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Application of Multi-agent Participate Model of Service Innovation in Communication Industry

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Abstract

As Chinese economy develops, service innovation has become a key element for which Chinese enterprises compete and upgrading of service industry all over China due to its influence on national economic competitiveness, among which the innovation of multi-agent service plays an important role in enterprises. This thesis mainly studies the concept of the Multi-agent Participate Model of Service Innovation and explores the strategic role and position of the model in communication industry.

The purpose of this thesis includes two parts: firstly it studies the service innovation which multi-agent such as enterprises, customers and suppliers participate in so as to establish a new theoretical framework of such service innovation. Secondly, from the perspective of strategic management of enterprises, it considers the selection of Multi-agent Participate Model of Service Innovation in competitive strategies of the communication industry to clarify the strategic role and position of such model in management of the communication industry.

Questionnaire and interview are two main data acquisition methods in this thesis. The author surveyed 100 employees from China Telecom with a questionnaire designed by herself. The data shows that customers' demands for market and competitors' competition in the market have a great influence on the innovation activities of enterprises. Some senior managers of China Telecom have been interviewed for this study. The interviews have shown the significance of Multi-agent Participate Model of Service Innovation in telecommunication industry and the Multi-agent Participate Model of Service Innovation can favorably be applied to telecommunication industry. The enterprises, customers, employees, managers and suppliers are of inseparable relationships in the model. As an innovation model of enterprises, Multi-agent Participate Model of Service Innovation can better mobilize enthusiasm of each participant of service innovation, and innovativeness of

management service to clarify the strategic position of the model in enterprise management.

Key Words:

Service Innovation, Multi-agent Participate, Open Innovation, Innovation Strategy, Multi-agent Participate Model of Service Innovation

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1. Research Background

Since the 1960s, profound changes have taken place in the global economic structure, which is mainly characterized by the rapid development of global service industry and the modern service industry becoming a center for social and economic life (Xing, 2012). Due to its advantages such as low pollution and high profit, the service industry plays an important role and occupies an important position in the economic development of countries in the world. For example, the proportion of the global service industry in GDP has increased to about 70% in 2010 from about 40% in 1960, and features of “the service economy” become more and more obvious. Under such trend, the service innovation has become a key point for global service enterprises to obtain sustainable competitive advantages, as well as a key factor for the improvement of service industry of countries across the world and even the competitiveness of the national economy (Lin, 2003). However, the proportion of the production value of China’s service industry in GDP has been far lower than that of developed countries, and even cannot reach the general level of developing countries for a long time (He, 2007). This shows that the production value of China’s service industry is still too small, relative to the overall size of the national economy; and the development of service industry still has a long way to go.

To this end, the State Council noted in Opinions on Accelerating the Development of Service Industry (GF [2007] No.7) that “It is the only way to promote economic restructuring and accelerate the transformation of the economic growth model by accelerating the development of service industry, increasing the proportion of service industry in the structure of tertiary industries and enabling service industry to become the leading industry of the national economy” and also demanded “encouraging service enterprises to enhance the capability of independent innovation, improve their overall quality and competitiveness through technological progress and make continuous management innovation, service innovation and product innovation”

(State Council, 2007). However, since the service has such characteristics as intangibility and indivisibility, and the service innovation is different from general manufacturing industry innovation in performance model, organizational management, etc., an analytical method which is more applicable to service features is required for studying the service innovation (Edwin J N, 2006). From service features, the service innovation has more obvious characteristics of multi-agent participation and openness compared with the general product innovation. The difference between these service innovations and traditional product innovations is that service innovations contain more multi-agent, new technology and more complex interaction.

2. Research Purpose

As mentioned above, in order to accelerate the development of China's service industry, it requires effective innovation; and one big problem generally faced by service enterprises at present is how to effectively innovate and which method shall be taken for innovation. To deal with this problem, this thesis researches the service innovation model open for multi-agent and attracting internal and external resources of enterprises such as managers, employees, customers and suppliers to participate in innovation, from the perspective of innovation management and on the basis of relevant theories such as modern service innovation and open innovation. And this thesis will focus on the following questions and contents:

2.1 Construction of the theory framework of Multi-agent Participate Model of Service Innovation

To modern service industry, the service innovation needs more consideration on participation of such agents as customers, employees and managers due to the unique characteristics of service. Meanwhile, with the development of modern technology

and service, it is also important for other agents, such as suppliers and partners, to participate in the service innovation. In reality, more and more enterprises attach importance to this kind of Multi-agent Participate Model of Service Innovation; and how to link this multi-agent? Systematic theoretical research is required for systematically constructing a theory framework of service innovation model multi-agent (including enterprises, customers and suppliers) participate in, which is one of the basic contents explored by this thesis firstly.

2.2 Could this Multi-agent Participate Model of Service Innovation serve as a strategic choice of the communication industry?

In the view of strategic management of enterprise, this thesis will discuss the selection problem of the Multi-agent Participate Model of Service Innovation in competitive strategy of the communication industry to reveal the strategic role and status of the model in the management of the communication industry.

3. Research Ideas and Main Methods

In this thesis, the research ideas are as follows:

Firstly, on the basis of the clear researching background and purpose, introduce the main problems and contents which need to be studied, and elaborate on how to research (research ideas and methods).

Secondly, sort and make comments on the research literature mainly involved in this thesis's research field, including summarizing literature relating to research field such as service innovation and open innovation, sorting the development course of relevant researches, commenting on the existing research results, and clarifying the theoretical basis for this study.

Thirdly, conduct research and analysis through cases to build a theoretical model of the Multi-agent Participate Model of Service Innovation, by which the framework of basic theory in this thesis is formed.

Fourthly, in the view of the enterprise strategy, conduct a questionnaire survey among internal employees of the enterprise and an interview with senior leaders of the enterprise to explore the strategic role and position of this model in enterprise management.

Fifthly, at last summarize and forecast this study, generalize the main conclusions and innovations of this study, and point out the field and the direction for further study in the future.

For research methods, this thesis mainly applies the following methods:

- Literature research method – This method is mainly applied in the second chapter for summarizing and deducing relevant opinions and conclusions. With the existing literature, the basic concepts and main research fields are analyzed and defined.
- Case study method – This method, based on theoretical research, conducts empirical studies with specific cases of Multi-agent Participate Model of Service Innovation to verify the main findings in the theoretical study, and make a deep analysis and dig into the case to discuss the management policy.
- Questionnaire method – This method is to collect data through questionnaire survey and interview, then sort and analyze the data, in combination with practices discussing the strategic role and position of the model in enterprise management.

4. Literature Review

This study mainly involves the theories of service innovation, open innovation, etc.; the relevant research status quo and developments in these areas are listed as follows.

