply their relationship management capability to commercial aims (new service/product offerings) to create value through innovative activities [56].

Common understanding means more general understanding of shared information among partners, which will enlarge the effects of relationship management capability [16]. Relationship management capability builds strong connections among partners to promote knowledge transfer and resource acquisition. On the one hand, because the knowledge transferred from different firms has been organized and encoded in different ways, this makes it more difficult to understand. However, common understanding enables partners to decode and assimilate the core of the knowledge by using joint teams and face-to-face communication, which can be used to update new technologies, develop new services, new products, and new processes [69]. Accordingly, the more the key knowledge gained and used by means of relationship management capabilities, the higher the service innovation performance. On the other hand, firms can acquire substantial resources from partners; however, some of the resources might be ignored, not because they are unimportant, but because firms cannot interpret them accurately [70]. Common understanding serves as an effective mechanism to properly interpret the resource, i.e., cross-functional teams, face-to-face meetings and productive discussions. Obviously, combined with common understanding, relationship management capability enables firms to identify and utilize more valuable resources in service innovation.

More importantly, partners' development of high levels of relationship memory is usually accompanied by the same types of physical artifacts, such as documents, computer memories, and programming [16]. In such conditions, the benefit of relationship management capability may be become larger. Based on similar or identical physical artifacts among partners, the efficiency and effectiveness of knowledge transfer and resource acquisition by relationship management capability will be increased [71]. This can create stronger positive consequences for service innovation. In addition, relationship memory means that partners develop idiosyncratic routines in formal or informal procedures and scripts for how the parties undertake joint activities [72]. These provide strong support for relationship management capability because partners can transfer knowledge and ex-

change resources according to similar routines. It is deemed beneficial to promote firms' performance of service innovation. Therefore, the following hypotheses are offered.

H2. *When relationship learning is higher, the positive relationship between relationship management capability and service innovation performance is stronger.*

H2a. *When information sharing is higher, the positive relationship between relationship management capability and service innovation performance is stronger.*

H2b. *When common understanding is higher, the positive relationship between relationship management capability and service innovation performance is stronger.*

H2c. *When specific relationship memory is higher, the positive relationship between relationship management capability and service innovation performance is stronger.*

3.3. The Joint Effects of Relationship Learning and Competitive Intensity

Relationship learning and competitive intensity may have a joint effect on the service innovation performance of a firm engaged in relationship management capability. Because relationship learning and competitive intensity may coexist in firms' service innovation practice, these two factors are likely to have interaction effects. In the absence of competition, firms may achieve good performance, even if they do not innovate, because customers are "stuck" with firms' products and services [60]. Contrarily, in a case of intensive competition, customers can buy similar products and services from different firms to satisfy their demands, and these stimulate firms to innovate continuously for better performance than their competitors. Therefore, in an intensively competitive environment, relationship learning is particularly crucial for service innovation with high relationship management capability. Relationship management capability accelerates firms' knowledge transfer and resource acquisition by building strong connections among partners, then relationship learning further helps firms to identify and realize the value of knowledge and resources in service innovation practice. As a result, through well-developed relationship management capability and effective relationship learning, firms will gain good performance by engaging in innovative service activities to meet customer demands under competitive intensity. In a word, the conjunctive effects of relationship management capability and relationship learning will maximize service innovation performance of firms in highly turbulent markets. Therefore, the following hypotheses are proposed:

H3. *At high levels of competitive intensity, the relationship between relationship management capability and service innovation performance is stronger for the firms with strong relationship learning than for the firms with weak relationship learning.*

H3a. *At high levels of competitive intensity, the relationship between relationship management capability and service innovation performance is stronger for the firms with strong information sharing than for the firms with weak information sharing.*

H3b. *At high levels of competitive intensity, the relationship between relationship management capability and service innovation performance is stronger for the firms with strong common understanding than for the firms with weak common understanding.*

H3c. *At high levels of competitive intensity, the relationship between relationship management capability and service innovation performance is stronger for the firms with strong special relationship memory than for the firms with weak special relationship memory.*

4. Research Method

This research is based on the quantitative research method to conduct empirical analysis through hierarchical regression analysis. Statistics software SPSS20.0 was used to achieve the purpose of verifying theoretical models and research hypotheses.

