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Research on Service Supply Chain: Opportunity and Challenge of China

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Abstract

In recent years, with the developing of service-oriented economy and the emerging of the new services, the reaserch on service supply chain accepts extensive attention. In this paper, we analyzed the background of the rise and development of the service supply chain research and explained the characteristics of the service supply chain; then we reviewed the development of theory and practice of service supply chain and revealed the difficulties and challenges service supply chain operation management faces. At last we outlined the research status of service supply chain and put forward the future study direction. Through the literature review and carding the research situation, we hope to promote the further service supply chain research and development.

Key words: Service; Service supply chain; Opportunity; Challenge

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INTRODUCTION

a) Changes in the Service Industry

Scientific and technological progress and innovation has become the fundamental force to promote the development of modern service industry, the integration of science and technology and industry is acting in increasingly significant in the modern service industry. The impact of technological advances and innovative ideas on services mainly show in two aspects: emerging of new services and upgrading the form of traditional services.

New services is the one developed by using the modern concept, network technology, new marketing, and service innovation, it has five basic characteristic: high-growth, high-tech, high-risk, high human capital content and low consumption. Compared with the traditional service, new services provide much higher value-added, and meet the need of high-level community and diverse society. The most trend of new service is product services, from simple tangible products to product-based value-added services, such as IBM's information services. The most popular American science fiction movie in 2010 hit is Avatar, it grossed 2.75 billion dollars at the global box office, which exceeds China Baosteel Group 2009 full-year total profit, this result is very compelling.

Manydepartment, national and multinational corporations, trade unions and society organizations participated in the emerging competition in the service sector, seeking to share the benefit of the develop of services. Compared with the traditional services and manufacturing industry, the new services have a particularly big advantage on the economic and social benefits, including the creation of higher value, more employment opportunities, generate less pollution, better promotion of social and economic advancement because of its unique features and the way they operate.

With the rapid development of new services, the service supply chain entered in the new developing stages. There emerge some kind of features which many traditional services do not own, such as electronic, Informationization, this makes certain services (ATM, Internet banking) to a certain extent standardization and these services are no longer solely depend on human being. In response to these new changes, ensure the smooth production and sales of new service products, assurance services companies to achieve maximum efficiency in the overall environment, it is necessary to do the research of service supply chain.

Modern service industry rose when the traditional

services developed and reach a certain size. Usually, we call the service industry, before modern services, traditional services, such as transportation, storage and postal industry, wholesale and retail, accommodation and catering industry. The transformation of traditional service, upgrading, modernization is to use new technology and new business models to upgrading traditional services, in order to create demand, and guide consumption, to change the low productivity of traditionnal services, reach the promotion of traditional service to high-class development and operating efficiencies.

With the improvement of socio-economic level and people's living standards, the requirement for the traditional service is higher and higher, such as more personalized, more efficient, higher social benefits and so on. This makes traditional service facing a great challenge, but it is also an opportunity. The development of scientific and technological, especially the information technology may bring traditional services new vitality.

Transformation of traditional service industry has become an important moviation of the development of service supply chain, due to the application of new technologies and new business models and other techniques or methods not previously available, traditional service has generated a lot of changes, such as major airlines, hotels and travel agencies are all relying on the platform to carry out their own online business, Hewlett-Packard and other multinational companies have used the global labor resources, outsourced some technical support, customer service support and product design support services to companies in other countries, which has become their core competitive advantage. These changes led to new research on the traditional service supply chain, to meet these changes we must make the appropriate adjustments and innovation.

b) The Era of Global Service Economy

In recent decades, with the manufacturing economy turn to a service-based economy, the service sector has been developing rapidly in many countries and the GDP in both world and countries occupy a great proportion, this trend is constantly deepening, the services industry has become the core of the national economy. According to 2013 World Bank WDI database, we set the statistics tabulation as follows.

Table 1
Some Countries/Regions Manufacturing and Service Industry Add Value out of GDP

	Added value of manufacturing out of GDP (%)		Add value of service industry out of GDP (%)	
Regional \ time	2000	2012	2000	2012
USA	16	13	75	79
Japan	21	19	67	73
China	32	30	39	43
India	15	14	51	57
Developed countries	18	15	70	74
Developing countries	12	13	45	49
Global	19	17	67	70

From Table 1, we know during the period from 2000 to 2012, the services value added out of GDP in various countries and regions in the table has increased to varying degrees, while the share of manufacturing value added in GDP appears generally declined. From a global perspective, services value added in 2012 has accounted for 70% GDP, while the share of manufacturing value added fell to 17%.