4.1 Study on Implications of Service Innovation

Since the concept of innovation was put forward by Schumpeter in the last century, the research in innovation field has all the time been attracting attention of theory circles; however, for a long time, innovation researches were focused more on product innovation and paid attention to the issues of technology innovation in the enterprise (Jerry S, 2006). Since the service industry covers a wide range and the service itself has characteristics like intangibility, studies on service economy and service management are more disperse; the study on service management in the view of innovation started relatively later; and research results appeared more common after the 1980s. In fact, with the emerging of service economy in the 1960s, theory circles have begun to focus on the research on service industry and service management. However, the concept “service” has been a controversial topic. Because the service industry is too large and trivial, and it is often integrated with other economic activities (such as agriculture, manufacturing, etc.), it is more difficult to define the service comprehensively and accurately; and accordingly there is still no uniform definition in the academic circles. From the literature, most scholars agree that the service is an untouchable and intangible process. The service is mainly defined in three levels of interpretation: 1. Defining the service in the view of products, the first definition considers that products (or services), whether from manufacturing or service industry, are basically a hybrid of “tangible products” and “intangible services”, but with different proportions; until now, the research of service innovation mainly focuses on the development of traditional new product which is based on “tangible product”. (Andrea Ordanini, 2011). 2. Defining the service in the view of process, the second definition considers that general products are produced by the manufacturing industry, and tangible products can be explicitly obtained after the manufacturing process, while the service is an intangible process of solving consumers’ problems and meeting consumers’ demands, i.e. the whole intangible

process of perceiving customers' demands, acting accordingly to solve customers' problems and finally making customers satisfied (Fitzsimmons J A, 2001). 3. Defining the service from the intrinsic characteristics, the third definition considers that although in the service process, consumers may come into contact with tangible products, the inherent features of the service are intangible, and usually the transfer of ownership of tangible products will not happen owing to service consumption (Nimit C, 2005).

Although there are theoretically many definitions of service, it is generally accepted that just as in the manufacturing industry, there are a wide range of innovative behaviors in the service industry. However, there are many explanations of the concept of service innovation: technology is only one possible dimension of the service innovation, while the service innovation with a wider coverage is a concept with a broader category (Hipp, 1999; and Hauknes, 1998). Starting from the novelty of service, service innovation is considered to be a major innovation to the service, or the introduction of new services into the market, or an improvement of the service product line, or changes to service styles, modes, etc. (Heany, 1993). Service innovation narrowly refers to a service-oriented organization, including profit and non-profit enterprises and institutions and departments, which provides more efficient and satisfactory service pack for target customers to get greater benefits. This service pack is a combination of products or services composed of elements including tangible products and intangible services. While the service innovation broadly means that all types of organizations (or departments), through continually providing customers with services, products, or a combination of the two, increase customers satisfaction and loyalty to create greater value and utility (Lu et al, 2000). Van and Elfring (2002) consider that service innovation is a new implementation process of a new service idea, service behavior and goal. The "new" herein is mainly relative to manufacturers, competitors and market environment. They also point out that the service innovation may include new service portfolio, models which is based on technological innovation and consumers and other organizations participate in,

etc. Service innovation is new or obvious changes that have taken place in service concept, customer contact methods, delivery systems or relevant service technology, as well as one new service function or more arising therefrom, compared to manufacturer or market (Bart et al, 2003). Service innovation means “Apply new ideas and technologies in the service process to improve and change the existing service processes and service products, improve the existing service quality and efficiency, extend scope of services, update service contents, increase new service items, create new value for customers, and ultimately form competitive advantage of enterprises” (Xu and Lv, 2003). Service innovation refers to new, obviously-changed service ideas or service process created by organizations to increase additional value of customers, or new or improved approaches provided to solve customers’ problems (Tidd and Hull, 2003). Berry et al (2006) consider that service innovation refers to activities of adding new services, improving the way that services are offered and extending the existing services. They also emphasize the significance of service enterprises developing new markets through service innovation. Lin and Wu (2007) consider that service innovation is a very broad concept, and the service innovation activities can occur in various industries and sectors. Thus, from a broad perspective, the service innovation refers to all innovation behaviors and activities related to or aimed at services; while, from a narrow perspective, the service innovation mainly refers to the innovation behavior and activities occurring in the service industry. They believe that in order to understand the meaning of the service innovation, such five aspects, including intangibility, novelty range, and diversity of forms, customer-oriented quality and applicability of innovation, should be taken into account. According to the above literatures, there is no uniform definition of the service innovation; due to the intangible nature of services, it is also difficult to clearly describe and measure novelty degree of new services; and various concepts of service innovation are proposed from different research perspective of scholars and analyzed and defined from features and practice of service.

4.2 Study on Service Innovation Model

Obviously, due to the broadness of the concept of service innovation, there is diversity in the expression form and innovation model of service innovation. Early researches on service innovation model are more influenced by research on technology innovation. For example, Barras (1986) has proposed “Revers Product Cycle (RPC)” theory based on the A-U model of technological innovation, thought that the service innovation consists of such three phases as incremental innovation, radical innovation and product innovation, according to the part the computer system plays in the service innovation when the computer system is introduced into the service industry, and thus proposed the technology supply-leading service innovation model.

With further research, people gradually started to propose different service innovation model from the characteristics of service itself. Studying service innovation model according to the service characteristics, Miles (1995) has proposed such three types of innovation as the product-based service innovation, service process innovation and service delivery innovation. On this basis, service innovation is divided into four models: product innovation, process innovation, organization innovation and market innovation (Sundbo and Gallouj, 1998). According to the different levels of innovation, the service innovation is divided into six models: radical innovation, improved innovation, enhanced innovation, impromptu innovation, integrated innovation and modular innovation (Gallouj and Weinstein, 1997).