4.1. Sampling and Data Collection

Service innovation in this study is defined as service product and process innovation including new features, new processes and new service delivery methods, which is a broad concept [1]. Therefore, the enterprise selection of this research sample should involve various industries as much as possible, so as to conduct cross-industry research. Survey objects include primary, secondary and tertiary industries, in order to ensure the generality of the research conclusions. Twenty-two provinces from different regions in China were selected randomly in this study. The key information source selection principle in the research was that there were middle and senior managers with more than two years of service in the company. The purpose was to ensure that the respondents of the questionnaire could fully understand the enterprise information and reduce the deviation. Our data collection process went through three stages.

First, given the imbalance in economic development in the eastern, central, southern and western regions of China, two-thirds of the provinces, autonomous regions, and municipalities from each of the three regions were randomly chosen to minimize the regional bias. This process led to a sample of nine provinces, six autonomous regions, and six municipalities from the eastern, central and western areas, respectively.

Second, a listing of firms located in each chosen province, autonomous region, and municipality from the local provincial-level Chamber of Commerce or published yellow pages is formed. The total number of firms was 500, and roughly contained an equal number from each province.

Third, the 500 firms were contacted by e-mail and/or telephone and invited to participate in the survey. Once the company confirmed participation, one appropriate respondent was identified, and contact information was obtained. Before the respondents were interviewed, to maximize the quality of the data collected, a group of 20 postgraduate students and five instructors were organized and trained for skills in interviewing and procedures for conducting the survey.

Finally, 298 firms were included in the final analysis, which accounted for 59.6% of all firms contacted. The profile of the sample is shown in Table 1.

Table 1. Basic characteristics of the sample firms (N = 298).

Classification Criteria	Value	Number of Samples (%)	Classification Criteria	Value	Number of Samples (%)
Established time	<5 years	69 (23.2)	Number of employees	<20 persons	44 (14.8)
	5~10 years	65 (21.8)		20–300 persons	121 (40.6)
	10~20 years	78 (26.2)		300–1000 persons	49 (16.4)
	>20 years	86 (28.9)		>1000 persons	84 (28.2)
Industry type	Service	179 (60.1)	Annual operating income (yuan)	<30 million	142 (47.7)
	Manufacturing	108 (36.2)		30~200 million	51 (17.1)
	Construction	8 (2.7)		200 million~1 billion	40 (13.4)
	Agriculture	3 (1)		>1 billion	66 (22.1)

4.2. Measurement Development

Tried and tested scales that have been widely used in the published literature were used in this study. Through the literature review on relationship management capability, service innovation performance, relationship learning, and competitive intensity, the original version of each mature scale was identified in order to have a better understanding of the design philosophy of the scale developers and ensure the validity and reliability of the measurement tool. All constructs were measured with a Likert 7 scale anchored by "strongly disagree" and "strongly agree". Measures developed in English, i.e., Avlonitis et al.'s measures for service innovation performance, were translated into Chinese, and then back-translated into English [30]. The two English versions of the statements

were then compared to make sure that the meaning of the items was interpreted accurately and clearly in Chinese.

The questionnaire consists of three parts. The first is the description of this research, which explains the purpose of this study and promises that all the information involved in the questionnaire is only for academic research. The second part is the basic company information and personal basic information of the respondents in order to ensure the authenticity of the respondents and the corresponding company, and permit judgement on whether they meet the requirements of key information personnel. The last part includes the questions for each variable.

To further ensure data reliability and validity, the questionnaire was pre-tested by interviewing managers of 10 representative enterprises in terms of industry and size. Ten senior executives, including CEO, CFO and GM, were invited to answer the questionnaire and comment by writing back on its clarity, accuracy, and comprehensiveness. The questionnaire was then amended according to suggestions from these representatives. Moreover, 25 senior managers from the MBA programs of a finance and economics university in China were invited to answer the questionnaire. Afterwards, they were asked in an organized meeting about the appropriateness, accuracy, comprehensiveness, and clarity of the questions, and then discussed solutions.

