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SERVICE CHAIN MANAGEMENT

ICPSCM 2016

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ABSTRACT

The service sector is already a supporting industry in 21st century, and therefore the service chain has been proposed and popularized widely. The importance of service and customer focusing become more essential for companies, especially the service company as such as hospital and airline company. The purpose of this paper is to introduce the concept of service chain with literature review and to distinguish the differences between service chain and supply chain. Through a proposed service chain model and an example of Emirates Airline, the paper illustrates the service chain process and stages in detail. And the key factors influencing service chain and the service chain features will be demonstrated and listed. The challenges of service chain future development are described in the paper later. This paper will elaborate the service chain and it will be great helpful for large service company to improve efficiency and customer loyalty, holding competitive edge over domestic and international competitors.

KEYWORDS
Service Chain, Service Chain Management, Supply Chain, Supply Chain Management, Demand Chain

INTRODUCTION

Since the emergency and development of the tertiary industry, the growth of service sector has been growfast, while the proportion of agriculture and industry is smaller and smaller. It is more important to focus on service research currently. Service sector is becoming increasingly important for companies and government to increase production growth and create advantage edge over their domestic and international competitors. Based on the previous researches, it has been found that service sector is not isolated and there are some certain relationships between service companies, organizations and parties, which is like a chain of service. The idea of service chain comes from this and it can be seen as analogous to supply chain (Simchi-Levi et al. 2000; Vollmann et al. 2004) but for service, while supply chain is mostly for products.

Service chain is organized chains that connect all relevant organizations and parties, such as government, bank and insurance company, to serve customer better based on IT technology and logistics technology etc. it is a completed network aimed at maximizing customers' demand. Service chain management is concerned with the planning and management of activities from support functions to the delivery of end customer services. The flow of material is not necessary in the service chain, so it is quite essential to use techniques to foster intangible service. To a certain degree, Service Chain Management was confined to studying the operations and systems only in large companies such as banks, airlines. But with the Internet development, the connection between service company and customer become easier, so more and more services through network appeared and the service chain are everywhere not only belonging to large company anymore.

LITERATURE REVIEW

Vaishnavi, V. (2004) applied a patent of Service Chain Management System, which invents and "provides a method for managing delivery of a service by defining selected attributed of and inter-relationships among four interacting components (a service provider, one or more customers of the service, technology required for delivering the service as well as one or more suppliers of that technology). The attributes and inter-relationships are then monitored, and performance metrics for assessing the quality of service delivery are generated based on the monitored attributes and inter-relationships", according to the invention description. The invention makes sure the appropriate delivery service quality and number of resource through consolidation and new method's employing.

Stubbings, P., & Virginas, B., & Owusu, G., & Voudouris, C. (2008)present the research on a prototype collaborative forecasting application to honor customer demand and sustain quality of service in service chain. It is

necessary and essential to forecast customer demand precisely and failure to allocate appropriate resource will contribute to costs and loss. This paper identifies key theoretical and implementation specific issues related to collaborative forecasting and the initial modular artificial neural network approach to the problem in service chain.

DeLuca, S. A., &Darcy. P. B. (2009) have been authorized the patent about system and method for service chain management in a client management tool. This invention is a client management product for a computer system, since service chain is closed to computer technology. According to invention, "a central monitor establishes a performance threshold for two or more components form a service chain. One or more management templates, corresponding to the performance threshold, are issued to the components for monitoring. If the performance fails to meet the performance threshold, an indication of the failure is provided to a computer system operator". This invention utilizes client management products to proactively monitor client machines. And it works better in large company. And this invention combines the capacity planning products and performance monitoring products, which become more efficient and the integration bring company huge benefits.

Jung, J. J. (2011) proposed a novel (service-oriented architecture) SOA-based platform to discover a service chain, for the reason that the number of businesses and services are ever-increasing, and complexly linked with each other. The paper emphasizes that considering not only explicit relationships (e.g., agreement) but also implicit relationships by matching semantics of the services. Decision makers can find out the way to choose businesses easily in a certain situation. And more importantly, it is simpler for business alliance formation process, including merge and split up can be done by using social network analysis (SNA) methods and finding out social relationships, such as centrality, between the connecting services.

Chiou, Y. C., & Chen, Y. H. (2012) researchon the service quality effects on air passenger intentions form a service chain perspective. They divide the whole airline serviced into eight parts and use a second-order confirmatory factor analysis (CFA) to analyze eight stages and their relationships and connections. It is proposed two conceptual frameworks – overall framework and service chain framework. It is confirmed that the proposed model works in the case study of Spring Airlines, a low-cost carrier in China. And notably, the results for the relationships between the consecutive service stages show that a lack of satisfaction at a specific service stage will influence customers' integral impression of the next stage. So it is essential to make sure every stage quality along the service chain.