“Four Dimensional Model” of the service innovation contains such four dimensions as new service concept, customer platform, service delivery system and technology selection. This model is actually an integration of the innovation concept and pattern, which provides a good theoretical basis for the study of the service innovation model (Bilderbeek et al, 1998). Along with the development of the research of service features-oriented, there are more and more research results of the service innovation model, among which the study of European S4IS (1998) project team has great influence. Their representative achievement is: the general model of service innovation, including concept stage, development stage and protection stage, is a

typical model applicable to innovation of most service enterprises, especially to enterprises using “modular” and “customized” innovation modes (Sundbo, 1998). Additionally, typical R & D model, professional service model, organized strategic model, supporting innovation model, artisan model and network model are proposed, aimed at service enterprises’ innovation practice with different nature and type (Sundbo and Gallouj, 1998). Other researches on service model include that the service innovation consists of such three aspects as new service concept, new customer contact and new service delivery system, and accordingly such four models of the service innovation are proposed:

Supply-driven service innovation model, customer-guided service innovation model, spontaneous enterprise service innovation model and integrated service innovation model (Van et al, 2003). Service innovation form, from service characteristics, mainly includes innovation of service delivery methods, organization structure, service operation system, and service process (Lu et al, 2000). Four types of service innovation proposed by Normann (1991) include social innovation, technological innovation, network innovation and replication innovation, and he also puts forward the customer participating in and bundling innovation model through further research on the social innovation. On the basis of previous studies, Hipp and Grupp (2005) propose four kinds of service innovation model including knowledge-intensive, network-intensive, scale-intensive and external innovation-intensive service innovation model based on service features and characteristics of the innovation process. Service innovation is divided by Hippel (2005) into knowledge-intensive service innovation, network-based service innovation, scale-intensive service innovation and supplier-led service innovation, based on German service innovation survey data. Existing service innovation types could be summarized as technological innovation, process innovation, organizational innovation and specialized innovation (Zhang, 2005). Through the review of the service innovation literatures and case studies, service innovation is divided into two types: one is concept innovation, namely, to provide customers with a brand new or improved service content or

function. This may be a new service, or an upgrading of the original service, or a new service formed by separating or restructuring the original service function. The second is delivery innovation, that is to say, to improve enterprise efficiency and customer satisfaction by changing service mode or process with no changes in the core service function (Wang et al, 2009). These studies have proposed the specific performance mode of the service innovation from different research perspectives.

After systematic summary of domestic and foreign studies on service innovation, service innovation is classified into nine basic models including product innovation based on new service development, process innovation based on introduction of new process, organization innovation based on introduction of new organization element, market innovation based on market's new behavior, technology innovation based on technology development, delivery innovation based on new or improved service delivery process, reconstruction innovation based on different service elements' combination or decomposition, specialized innovation based on specific customer issue solutions, and formalization innovation based on service element visibility and changes in the degree of standardization; and these nine models comprehensively summarize the basic model of general service innovation (Lin and Wu, 2007).

Howells and Tether (2004) propose internal-oriented and external-oriented service innovation model: the internal-oriented innovation model emphasizes innovation process and organization, namely, how the enterprise innovates; the external-oriented innovation model emphasizes the interaction between the enterprise and external factors (mainly the customer) in the innovation. However, Howells and Tether have just presented the concept of this model and have not conducted further research on this innovation model.

Besides, based on the role and influence of each agent in the service innovation, service innovation is divided into five models (Hertog and Bliderbeek, 1999), which is more close to this thesis:

1. Supplier-leading innovation model. This model was first identified, and was studied at best. It initially occurred mainly in the manufacturing, and then was extensively identified and studied in the service industry, which is a typical technology-driven innovation and characterized by technological innovation research paradigm. Brigit (2011) has pointed out that suppliers and other business partners are equally noble resources of innovative ideas, which is often overlooked by many SMEs; and he believes that, in the situation of good strategic cooperation, suppliers are willing and able to participate in the early stage of product and service design, and contact with customers, which will help enterprises' products and services better meet customers' requirements.

2. Service enterprise-oriented innovation model. Unlike the former, this is a service-oriented service innovation model; service enterprises, including employees (not only employees in R & D Department) and managers, play an important, leading role in the whole innovation process from idea generation to implementation of service.

3. Customer-oriented innovation model. The model emphasizes the importance of customer participating in the service innovation process; in the innovation process, customer is not only a participant, but also an innovation leader. The enterprise regards each innovation as a response to market demands, and then makes innovation according to customers' needs. In this model, although suppliers still provide necessary resources for innovation, customers play a leading role in the innovation and are cooperative producers and end-users of the new service.

4. Service enterprise-assisting innovation model. This innovation model more occurs in innovative cooperation between service enterprises and customer enterprises. In this model, service enterprises assist customer enterprises in a variety of ways, and provide customer enterprises with innovative resources (including knowledge,

technology, manpower, etc.) required for innovation. For example, Knowledge Intensive Business Service (KIBS) often requires a joint cooperation of multiple enterprises to carry out assisting innovation.

5. Aggregated innovation model. This is the innovation of all members on the aggregated value chain, and is a more complex and in-depth innovation model, including innovation sponsors and participants such as service enterprises (including managers and employees), suppliers and customers. In the view of research, this study is made from the perspective of the innovation participant, and belongs to the scope of the aggregated service innovation model. However, Hertog and Bilderbeek just classify the service innovation model, but do not make further research on the specific innovation model.

According to the above literatures, due to the diversity of expression form of the service innovation, the research perspective of the service innovation model is accordingly broader. In the view of study trends, scholars pay increasingly attention to service features-oriented studies; and it has become the main trend that exploring various service innovation models, oriented by service features and in combination with various expression forms of the service innovation in practice. Therefore, following this trend, in combination with the existing researches on meanings and models of the service innovation, this study will discuss the management law of the Multi-agent Participate Model of Service Innovation by starting with the feature of “Multi-agent Participate” in practice.

5. Theoretical Framework of Multi-agent Participate Model of Service Innovation

Starting with services and features of service innovation, this chapter will construct a basic theoretical framework of Multi-agent Participate Model of Service Innovation, in combination with relevant theories such as service innovation and open innovation.

5.1 Definition of Relevant Concepts

Firstly, for the definition of service, considering that the boundary between “intangible” service and “tangible” product is increasingly vague with the development of science and technology and modern service industry, on the basis of definitions of service in the existing literature, the service discussed herein is a relatively broader category, and is a service combination including intangible service and tangible product that may exist. That is to say, in an intangible process of resolving customers’ problems it may refer to tangible technologies or relevant products and equipments as well as other “service packs” supported by ancillary services. Compared with traditional tangible products, the “service pack” is mainly composed of intangible service, embodying the basic characteristics of service, while tangible technology or product is just an assistant part of the service pack. Compared with traditional intangible services, “service packs” may encompass (non-essential) tangible products and technical supports. Secondly, as to the concept of service innovation, the service innovation studied herein mainly refers to the innovation based on the above “service pack” by the enterprise, namely, a commercialization process of enterprises developing, designing and delivering (or producing and selling) new services (including brand new or improved services) to create greater value. Thirdly, as to the concept of open innovation, based on the interpretation of the open innovation given by Chesbrough, the open innovation discussed herein refers to an innovation paradigm that enterprises balance and coordinate external and internal resources to generate new ideas, while comprehensively utilizing a variety of internal and external resources to service innovation activities through a variety of ways. Finally, as to the concept of participating agent of service innovation, it mainly refers to relevant stakeholders who maintain close contact with the enterprise through a variety of ways, participate in the enterprise’s service innovation process and provide various help and supports for the service innovation, including employees and managers inside enterprises as well as customers, suppliers, partners, agencies, universities and research institutions, government departments, etc. outside

enterprises.