After the questionnaire was refined, a formal questionnaire distribution was launched. Questionnaires were distributed through two different ways: by post and by email.

From January to June 2018, a total of 500 copies were distributed and 349 questionnaires were received, with a total response rate of 69.8%. Removing 51 invalid questionnaires, the total number of valid questionnaires was 298 and the final effective response rate was 59.6%. The structure of the sample companies was sufficiently diverse and heterogeneous.

4.2.1. Dependent Variable

The dependent variable is service innovation performance. The literature shows that performance measurement can be divided into objective and subjective measures. Objective measures use the absolute value of the firm's actual performance [73]. Subjective measures require respondents to evaluate their company's performance relative to its competitors [74]. For this study, subjective measures were used for the following reasons: First, objective measures are difficult to obtain due to the reluctance of companies to disclose financial information [75]. Second, many studies have shown a strong correlation between objective measurement data and subjective answer data [45]. Third, objective comparisons of companies are difficult due to differences in accounting practices [76] When obtaining a subjective assessment of a company's performance, these measures are more likely to accurately reflect a company's true position relative to competitors rather than absolute value [45]. Therefore, this study adapts the scale of Avlonitis G et al. [33] and others, including three measurement items, and the specific indicators are shown in Table 2.

Table 2. Analysis Results of Reliability and Validity.

Construct and Items	Factor Loading	Percentage of Variance Explained
Service Innovation Performance (α = 0.803, AVE = 0.696, CR = 0.872)		71.819%
1. New services provided by our company are profitable	0.899	
2. The services provided by our company have a large market share	0.777	
3. Services provided by our company exceed profit targets	0.822	
Relationship Management Capability (α = 0.866, AVE = 0.615, CR = 0.905)		61.45%
1. Our company encourages close communication between employees and partners' employees	0.659	
2. Our company communicates regularly with partners	0.783	
3. Our company has the ability to build a good working relationship with partners	0.828	
4. Our company thinks of partners	0.821	
5. For the differences, our company will handle them properly to achieve mutual satisfaction	0.809	
6. Our company can establish mutual trust mechanisms with partners	0.791	

Table 2. *Cont.*

Construct and Items	Factor Loading	Percentage of Variance Explained
Relationship Learning		
Information Sharing (α = 0.912, AVE = 0.791, CR = 0.938)		79.131%
1. Our company will share market information or customer demand information with partners	0.890	
2. Our company will share information with partners about technological changes of important products or services	0.903	
3. Our company and partners will share information about their strategies or policy changes	0.896	
4. Our company will exchange successful experiences or failed lessons about product or service changes with partners	0.868	
Common Understanding (α = 0.889, AVE = 0.819, CR = 0.931)		81.889%
1. Our company and partners usually establish joint teams to solve operational problems	0.917	
2. Our company and partners usually establish joint teams to analyze and discuss issues	0.934	
3. The atmosphere of our company's relationship with our partners can stimulate constructive discussions and sharing of a variety of perspectives	0.863	
Special Relational Memory (α = 0.872, AVE = 0.613, CR = 0.905)		61.309%
1. We meet frequently with partners to maintain the personal network in the company and partnership	0.770	
2. Our company will regularly evaluate and update the relationship information with partners as needed and store it in an electronic database	0.810	
3. Our company often evaluates and adjusts our daily work during order delivery	0.794	
4. Our company regularly evaluates and revises formal contracts with partners as needed	0.729	
5. There are many face-to-face communication opportunities between our company and our partners	0.753	
6. Our company and partners will often make adjustments to reach a consensus on end-customer needs, preferences and behaviors	0.837	
Competitive intensity (α = 0.722, AVE = 0.5494, CR = 0.830)		54.954%
1. There are many companies in the market offering similar service products as ours	0.746	
2. In our industry products, technologies, and services change rapidly	0.698	
3. In our industry, competitors often adopt price competition strategies	0.748	
4. In our industry, the market competition is very fierce	0.771	
Network Planning Capability (α = 0.796, AVE = 0.626, CR = 0.870)		62.619%
1. Our company looks for potential partners through multiple channels	0.792	
2. Our company will evaluate the degree of trustworthiness of potential partners	0.843	
3. Before cooperating with a partner, our company will firstly assess whether the establishment of this partnership will hinder the company's relationship with other partners	0.769	
4. Our company knows what kind of relationships we should maintain	0.758	
Resource Identification and Acquisition (α = 0.828, AVE = 0.661, CR = 0.886)		66.081%
1. Our company can judge whether the resources provided by partners are useful	0.793	
2. Our company has the right way to get the resources and information of partners, etc.	0.868	
3. Our company knows how to get partners' resources and information, etc.	0.825	
4. Our company understands what resources and information partners have	0.762	