The benefits of the rapid development of the service sector is also significant, as in the creation of employment opportunities (in China, for example), according to China's National Bureau of Statistics, we set tabulation as follows:

Table 2
China's Service Industry Employment from 2008 to 2011

	Employment (ten thousand)			
Industry\time	2008	2009	2010	2011
Primary industry	29,923.3	28,890.5	27,930.5	26,594.0
Secondary industry	20,553.4	21,080.2	21,842.1	22,544.0
Service industry	25,087.2	25,857.3	26,332.3	27,282.0

This service sector development can bring rapid income growth, jobs increased, and advancement of gender equality and reducing poverty rates, it is also called services revolution and services industry would reach sustainable development. (Shostack, 1977).

However, from Table 1 we know that, compare with the developed countries, especially the United States, China's service industry accounts for the proportion of GDP is still very low; also for developing countries, we are smaller than India, even not higher than low-income countries

To deal with this situation, seize the historic opportunity of rapid development of service industries, achieve leapfrog development, the Chinese government implemented a number of policy development services. As early as 2007, the State Council recognized the importance of the service sector, issued the "Opinions on Accelerating the development of services", in order to accelerate the implementation of specific policies, the State Council formulated the "some opinions of speed up the development of services" in 2008. In 2012 the State pay more attention on the development of services, in addition to the State Council promulgated the "service industry 12th Five-Year Plan", and the Ministry of Commerce, Development and Reform Commission and other five ministries together to develop "modern service industry integrated pilot performance appraisal management approach".

For leapfrog development of China's service industry, It is important to increase research on service supply chain to provide essential guidance for the development of the service sector, and this could become an efficient mean.

c) Formation of Service Supply Chain

Driven by competition mechanism and price mechanism, producers are supposed to produce commodities needed in the market by more efficient methods, while social division of labor can improve laborers' proficiency, promote production technology and increase labor productivity. With the refinement of social division of labor, the specificity of a company strengthens. Many service companies can focus on their advantageous parts and provide service for customers by integrating different services that other service companies are advantageous in. This constitutes the basic of service supply chain.

1. SERVICE SUPPLY CHAIN AND ITS FEATURES

1.1 Characteristics of Service Products

There are significant difference between service products and physical products, and we can easily distinguish them. Zeithaml (1985) reviewed the studies from 1963 to 1983, the literature showed that, about 33 authors who published 46 articles focused on the characteristics of the service, which has frequently mentioned four characteristics: intangibility, heterogeneity, separability and perishability (IHIP). Iakovaki, Srai, and Harrington (2009) also put forward a similar opinion. However, in practice, services and tangible products are difficult to be completely distinguished by the above IHIP, not all services meet all the IHIP. We summarize the current literature, found the characteristics of the service mainly include the following aspects:

- Intangibility, Compared with tangible products, goods and services cannot be seen, feel or touch, which is the most important feature of the service.
- Heterogeneity, There are no the same customers and service employees and the impact of human interaction makes a different definition of service quality widely.
- Inseparability, Services' production and consumption almost happen simultaneously.
- Perishability, Services cannot be stored, resold or returned, there is no inventory in services industry.
- Labor-intensive, Mass-produce Service is impossible, its production must rely on human resources.

1.2 Differences between Service Supply Chain and Product Supply Chain

Baltacioglu, Erhan, and Melike (2007) found that there are huge difference between service supply chain and physical products supply chain, particularly in the structure, and this mainly result from the characteristics of service products, which distinguish service product significant from physical products. Also, it makes the difference of their operation characteristics. With manufacturing economy turning to a service-based economy, Sengupta and Daniel (2006) thought it is more and more important to understand and emphasize the difference between service supply chain and traditional product supply chain

While Shostack (1977) classified the products on the market into four categories: pure physical products, physical products with services, services with physical products and pure service, he put these products on a horizontal axis from left to right order, call them product/service continuously pedigree chart. Based on the categories above, Chen (2012) added the role of the supply chain, resulting in product/service continuously pedigree chart and the role of supply chain, shown in Figure 1.