5.2 Concept of Multi-agent Participate Model of Service Innovation

Based on the above concept, the concept of Multi-agent Participate Model of Service Innovation put forward in the thesis will be discussed hereunder. Multi-agent Participate Model of Service Innovation refers to a kind of innovation model, in enterprises' service innovation activities, on the basis of enterprises' strategic intentions, which opens consciously enterprises' service innovation activities by making full use of innovation resources inside and outside enterprises to create greater enterprises value and innovation performance, attracts, encourages and organizes various stakeholders inside and outside enterprises (including enterprises' managers, employees, customers, suppliers, partners, agencies, universities, research institutions, government departments, etc.) to participate in enterprises' service innovation activities through a variety of ways, and includes every link or process from generation and design of new service ideas (originality) to production and sales. We could grasp the meanings of Multi-agent Participate Model of Service Innovation from the following aspects:

1. The Multi-agent Participate Model of Service Innovation is an enterprise-leading innovation model. Although, in the process of innovation, there are many stakeholders participating in it, such participation is the innovation participation based on the enterprise strategy orientation, that is to say, who will participate, how to participate, as well as participation mode; participation degree, participation stage, etc. are all based on strategy arrangement of enterprise. Meanwhile, the enterprise is responsible for the organization and management of the entire innovation activity, coordinating relationships between agents and efficiently allocating various innovation resource elements to make innovation activity meet enterprise's interests and achieve enterprise's innovation strategy objectives.
2. The Multi-agent Participate Model of Service Innovation is an open innovation activity with resource internally integrated. An important activity of the open

innovation is the internal integration of resources, namely, to look for and attract external innovation resources to flow into the enterprise to serve the enterprise after effective integration with the internal innovation resources of the enterprise through analyzing the internal and external environment of the enterprise (Chesbrough and Crowther, 2006). Obviously, the Multi-agent Participate Model of Service Innovation has the basic features and requirements of this open innovation activities and belongs to the category of open innovation activities.

3. In reality, service innovation and open innovation have various realization forms; Multi-agent Participate Model of Service Innovation is a model of service innovation as well as a model of open innovation. It could be considered to be either an open innovation model used in the service industry, or an application of open innovation model in the service industry. Therefore, the relationship among conceptual categories of service innovation, open innovation and Multi-agent Participate Model of Service Innovation is shown in Figure 5-1; Multi-agent Participate Model of Service Innovation belongs to a part of the overlap between service innovation and open innovation in the concept, and can follow the research logic and normal form of service innovation and open innovation in terms of research.

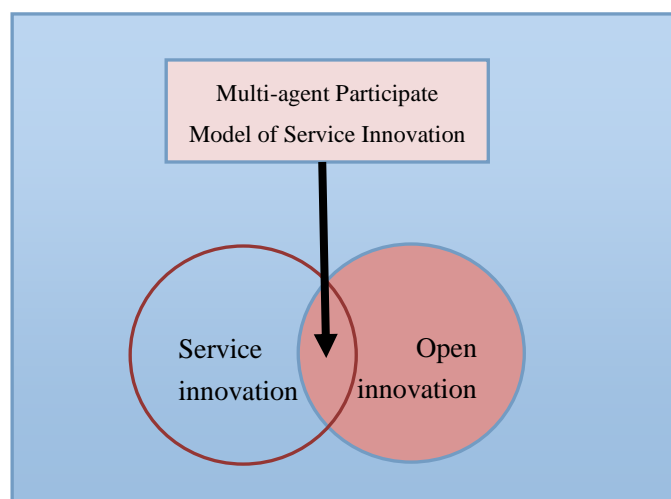


Figure 5-1 Conceptual Category of Multi-agent Participate Model of Service Innovation

4. Multi-agent Participate Model of Service Innovation is a service feature-oriented innovation model. As mentioned earlier, the service innovation discussed herein is an

innovation based on the “service pack”, that is to say, the service may also include tangible technology and combinations of product support and ancillary service, and it is not entirely a pure “intangible service”; but the service pack is still mainly “intangible service”, embodying basic characteristics of service and service innovation. Seen from the logical sense, Multi-agent Participate Model of Service Innovation can be implemented in innovation of technology or product in the manufacturing industry as well as in the service innovation. However, in the view of service features orientation, the service innovation, especially the modern service innovation, has greater multi-agent participation, reflecting the openness of innovation systems, which is set forth in many research literatures above.

5.3 Theoretical Model of Multi-agent Participate Model of Service Innovation

In the situation of Multi-agent Participate Model of Service Innovation, the internal managers and employees of enterprises and external customers and suppliers are important innovation resources and participants, and they play an important role in the service innovation. In this thesis, these main participants in the service innovation are divided into three categories: I. Enterprises: including enterprise’s managers and employees (including front-line employees and other employees); II. Suppliers: including suppliers of technical equipment and providers of composite services; III. Customers: as shown in Figure 5-2.

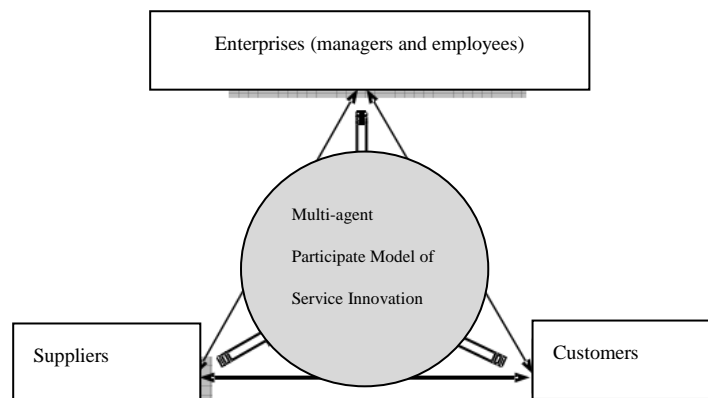


Figure 5-2 New Service Triangle

These three types of participants constitute a “new service triangle” of “enterprises - suppliers - customers”, which is different from the service triangle of “enterprises - employees - customers” (Albrecht 1998, Gronroos 1990 and Bitner 1995). The new service triangle constructed herein emphasizes the multi-agent participation of service innovation and relationships between participants: interactions between enterprises and customers, interactions between enterprises and suppliers, and interactions between suppliers and customers form a cross-organizational relationship of offering and delivering service. In the platform of Multi-agent Participate Model of Service Innovation, every agent jointly participates in each process and links of service innovation, and various interactions happen among them.