Note. CR = construct reliability; AVE = Average Variance Extracted.

4.2.2. Independent Variables

Based on the research of Ritter et al. [42], the relationship management capability was measured using six-item scales from the aspects of relationship establishment, maintenance, and information exchange. Based on the study of Selnes and Sallis [16], relationship learning was measured using thirteen-item scales associated with information sharing, common understanding and special relational memory. Competitive intensity was measured using four-item scales based on previous work [63,77]. It is measured on the basis of the homogeneity of services or products, the speed of updating, competition strategies, the degree of competition and so on. The specific indicators are shown in Table 2.

4.2.3. Control Variables

In order to better understand the relationship of variables in the model, some variables were controlled when testing the hypotheses. Firms' network planning capability, resource identification and acquisition capability can affect innovation performance, as has been confirmed by numerous studies. This study uses the scale of Mort and Weerawardena [78] and Rusanen et al. [79] to measure them. The size of the firm has a relatively visible impact on the innovation performance of the firm, so it is listed as a control variable, and the size of the company is measured by annual operating income. The age and education level of employees are significantly related to innovative behavior [80], so they are listed as

control variables, and education background is used for their education measurements. The specific indicators are shown in Table 2.

4.3. Reliability and Validity

To test the quality of the questionnaire data, reliability and validity tests were performed by SPSS. The results in Table 2 show that the Cronbach's α value of each variable ranges from 0.722 to 0.912, which reflects a good internal consistency between variables and questionnaire items. Moreover, Composite Reliability (CR) is higher than 0.8. Therefore, the reliability of selected variables in this study is deemed satisfactory.

Meanwhile, the validity test deals with constructive validity, which includes convergent validity and discriminant validity. Convergence validity is mainly measured by three aspects: the factor load, average variance extracted (AVE) and CR. The values of these three items are generally required to be greater than 0.5. It can be seen from Table 2 that factor load, the CR value and the AVE value of each measured variable are all above 0.5, which supports the good convergence validity of the model. Discriminant validity usually requires that the quadratic root of AVE of each measurement variable is greater than the correlation coefficient between the measurement variable and other variables, and the quadratic root value of AVE is above 0.7. In this paper, discriminant validity is tested by using the research method of Bagozzi et al. [81].

4.4. Correlation Analysis

Table 3 details the mean, standard deviation, and correlation coefficient of each factor. The value on the diagonal of the table is the square root of the average variation extraction (AVE) for that variable. The correlation coefficient is used to represent the correlation between two factors. It is obvious that the quadratic root of AVE of each latent variable is larger than the correlation coefficient between each latent variable, and these values are higher than 0.7. If the value exceeds 0.7, it indicates that the two factors are too similar to be divided into two factors. As shown in Table 3, this situation does not exist in this study. According to the mean and variance values of the factors in the table, it is found that all factors meet the requirements of normal distribution. Combining Tables 3 and 4, the individual correlation coefficients (0.001–0.669) of each factor are all smaller than their own reliability coefficients (0.722–0.912), indicating that the questionnaire variables have a good degree of discrimination. Therefore, subsequent hierarchical regression analysis and hypothesis testing analysis can be performed.