Tally, W. K., & Ng, M., & Marsillac, E. (2014) provides a methodology for port performance evaluation by utilizing the concept of a port service chain. A service network in port is established to evaluating the effectiveness, which accounts for the quality-of-service relationships along the service chain. It can imagine that if such relationship is ignored, the resource will not be allocated reasonably and the quite amount of cost and loss will be unavoidable. The integration of service network (service chain) will bring more effective on labor and resource when implementing the methodology.

Xu, L., & Govindan, K., & Bu, X. Z. (2015) studies a sea cargo service chain with one carrier and two forwarders providing transportation service. With building model to stud how the carrier and forwarders dealing with the price and empty equipment repositioning (EER), they found out that the cargo depends on the potential demand imbalance volume between two ports. And there is a threshold when less than EER cost, the carrier assumes all repositioning costs. The study is focusing on pricing and balancing of the sea-cargo from service chain perspective.

Cheng, G. Z., & Chen, H. C., et, al. (2015) proposed a service chain instantiation framework based on the integration of software-defined networking (SDN) and network functions virtualization (NFV) to address the problem that isolated network functions are difficult and costly to manage. In the paper, there are three contributions. First, the network functions are featured with the new atomic function to define the public features of network functions with hidden details. Second, it is proposed that an implementation of service chain consisting of a sequence of atomic function with order constraints. Third, the paper implement a proof-pf concept for service chain, Matchmaker, on the top of the SDN controller, which can manage network function in an efficient and scalable way.

DIFFERENCE BETWEEN SUPPLY CHAIN AND SERVICE CHAIN

Service chain is the analogue of supply chain in terms of subject. Service chain focus on customer and service while supply chain focus on products. This is the main distinguish between the two chains. The chain components structure is different between them. It can be seen in the diagram below, supply chain starting from raw material and end with customer delivery. Demand chain is exactly opposite direction to the supply chain, but the subject is also product with customer focusing. The subject of service chain is customer and product doesn't exist or occupy small proportion. The extent on customer-orientation is more severe in service chain.

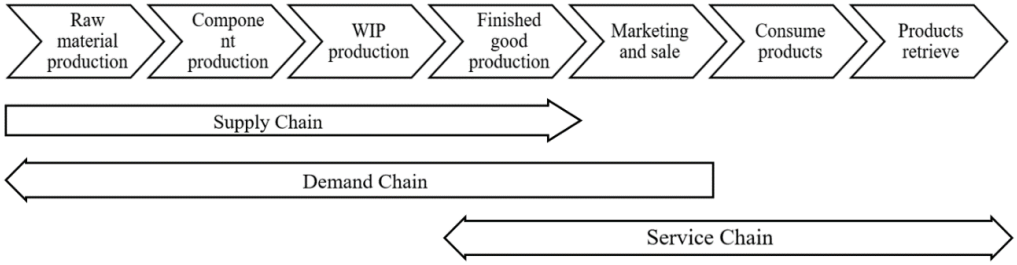

Figure 1 Difference among supply chain, demand chain, and service chain based on product or service lifecycle

There are two kinds of operation mode in supply chain, which are push-based mode and pull-based mode (Bowersox, et al., 2002). The defferences between two modes are depend on production mode of the core compnay in supply chain, make to stock or make to order. Chopera and Meindl analysed the supply chain deeply into deviding whole supply chain into two stage, push cycle in upstream and pull cycle in downstream. Compared to two different modes in supply chain, there is only one mode in service chain, which is compeletly pull-mode and reacting to market only. The unstorable and nontransferable features decide that there is no push factor in service chain. In another aspect, service is more creative than products, which means it is difficult to predict the service time and specific content. Difference between customers has a wide range. And the lead time customer willing to wait is much more shorter. So service chain has to be customer-oriented pull-based mode.

Generally, supply chain is more stable than service chain. Supply chain emphasizes integrated cooperation based on longterm trust among companies, which requires long time to build good relationships and trust. There is a conslusion by Edwars & Samimi (1997) that to build trust relationship, it will normally take 10-15 years, comparing American and Japanese compnaies. So it is definitely that supply chain needs companies to colaborate long time and be stable in the relationship. Otherwise, it will cause internal (in the supply chain) cost raising and lower efficiency. Service chain, on the other hand, is more unstable because of labile customers. And the service choice range is much more wider than the products range. At this point, although there may be some similarities between service chain and supply chain with customized product, service chain has higher customer demand change than supply chain gernerally. And the direct perticipation of customer in the service chain brings direct and first-hand information to the chain, the position of organization in the service chain is also changeable. It is possible that some service auxiliary supplierbecome the core position after controling initial customer information and preference.

Although the theory of service chain is opposite to supply chain, there is no conflict in implementation layer. Service chain can be used to support supply chain in some customer-oriented business. At the same time of concentrating on customers' demand, company should enhance the relationship between suppliers in upstream. With the help of high-technology communication and administration, company will transform to a competitive and low-cost operation mode.