The theoretical model of service innovation contains a number of major participants such as enterprises, customers, suppliers, etc., which reflects a service innovation process in the situation of Multi-agent Participate Model of open Service Innovation. In this theoretical model of Multi-agent Participate Model of Service Innovation, the following aspects are included:

1. The idea of Multi-agent Participate Model of Service Innovation is created in the aspect of the innovation source. In the situation of Multi-agent Participate Model of Service Innovation, new service ideas may be inspired by managers and employees inside the enterprise, or by customers, suppliers, etc. outside the enterprise.
2. Multi-agent Participate Model of Service Innovation, namely development and design of new service idea, converts the new service idea into the realizable “service product” by means of technology, market experiments, etc. In the situation of multi-agent participating in innovation, the enterprise, supplier and customer jointly participate in this process under the guidance of enterprise strategy and organization. But the process is not a standardization process, that is to say, different service enterprises have different design methods for different service products.

3. Owing to the indivisibility of service production and consumption, while the new service multi-agent participates in is being produced; customers consume it, by which sales can be achieved. In the situation of multi-agent participation in innovation, the service production is more embodied as interactions of multi-agent, which forms integration and fusion of multi-platform.

Based on the new service triangle of “enterprises - customers - suppliers”, there are various interactions between multi-agents, such as interactions between enterprises and customers, enterprises and suppliers, suppliers and customers, as well as suppliers and suppliers, customers and customers, managers and employees, etc.; these complex interactions constitute a variety of platforms existing in the innovation system, as shown in Figure 5-3, in which interactions among enterprises, customers and suppliers are regarded as the main platform.

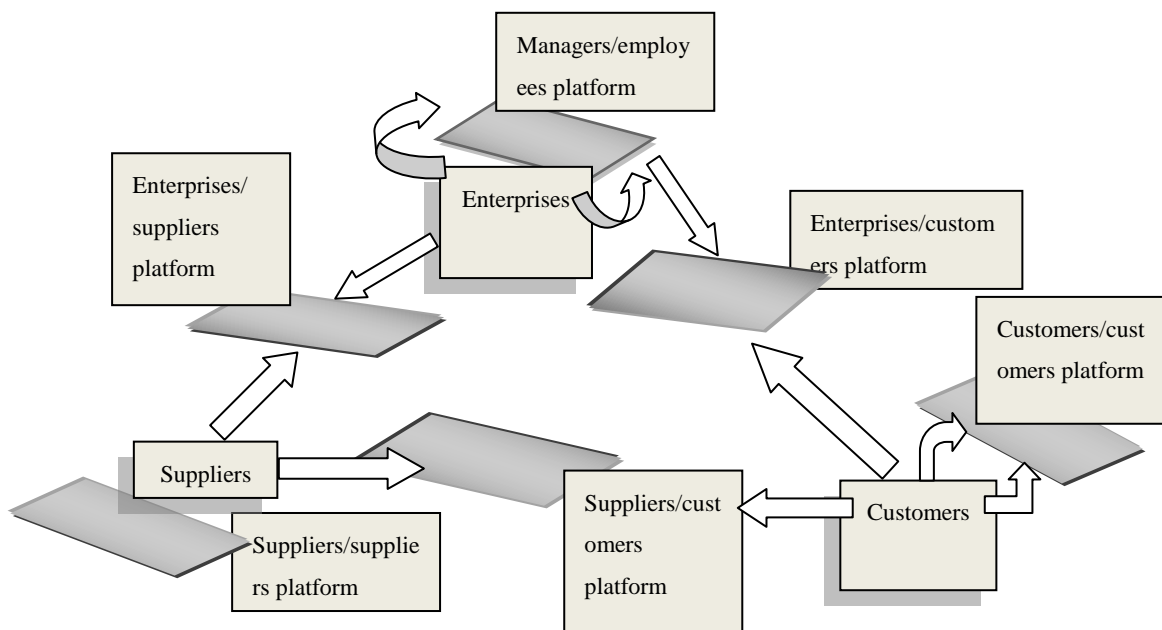


Figure 5-3 Platform Based on New Service Triangle

1. “Enterprises/customers” platform. In Multi-agent Participate Model of Service Innovation, the interaction between enterprises and customers is very important; when customers participate in innovation, the enterprise should maintain good interaction with customers, fully understand customers’ needs and capabilities, and communicate

with customers on enterprise's innovation intentions, service mode, etc.; and maintaining good cooperation has a very important significance on the development of the enterprise.

2. "Enterprises/suppliers" platform. With the complication of development of service, it becomes a significant trend that suppliers participate in innovation, interact and cooperate with enterprises. In order to keep good interactions with suppliers, enterprises should fully understand and adapt to the new technology or service provided by suppliers, maintain good connection and merging of enterprises' existing technology or service with technology or service provided by suppliers, and can accurately reflect their own needs and technical capability to suppliers; and enterprises and suppliers can form an important strategic partnership through good interactions on the platform.

3. "Suppliers/customers" platform. In Multi-agent Participate Model of Service Innovation, when both suppliers and customers participate in service innovation, there are interactions between them, which form the platform. In the suppliers/customers platform, on the one hand, suppliers should fully understand customers' needs, to improve their technology or service supply and make the final service pack more adapted to the needs of customers. On the other hand, customers should keep good interactions with suppliers, and actively reflect their demands and expectations for new services to the supplier, so that suppliers can cooperate with enterprises better to complete innovation activities.

In the Multi-agent Participate Model of Service Innovation, complex interactions contained in these platforms will affect the operation of the innovation system, which is an important feature of Multi-agent Participate Model of Service Innovation. Of course, each platform's impact on the innovation system is different due to different components of each platform.

6. Case Analysis

The previous chapter has constructed the theoretical framework of Multi-agent Participate Model of Service Innovation, simply defined the model and explained the relevant meanings. In the view of the development, Multi-agent Participate Model of Service Innovation is becoming an important trend of the development of the service innovation. In the view of enterprise strategy, could this Multi-agent Participate Model of Service Innovation serve as a strategic choice of the communication industry? This chapter will discuss the strategic choice of the service innovation model of the communication industry from the perspective of competitive strategy of the communication industry.

The communication industry is one of basic service industries, covering all consumer groups; as a representative of an industry, it reflects the status quo and development trend of enterprise management innovation. The communication industry has such characteristics as basis, strategy, pillar, guiding, etc., and meets the requirements of innovation model such as universality, prospectiveness, ect.. Currently, the communication industry is moving towards the era with deep development of 4G and deep integration of the industry, promoting of operator's full-service strategy, and officially promoting of mobile internet, cloud computing and internet of things, which makes hot spots constantly emerge all over the communication industry and continuous service innovation.