Table 3. Correlation coefficient between statistical description and each research variable.

	Variables	SIP	RMC	IS	CU	SPM	CI	JB06	JB08	JB13	NPC	RIA
	Service Innovation Performance (SIP)	0.834										
	Relationship Management Capability (RMC)	0.315 **	0.784									
Relationship Learning (RL)	Information Sharing (IS)	0.132 *	0.195 **	0.889								
	Common Understanding (CU)	0.122 *	0.255 **	0.665 **	0.905							
	Special Relational Memory (SRM)	0.302	0.183 **	0.594 **	0.657 **	0.783						
	competitive intensity (CI)	0.336 **	0.281 **	0.14 *	0.031	0.12 *	0.741					
Control variables	Annul Operating income (JB06)	0.069	−0.049	−0.01	0.017	0.014	−0.014	/				
	Age (JB08)	−0.027	−0.004	0.146 *	0.037	0.041	0.069	−0.153 **	/			
	Education degree (JB13)	−0.084	−0.017	−0.074	−0.028	0.000	−0.155 **	0.271 **	−0.246 **	/		
	Network planning capability (NPC)	0.109	0.522 **	0.095	0.115 *	0.075	0.135 *	0.001	−0.132 *	0.057	0.791	
	Relationship identification and acquisition (RIA)	0.255 **	0.669 **	0.069	0.119 *	0.131 *	0.176 **	0.082	−0.079	0.028	0.537 **	0.813
	Means	5.113	5.837	5.300	5.126	5.316	5.360	10.300	1.670	3.480	5.785	5.672
	Standard Deviations	1.111	0.9114	1.212	1.212	1.086	0.981	5.581	0.790	1.100	1.145	1.035

Notes: N = 298; The statistical result is the Pearson correlation coefficient; The diagonal data is AVE square root. * represents $p < 0.05$, ** represents $p < 0.01$.

Table 4. KMO and Bartlett sphericity test.

KMO and Bartlett Sphericity Test		Relationship Management Capability	Service Innovation Performance	Information Sharing	Common Understanding	Relationship Memory	Competitive Intensity	Network Planning Capability	Resource Identification and Acquisition
Kaiser–Meyer–Olkin		0.888	0.861	0.833	0.716	0.891	0.730	0.749	0.791
Bartlettsphericity test	Approximate chi-square distribution	798.317	1331.071	818.726	545.663	778.565	230.76	372.305	439.26
	Freedom	15	28	6	3	15	6	6	6
	Significant probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

5. Results

Before hierarchical regression analysis was performed, normality of residuals, homoskedasticity and multicollinearity were also verified. The statistics of residuals histogram outputted by SPPS show that residuals follow a normal distribution in each model. The residuals for different fitted values are approximately the same. The points in the scatterplot of each model are evenly distributed, indicating homoskedasticity. The variance inflation factors (VIFs) result shown by SPSS shows that multicollinearity is not an issue because the VIFs are all less than 10.

Table 2 shows that relationship learning and relationship management capability were highly positively correlated. Competitive intensity and relationship management capability were also positively correlated. Consistent with our expectations, the three main measures (i.e., relationship management capability, relationship learning, and competitive intensity) were positively correlated with service innovation performance.

This study requires the use of hierarchical regression analysis, so the steps advocated by scholars such as Carte and Russell [82] were adopted, namely: (1) Independent variables, moderation variables and control variables were averaged and centralized in the model, in order to eliminate collinearity problems; (2) A test of the main effects of independent, moderation, and control variables on the dependent variable was conducted; (3) A test of the effects of interaction variables of independent, moderation, and control variables on the dependent variable was completed; (4) Testing of steps (2) and (3) was conducted to determine whether the R2 changes significantly in the two equations; if the change is significant, this indicates that the moderation effect is significant. The final inspection results are shown in Table 5.

Table 5. Results of hierarchical regression.