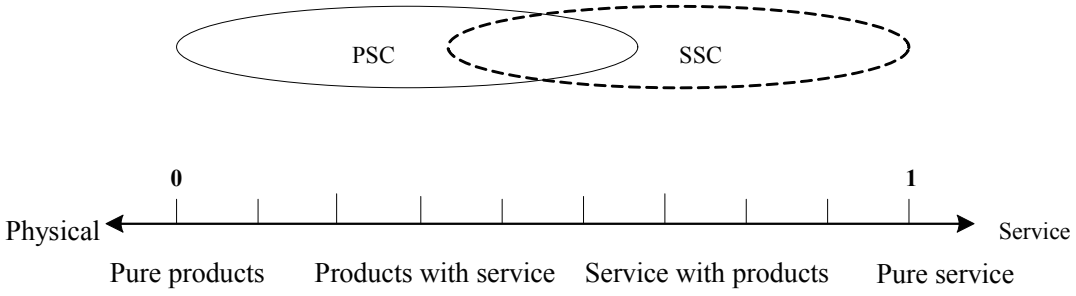

Figure 1
The Role of Supply Chain

From the figure we known, not only the service supply and physical products supply chain have their own significant role in scope, they also overlapped in some areas. Ellram, Wendy and Tate (2004), Sengupta and Daniel (2006), Baltacioglu (2007) illustrated the difference between the physical product supply chain and service supply chain through their point of view; Fu (2005), Liu, Ji, and Wang (2010) also compared these two kind of supply chain in aspects of organizational structure, mode of operation and performance evaluation. Comprehensive view of the above scholars, we arrive at the similarities and differences as follows:

1) The same characteristics of these two supply chain, as shown in Table 3.

Table 3
The Similarity of the Product Supply and Service Supply Chain

	The similarity characteristics
Background	the development of specialized core competitiveness
Manage content	Carry out in supply, planning, logistics, demand to
Goal	Quick response and minimum the total system cost
Integrated content	Business integration, relationship integration, information integration and incentives integration
Information interaction	Information technology and information sharing are essential

From Table 3, there are many similarities in operational management of these two supply chains, which include demand management, relationship management, order management, resource management, and capacity and performance management.

2) There are mainly four aspects the service supply chain different from the product supply chain, namely, the role of the object, the structure of the supply chain, supply chain operations and performance evaluation.

For the role of the object properties, the product supply chain objects are physical products, physical products are assembled by raw materials provided by suppliers of raw materials. In most cases, the value of raw materials to the final customer is small, they prefer to buy the final product. While the objects of service supply chain are intangible services. Under normal circumstances, complex services are the collection of sub services, which can be provided directly to final customers or to be integrated to the end customers. Producers of sub service may be the service providers or the service integrators.

To the structure of supply chain, they are inconformity among the channel, mode of operation, the presence of the parties involved in the scope and stability. But in terms of supply chain operations, both in the mode of operation, coordination and content of customer response on modes, we can find the differences. See as shown in Table 4 below.

Table 4
Differences of These Two Supply Chains

Differences		PSC	SSC
SC Structure	Structure	More than on core enterprise	Integrator is the only core enterprise
	Participants	Connected with their Upstream and downstream	All involved in the whole process of service
	Stability	Stability based on trust	Stability is low
SC Operation	Operation mode	Push and pull mode	Market-driven
	Coordination	Production and inventory	Ability of services, service plan
	Response	Lags in response	Response immediately.

As the performance evaluation, due to the intangible nature of services, their evaluation and indicators are subjective, which leads to inconsistent standards of service? So quality of service depends largely on the service delivery environment and customer attitudes. The product is a tangible entity, it has a certain standard, and can be quantitatively determined, and thus its performance evaluation is more objective and easier to operate.

2. CHALLENGES OF SERVICE SUPPLY CHAIN OPERATION MANAGEMENT

In the last section we analyzed the characteristics of service. As Goodma and Steadman (2002) pointed out, it's these characteristics that make the service industry more complicated than the brick-and-mortar industry. Sengupta and Daniel (2006) made a comparison between service supply chain and product supply chain, and found that a strategy that is efficient for one kind of supply chain is not necessarily suitable for another kind of supply chain.

However, there is no consolidation of the difficulties and challenges faced service supply chain at present. In terms of operation management, service supply chain and product supply chain both include demand management, capacity and resource management, and service performance management. Due to such differences between these two kinds of supply chains, they are the challenges that service supply chain needs to tackle.