For example, in 2006, Huawei launched the global online Innovation Jam in which multi-agent such as managers, employees, customers, suppliers, etc. participated, and which attracted 150,000 participants from 104 countries and collected a total of 46,000 new ideas; and Huawei has finally invested \$100 million to support ten of these ideas. Another example, e-market services, including B2B (enterprise to enterprise), B2C (enterprise to customs) and C2C (customs to customs), provided by

Alibaba.com, JD.com and other websites, integrate services including advertising, search engines, credit assessment, business forums and electronic clearing, in which the main service providers, together with numerous technical, service providers and intermediaries, provide customers with a range of innovative service portfolios (Andrea Ordanini, 2011).

China Telecom, in the production (or delivery) of new service multi-agent participate in, launches the online trading market service innovation, achieving great success, which implements free trades of enterprise-to-enterprise (B2B) on the virtual network. By building e-commerce service platform between enterprises, it provides customers with online business services. Customers can not only find more trade partners and business opportunities, but also enjoy more and better commercial services and commercial environments on the website. Based on such service platform, multi-agent jointly participates in the completeness of the production and consumption of new service, including:

1. The interactions between enterprises and customers. Enterprise, through website, provides various customers with the opportunity of looking for trade partners. When the website platform supplies service, the web page works as the front desk platform. At this point, the interaction between customers and website is embodied in the use of web page information service, so the quality of service delivery is directly affected by web design layout, information management, updates, etc. At the same time, customers' knowledge, skills and demands will also have an impact on service delivery. In the background of service production, there are many communication and interaction between customers and service providers, such as website's identification and assessment of customer information and production of customer's network. To complete this process, it requires constant interactions between customers and enterprises.

2. The interactions between suppliers and customers. Website provides a trading

platform for customers, and also provides an interaction platform between various service and equipment providers and customers, for example, advertisers, search engine providers, banks, software producers and logistics service providers provide customers with necessary advertising, information search, credit, transaction settlement, software service, logistics service and other convenient services on the network platform provided by website. These convenient services and the trading platform provided by the website together constitute service products (service packs) of the complex service portfolio.

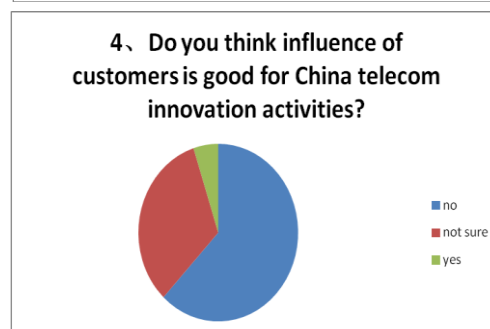
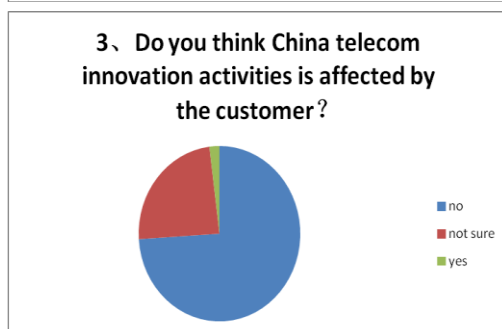
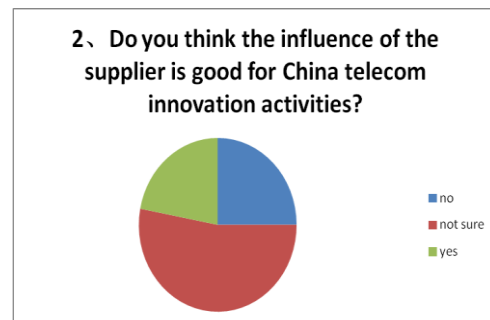
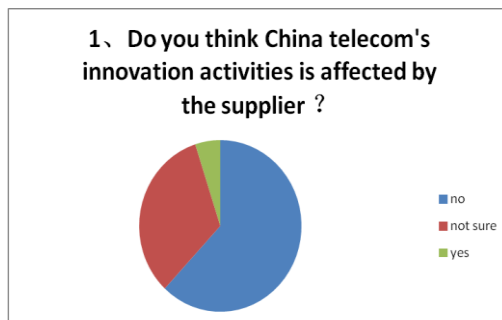
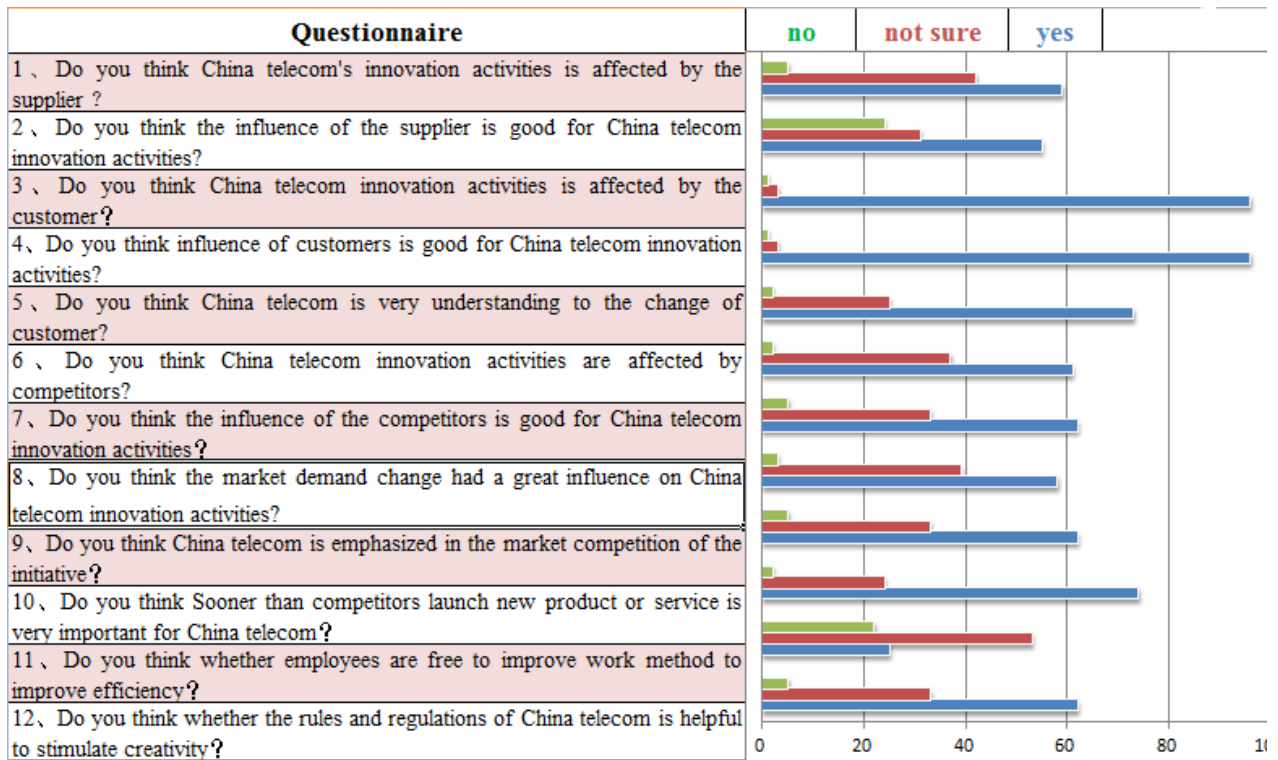
3. The interactions between enterprises and suppliers. In the production of a complex new service packs, the main service and convenient service innovation complement each other; for example, China Telecom's online trading market service platform is a kind of complex service products which integrates various ancillary services such as finance, commercial assessment, software and advertising. Therefore, interactions between enterprises and their partners including suppliers are also very important for the service innovation; China Telecom has succeeded in cooperating with banks, e-businesses, Ten cent and other value-added service enterprises, in the aspect of the innovation of its website service to together provide kinds of convenient services required for the online trading market service.