Variables	Service Innovation Performance							
	Model1	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**	**Model8**
Annul Operating income	0.015	0.02 *	0.020 *	0.019 *	0.019 *	0.021 *	0.018	0.021 *
Age	−0.038	−0.062	−0.071	−0.055	−0.055	−0.083	−0.069	−0.062
Education degree	−0.117	−0.115 *	−0.116 **	−0.117 **	−0.117 **	−0.084	−0.079	−0.09
Network planning capability	−0.030	−0.099	−0.100	−0.101	−0.111 *	−0.102	−0.105 *	−0.113 *
Resource identification and acquisition	0.286 ***	0.103	0.108	0.107	0.109	0.108	0.119	0.116
Relationship management capability (RMC)		0.372 ***	0.333 **	0.339 ***	0.357 ***	0.218 **	0.234 **	0.223 **
Information sharing (IS)			0.056			0.013		
Common understanding (CU)				−0.008			0.006	
Special relational memory (SR)					−0.027			−0.07
competitive intensity (CI)						0.256 ***	0.277 ***	0.270 ***
RMC × IS			−0.048			−0.042		
RMC × CU				−0.083 **			−0.082 **	
RMC × SR					−0.09 **			−0.104 **
RMC × IS × CI						0.087 **		
RMC × CU × CI							0.045	
RMC × SR × CI								0.118 **
F	5.087 ***	7.083 ***	5.773 ***	5.939 ***	5.820 ***	7.499 ***	7.345 ***	7.691 ***
R	0.283	0.357	0.371	0.376	0.373	0.455	0.451	0.46
R²	0.1	0.127	0.138	0.141	0.139	0.207	0.209	0.211
ΔR²	0.1	0.109	0.114	0.117	0.115	0.180	0.176	0.184

Notes: * represents $p < 0.05$, ** represents $p < 0.01$, *** represents $p < 0.001$.

From Model 2 in Table 5, it can be seen that relationship management capability is positively associated with service innovation performance (b = 0.372, $p < 0.001$), so H1 is supported.

As shown in Model 3, Model 4, and Model 5 of Table 5, the coefficient for the interaction of relationship management capability and information sharing is not significant (b = −0.048, $p > 0.1$); the coefficient for the interaction of relationship management capability and common understanding is significant and negative (b = −0.083, $p < 0.05$); the coefficient for the interaction of relationship management capability and special relationship memory is significant and negative (b = −0.09, $p < 0.05$). Therefore, H2a is not supported, but H2b and H2c are supported.

From Model 6, Model 7, and Model 8 in Table 5, the results show that the coefficient for the three-way interaction of relationship management capability, information sharing

and competition is significant and positive (b = 0.087, $p < 0.05$); the coefficient for the three-way interaction of relationship management capability, common understanding and competition is not significant (b = 0.045, $p > 0.1$); the coefficient for the three-way interaction of relationship management capability, special relationship memory and competition is significant (b = 0.118, $p < 0.05$). Therefore, H3a and H3c are supported, H3b is not supported.

6. Discussion

6.1. Relationship Management Capability and Service Innovation Performance

The results indicate that relationship management capability has a positive impact on service innovation performance, which is consistent with the arguments of previous research [38,83]. As a firm's ability to handle and manage binary or pluralistic relationships, relationship management capability helps the firm establish good partnerships with external partners and builds a close relationship network. These advantages enable the firm to acquire key knowledge and valued resources embedded in the partnerships or network relationships; enhancing service innovation to create potential for profit growth, improving performance, and bringing competitive advantage to the firm.

6.2. Negative Moderation Effect of Relationship Learning

The results show that the interactions of two dimensions of relationship learning (common understanding and relationship memory) and relationship management capability are negatively significant. This is to say that common understanding and relationship memory weaken the positive effect of relationship management capability on service innovation performance of the firm. The empirical results are contrary to previous studies. For example, Wang et al. [84] pointed out that organizational learning strengthens the positive relationship between network capability and the effectiveness of service innovation activities.