As for demand management, product supply chain aims at predicting, managing and updating the demand to guide operation. Nevertheless, the characteristics of service make it difficult to realize. First, the demand of service is highly uncertain, which increases the difficulty of demand prediction. Second, service cannot be stocked as inventory, which reduces the elasticity of service suppliers to meet demand uncertainty. Finally, the diversity of demand of service requires service suppliers to collect considerable information before making effective prediction.

As for capacity and resource management, the task is to balance customers' demand and companies' capacity. As the production and consumption of service are simultaneous, it offers great challenges for service suppliers. Moreover, the perishability of service leads to both the loss of service capacities that have not been used when demand is either relatively low or relatively high. Service is also extremely dependent on human resource.

Service capacity of its suppliers cannot be improved when lack of human resource, even though other resources are plentiful. In addition, due to the direct contact between service suppliers and customers, it puts forward new requirements for responsiveness.

As for supplier relationship management, it requires faster and better collaboration between service suppliers and service purveyors. Especially in service delivering, suppliers play an important role. Not only do they make direct contributions to service delivering, but also make direct contact with customers. Therefore, it is essential to reconsider the supplier relationship management.

As for order processing management, more and more service are sold by new modes like pre-ordering. Because service cannot be stored, this means the loss of service capacity when the customers cancel their orders. In addition, new sales modes like group-ordering and "seckilling" necessitate according adjustments to order management.

As for service performance management, the simultaneity of production and consumption, it is necessary to make timely adjustments to the evaluation of service performance. It is difficult to formulate the evaluation criterion due to the effect of high degree of human factor on evaluation.

Except the difficulties and challenges mentioned above, there are also other ones faced with service supply chain management. Here we conclude them altogether as follows.

First, diversity of demand requires service integrators not only to understand demand information of heterogeneous customers correctly, but also to select and integrate service dynamically. Second, intangibility and heterogeneity makes it difficult to formulate the quality and standard of service, further bringing challenges in evaluating, monitoring and collaborating service supply chain. Third, service cannot be stored or automatically produced, which increases difficulty in optimizing capacity, delivering and controlling service. Forth, the increase of cost of human resource and requirements to service, combined with the new changes in introducing and training human resource, give rise to greater challenges in promoting efficiency and controlling cost for service supply chain.

3. FURTHER RESEARCH ON SERVICE SUPPLY CHAIN

Current research in all aspects of service supply chain have been carried out, but many aspects of the research did not achieve much progress, so there is great value for further research in the following areas.

1) In terms of service level, the intangible nature of services makes it difficult to determine the standards of service quality. In addition, the different service requirements of different customers add to the difficulty to service measure. However, the measure of service level is particularly important for the evaluation of service performance. If we are able to achieve breakthrough in this section, we will contribute significantly to progress in service supply chain research.

2) In competitive environment, services supply chain should match the demand for services dynamically. As service supply chain is increasingly competitive in the industry, how we can make the service supply chain matches to dynamic service demand is not only important in academic research, but also further guidance on the practice cannot be ignored

3) On the optimal allocation and coordination of resources and capacity, the characteristic of perishable and labor-intensive make service cannot be stored and mass production. As the rising cost of human resources today, in condition of making full use of the human resource and other resources are not wasted, how to coordinate the limited human and other resources to help enterprises make full use of the service capabilities directly relates to the company's survival and development.

4) Pricing theory and methods under network and competitive environment. With the development of network technology, the information imbalance in services between enterprises and customers is gradually breaking down. In this case, the service companies pricing strategy has changed a lot, it is extremely urgent to explore how to adapt to the new situation and new changes,

5) Competition and Cooperation mechanisms. Service supply chain is to integrate various functional services, to provide services to customers. Then the service integrators are not only compete with integrators in the industry, but also with functional upstream service competition providers; As there exist no full competition in the market, it is worth considering for many enterprises how to use other providers' service capabilities for their own services

CONCLUSION

With the changes in the traditional service sectors as well as new services are emerging, the development of service industries shows a thriving scene. By the advantages of the service industry analyzed above, in future sector nations will continue to focus on the development of service. The service supply chain as an important part of service operations management, plays an irreplaceable role in promoting the rapid development of the service sector. However, compared with the product supply chain, we have made great achievements on service supply chain research in the last decade, but the research on service supply chain is still not match with the importance of services. Base on the importance of service supply chain, the nature of the service supply chain make it face many challenges in operational and research process, we also believe service supply chain bound to be more intentioned and become a vital part of the future supply chain research.

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