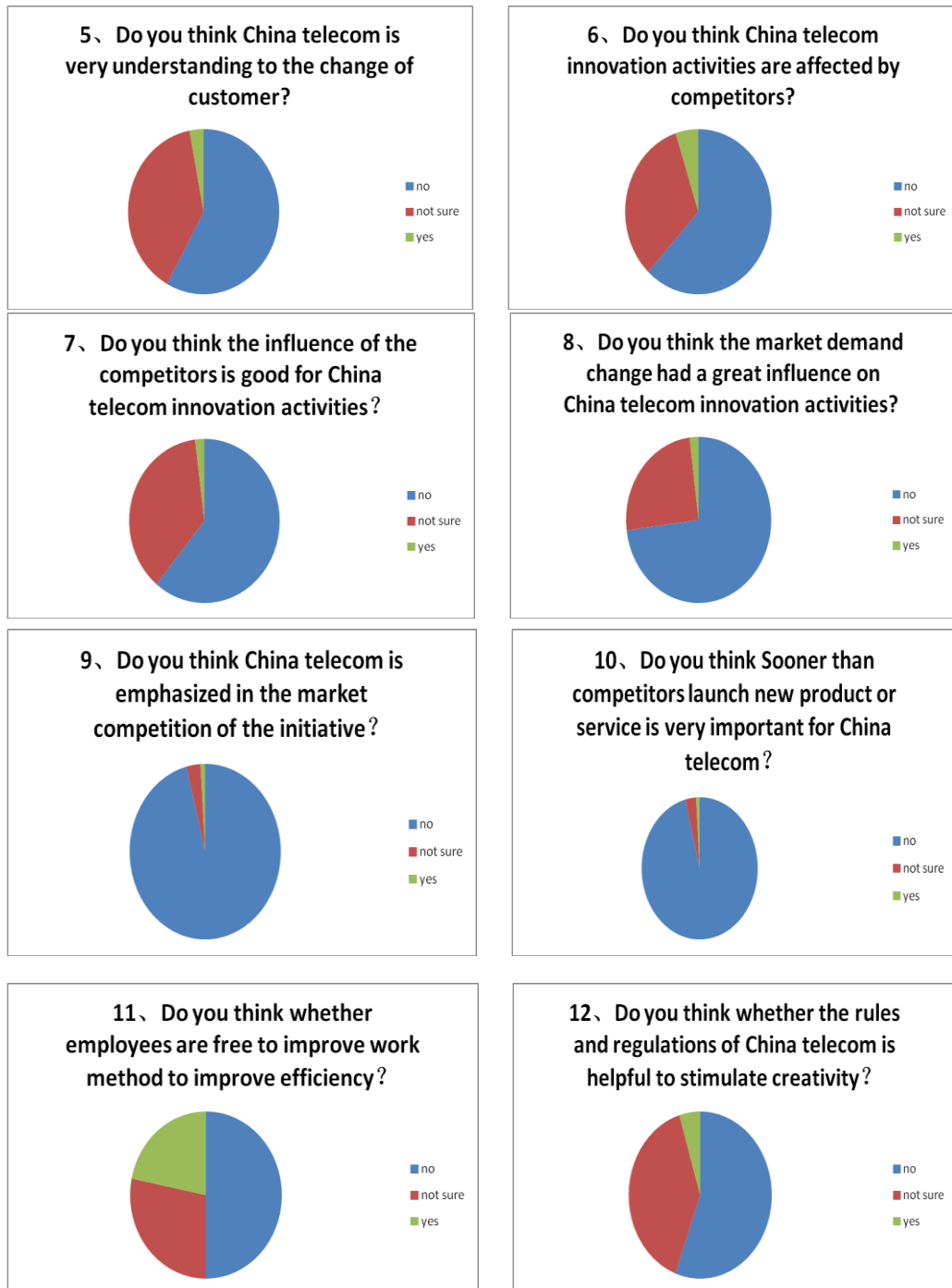
7. Questionnaire and Interview

7.1 Questionnaire

The questionnaire was mainly carried out among 100 employees of China Telecom, combined with market demand and innovation activities, was centered on the innovation of employees, customers and suppliers on the basis of Multi-agent Participate Model of Service Innovation and proposed innovation questionnaire, to analyze the strategic choice of the enterprise's service innovation.

The questionnaire includes 12 questions and three options (yes, no and not sure) for each question:





As shown in the questionnaire, both suppliers and employees have an influence on enterprise's innovation activities, but not great; and customers, market demands brought by customers and the competitor's incentive have a great influence on enterprise's innovation activities.

7.2 Interview:

What measures did China Telecom take for innovation management?

Answer (A for short):

1. Innovation in concept: China Telecom should pursue innovation in management; first of all the company should make innovations in the management concept, make enterprise information and the fast-growing information age synchronized, and meanwhile should possess the ability to meet emergencies and establish positive thoughts so as to ensure the healthy development of the enterprise;

2. Innovation in mode: China Telecom should transform the ideology, strength the efforts to innovate enterprise informatization, optimize enterprise resources, adhere to the idea of harmony, unite and collaborate with members to improve management efficiency; and it also should break limitations within the enterprise and move towards open innovation era to better obtain economic benefit;

3. Realization of system innovation in enterprise management: the norms and principles of the enterprise are the enterprise system, which consists of enterprise's leadership system, internal management system, operating mode system and economic management system. Reasonable distribution of feasible system is also the guarantee and basis of enterprise innovation, so the enterprise shall strengthen and reasonably distribute the system for the innovation of system;

How do customers participate in the enterprise's innovation management? What is the incentive system?