Black and Boal [22] proposed that the interaction of firm capabilities and resources can have either enhancing or suppressing effects. Based on this logic, there are several reasons that explain how the two dimensions of relationship learning (common understanding, relationship memory) and relationship management capability can have suppressing effects rather than enhancing effects. According to the definitions, relationship management capability, common understanding and relationship memory all focus on identifying, acquiring, utilizing of knowledge and resource from partnerships; therefore, their functions overlap and will lead to resource surplus. On the one hand, based on the logic of the suppressive relationship proposed by Black and Boal [22], the presence of one factor diminishes the impact of another if the two factors have similar functions. For example, both LeBron James and Magic Johnson are famous U.S. basketball players, but it may lead to a bad "chemical reaction" if they were on the same team, because of their similar abilities, positions, and roles on the team. The two great players might "suppress", negate, or neutralize, each other. On the other hand, previous studies argued that resource surplus may bring negative effects. For example, Yun et al. [85] confirm that there is a "dark-side" of surplus resources, as it can equally result in wastage and inefficiency. Thus, we conclude that there is a negative aggregated effect of the interaction among relationship management capability, common understanding and relationship memory on service innovation performance.

6.3. The Partial Positive Three-Way Interaction Effect

It is found that relationship learning (information sharing, relationship memory) and competitive intensity may have a joint effect on the service innovation performance of a firm engaged in development of a relationship management capability.

On the one hand, relationship learning diminishes the impact of relationship management capability because of their similar function, based on the analysis above. As competitive intensity increases, firms should enhance every kind of ability for responding quickly to the crises and challenges of competition. Therefore, greater emphasis should be

placed on both relationship management capability and relationship learning in continuous service innovation for better performance.

On the other hand, relationship management capability and relationship learning sometimes generate surplus resources which will lead to a negative interaction effect at lower level of competition. However, in highly competitive environments, more resources are needed for firms to deal with the crises and challenges of competition. Hence, surplus resources can also result in highly effective and efficient outcomes, not necessarily in wastage and inefficiency, within the context of service innovation. Thus, at high levels of competitive intensity, the negative interaction effect of relationship management capability and relationship learning (information sharing, relationship memory) will swing toward positivity and significance. This proves the conclusion put forward by Carlson, et al. [86] that if the company is in a turbulent environment rather than a stable environment, the knowledge and skills that enable interaction with external parties are more important for innovation and development.

7. Research Contributions and Implications

7.1. Research Contributions

Our research provides several contributions. First, it extends existing studies by reporting that service innovation performance depends on external capabilities (relationship management capability), joint activities (relationship learning) and external environments (competitive intensity). The results offer a more thorough understanding of the moderating effects of relationship learning on service innovation performance. Second, this study is the first empirical effort to investigate the three-way interaction effect of relationship management capability, relationship learning and competitive intensity on a firm's service innovation performance. This paper assists in offering a clearer framework of understanding of how relationship learning and competitive intensity jointly affect service innovation performance. Both external capabilities (relationship management capability) and joint activities (relationship learning) are particularly critical because firms generally lack external partnership or network relationships in new and challenging service economy contexts, especially in intensive competition environments. Further, this study contributes to the growing social network literature on relationship management capability. Finally, this study endeavors to examine the comprehensive impact of external capabilities, the effectiveness of joint activities and the competitive environment in order to understand service innovation performance of firms by focusing on relationship management capability, relationship learning and competitive intensity, which had previously been marginalized in the literature and are deserving of the more in-depth and analytical approach adopted in our study, which explores the full spectrum of service innovation domains.

7.2. Managerial Implications

The results of this study have important implications for practice.

Firstly, enterprises should improve their relationship management capabilities to facilitate the effective growth of enterprise service innovation performance. At present, the speed of updating of service products is accelerating, and customer needs are becoming more and more diversified [87]. It is difficult for enterprises to keep up with market trends and innovate products that meet customer needs through internal knowledge and information [88]. Therefore, enterprises need to constantly open themselves up, obtain relevant information from the outside for service innovation, and improve service innovation performance. One of the most effective ways is to use relationship management capabilities to build and maintain relationships with external organizations and obtain heterogeneous knowledge that is valuable to innovation. Satisfactory relationships with partners can enhance trust between partners by encouraging communication, establishing cooperative relationships, and resolving conflicts [89]. With the help of this layer of cooperation, the knowledge sharing, absorption and integration of the production technology and product

development experience of external organizations can feed into the firm's own innovation ability, so as to continuously improve the service innovation performance of the enterprise.