A:

Customers participating in innovation could help enterprise better grasp market demand, which is the source of enterprise obtaining more innovation and can effectively reduce the cost and risk of the development of enterprise's new product;

Our enterprise must make customers understand more about us in order to better encourage customers to participate in innovation. To this end, the enterprise can regularly introduce the status quo of the enterprise to customers, and invite customers to visit the enterprise; and the enterprise should make its processes more transparent so that customers could understand the enterprise more efficiently, which may truly make customers participate in the enterprise's innovation activities. Only in this way can the customer's innovation coincide with the process of the enterprise, which will make innovation work more effectively.

For the innovation customers participate in, the enterprise will give some incentives, such as Selection of Great Ideas, Activity of Exchanging Points for Telephone Bill, Discounted When Buying a Mobile Phone, etc., to encourage customers to participate in the enterprise's innovation.

How do employees participate in the enterprise's innovation management? What is the incentive system?

A:

1. Create a circumstance of innovation: the enterprise must pay attention to the recommendations of employees and provide opportunities for employees to equally communicate and fully express their opinions, which could make employees have interest in cooperation and passion for innovation, enliven innovative thinking really and make cooperation spirit cultivated.
2. Provide targeted opportunities for training and learning: the enterprise should carry out innovation management training to make employees understand the innovation; by means of case analysis, comparative analysis, etc., the enterprise may develop employees' interest in participating in innovation, and help them master the rules of innovative thinking and improve innovation thinking ability.

3. Make the incentive system flexible to improve employees' motivation of declaring innovation: the enterprise should amply reward employees for their reasonable innovations and make these closely connected with employees' performance assessment to provide a broad space for employees' career development and make full use of employees' capabilities. At work, the enterprise should bring into full play the responsibility of management in incentive system, actively communicate with and encourage employees so as to make employees exercise their innovation initiative to the greatest extent.

How do suppliers participate in the enterprise's innovation management? What is the incentive system?

A:

Enterprises, together with suppliers, can research and develop and manage technology; for example, enterprises work with suppliers to research and develop new products, set a positive and common cost objective, and promote the reduction of cost without undermining relations between them. Many enterprises develop clear and unambiguous procurement strategies and innovative ideas by using suppliers' procurement competitive advantage.

According to a win-win purchasing principle, the cost of suppliers depend on enterprise's sales; therefore, the more the enterprise sells, the greater profits suppliers may obtain.

According to the above analysis, the participation of customers and employees can better realize service innovation strategy, since the participation of customers and employees can better reflect the needs of consumers. Services are finished in the interaction between customers and employees, so customers and employees (especially the front-line employees) could directly perceive and contact services. Customers can better know what kind of services they need than anyone else, so the

participation of customers enables new service to better reflect consumers' demands. Similarly, the participation of employees can also help enterprises provide services more suitable for consumers' demand, because employees contact a wide variety of customers and more comprehensively understand customers' demand. Meanwhile, employees know more about enterprises than consumers and could reflect consumers' demand realistically. Especially in the service innovation of mass customization and the knowledge-intensive service innovation, the participation of customers and employees is especially important.

Suppliers' participation could also realize the service innovation strategies. In order to provide more service to better meet consumers' demand and expand the difference with other competitors, in the service innovation, it is essential to add more "personalized" elements; for this purpose, enterprises need to attract more suppliers, partners etc. to innovation and implement differentiation competitive by providing complex service packs including more assisting technology or service, in order to meet more needs of consumers.

According to the above analysis, enterprises, by adopting Multi-agent Participate Model of Service Innovation, can achieve their competitive strategy objectives very well. Therefore, in the view of enterprise strategy, Multi-agent Participate Model of Service Innovation conforms to competitive strategy objective of enterprise and creates greater value, which is an important strategic choice to obtain long-term competitive advantage.

8. Summary

On the basis of the construction of theoretical framework, the thesis mainly discusses: firstly, define and discriminate related concepts, and propose the concept and meaning of Multi-agent Participate Model of Service Innovation; secondly, starting with the

service and service innovation features, build a theoretical model of Multi-agent Participate Model of Service Innovation; thirdly, explore the strategic choice of Multi-agent Participate Model of Service Innovation. By studying multi-agent innovation model, draw the following main points and conclusions:

1. In the situation of Multi-agent Participate Model of Service Innovation, enterprises (including managers and employees), customers and suppliers are important innovation resource and participants, and constitute the “new service triangle” which in the service innovation plays an important role. On the basis of new service triangle, combined with service innovation features, a theoretical model of Multi-agent Participate Model of Service Innovation is constructed. This model reflects a service innovation mode under the circumstance of Multi-agent Participate Model of Service Innovation, indicating that Multi-agent Participate Model of Service Innovation is a dynamic innovation process containing complex interactions.

2. Meanwhile, from the perspective of enterprise strategy, this thesis analyses enterprises’ strategic choice of the Multi-agent Participate Model of Service Innovation: enterprises, by adopting Multi-agent Participate Model of Service Innovation, can achieve competitive strategy objectives very well. Therefore, from the perspective of enterprise strategy, Multi-agent Participate Model of Service Innovation conforms to competitive strategy objective of enterprise and creates greater value, which is an important strategic choice to obtain long-term competitive advantage.

9. Problems to be Discussed in the Future

1. What performance will such Multi-agent Participate Model of Service Innovation bring to agents such as enterprises, customers, suppliers, etc., and the whole

innovation system? This is a fundamental question that needs to be considered when enterprises use this model for innovation. If the opening of innovation system brings more agents into the service innovation, what benefits could be brought to agents and the innovation system? It has very important enlightening significance for service innovation practice of enterprises and is worth thinking in the future.

2. What kind of risk performance and characteristics does such Multi-agent Participate Model of Service Innovation have? This is another important question that enterprises need to consider when managing this model. In the Multi-agent Participate Model of Service Innovation, the innovation system may be exposed to more uncertainty due to agents' differences in knowledge background, innovation capacity, participation motivation, participation degree, interest orientation, risk requirements, etc. Therefore, the analysis of the main system risk existing in the model and the performance of risk factors and the discussion of the impact of various risk factors on agents and the performance of innovation system are worth further analyzing and discussing.

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