Secondly, firms should pay attention to matching the characteristics of their own enterprises when organizing and managing relationship learning. Although the construction of external relationships and the acquisition of knowledge are very important for enterprises, enterprises should pay attention to the matching and compatibility of new capabilities and existing capabilities when cultivating relevant partnerships [90]. This study explores the impact of relationship management capabilities and relationship learning on service innovation performance and finds that companies jointly cultivate the two capabilities of maintaining cooperative relationships and acquiring knowledge from cooperative relationships. However, this may cause the enterprise to be unable to invest enough resources in both capabilities, so it may not enhance enterprise capabilities. This reminds managers that, due to overlapping functions or excess resources, the positive role of relationship management capabilities may be partially diminished by corporate relationship learning. Therefore, managers should emphasize relationship management capabilities rather than relationship learning in a low-level competitive environment.

Finally, the competitive intensity of the external market environment has a positive and significant effect on innovation performance. Managers of companies must strive to develop relationship management competencies and relationship learning that can provide them with efficiencies and access to external knowledge and resources. Enterprises should have a correct understanding of the competitive environment and not be afraid to enter into the fierce competition. Although the competitive environment will bring challenges to the survival of enterprises, it also brings many opportunities. In the fiercely competitive environment, enterprises can better discover their own deficiencies, and can also cover up the defects caused by the overload of corporate capabilities [91]. Therefore, enterprises should accurately distinguish between crises and opportunities, improve their own deficiencies, seize opportunities, and strive to achieve corner overtaking in the fiercely competitive environment and enhance their competitive advantages. In view of the above situation, enterprises can use the knowledge and resources in service innovation to deal with various crises and challenges arising from competition. If they can do this effectively, their service innovation performance will improve significantly.

7.3. Limitations and Future Research

Firstly, in this study, hierarchical regression analysis can accurately measure the degree of correlation between various factors and the degree of regression fit, and improve the effect of prediction equations. However, this method can only select one of the original schemes, and there is no way to derive a better new scheme. At the same time, from the establishment of the hierarchical structure model to the pairwise comparison matrix, the subjective factors of the researchers have a great influence on the whole process, which makes the regression analysis limited in some cases. Therefore, other quantitative research methods, such as SEM, can be used in future research; a method of supplementing expert group evaluation is the way to overcome this shortcoming.

Secondly, this study focuses on financial performance when measuring service innovation performance. The multi-dimensional nature of innovation performance leads to the division of service innovation performance measurement indicators. It is a difficult point to study. Existing scholars increasingly tend to focus on the impact of non-financial performance in firms, which are considered to be their key competitiveness. Service innovation performance cannot be measured solely by financial performance, but non-financial performance should also be considered. Some scholars have proposed that service innovation performance can be measured through non-financial indicators such as customer satisfaction, company perceived image, product or service quality, and strategic goals. Future research needs to include multiple considerations to measure corporate performance, and performance indicators must have reliability and validity. When selecting performance measurement indicators, it is necessary to consider the appropriateness and representative-

ness of indicators in order to truthfully reflect the operational decisions of enterprises, and to further explore the different effects of management capabilities, relationship learning and competitive intensity on various aspects of performance.

Thirdly, the empirical research of this study is based on the data of Chinese companies in a specific period. Since innovation that is relevant to each industry changes over time, the results of this study should be updated by incorporating the latest input from each industry. Although the core idea of innovation may not change over time, innovation research is necessarily time-dependent and results should be used with timeliness. In addition to industry or organizational characteristics, organizational vision and mission and regional culture may also affect the selection of indicators. Therefore, when selecting innovation performance indicators, consideration should be given to adopting or adapting them to company-specific inputs. Future research should include practical studies on the service innovation activities of enterprises in a certain industry in different cultural environments, and comparative research on enterprises in some typical industries.

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