PROPOSED SERVICE CHAIN MODEL WITH CASE STUDY

This section is the proposed model for service chain. With the service chain popularization, a clear concept should be proposed for the service companies. The model is derived from supply chain, which displays all parties and their responsibility in the service chain. This new model emphasizes on the relationship between customer and service company. The purposes of this model are: (1) to identify a clear chain for service company to get a overview concept of service chain; (2) to clarify the responsibility for each link and stage; (3) to provide a measurement basis for evaluating each stage.

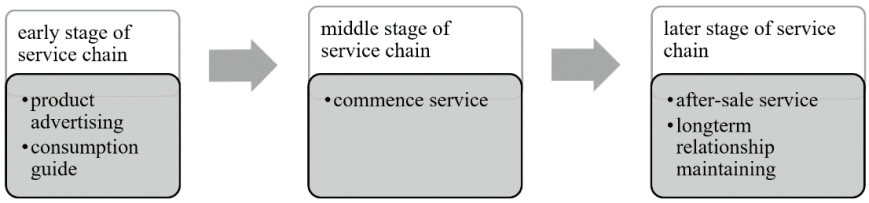

Figure 2 Overview stages in service chain

This diagram shows three stages in service chain. The early stage is service information releasing, including advertising and promotion to attract customers. Consumption guide is also needed for generating the concept of service

content in customers' mind. The middle stage of service chain is the commence of service. From the beginning to service finish. In this stage, customer gets feedback immediately and the satisfaction level will be obtained for company's future improve. The later stage of service is the after-sale service; such as offer member card or coupons to maintain customers. Long-term customer relationship also should be built by forming activities for customers regularly and offering customer birthday gift.

A detailed service chain with example below shows specific chain activities. It can be seen that service chain is a network composed by variable service institution and company, including government, hospital, affair agent, restaurant, shopping mall, hair cutting, and all kinds of service companies. They are quite specialized at their own work, but what is essential is that they have to turn their "work" concept into "service" concept. The service philosophy will generate high customer satisfaction and loyalty. Early stage includes information department advertising the service content and government issues policy to the public. And middle stage contains wide range of service. Bank provide capital to customers based on their credibility; insurance company sell their insurance product to customer to reduce loss of accident; affair agent provide affair assistance whenever customer need. The later period is after service is done or the product doesn't meet customers' need after using a while. It includes updating (e.g. computer system update), assignment and retrieve (e.g. empty milk glass bottle will be retrieved every morning after customer used. All parts can be one company or several service company work together. From the information releasing organization and promotion, to customer get money from bank to buy insurance, to customer has private insurance issue getting help from affair agent, to continuous service for the insurance within contract time. All organizations work smoothly to ensure the efficiency of service chain. And their responsibility is clear in specific area, this is also the basis for their work evaluation.

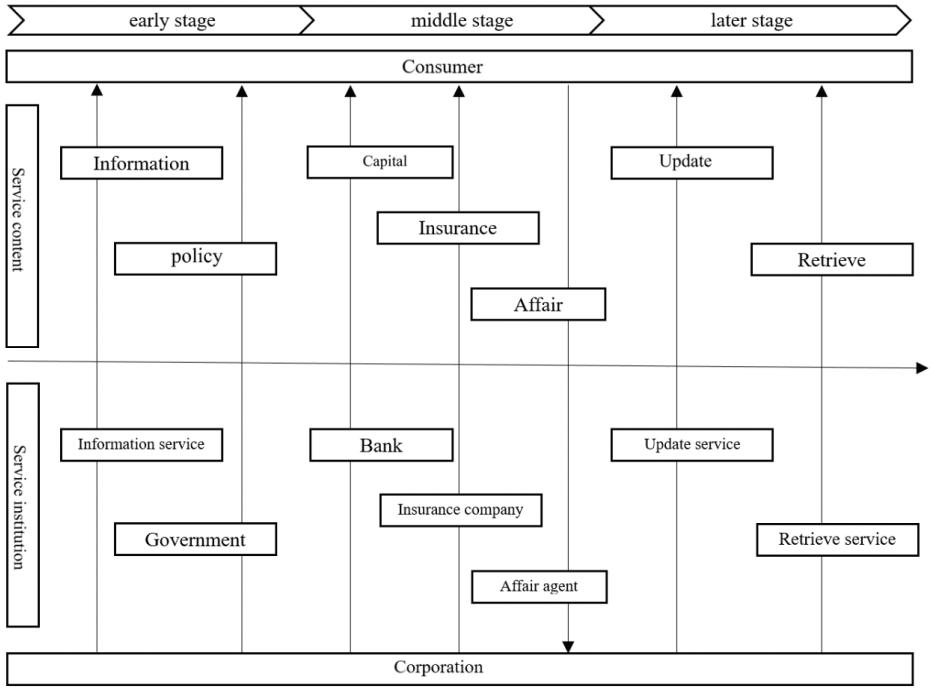

Figure 3 Service chain model

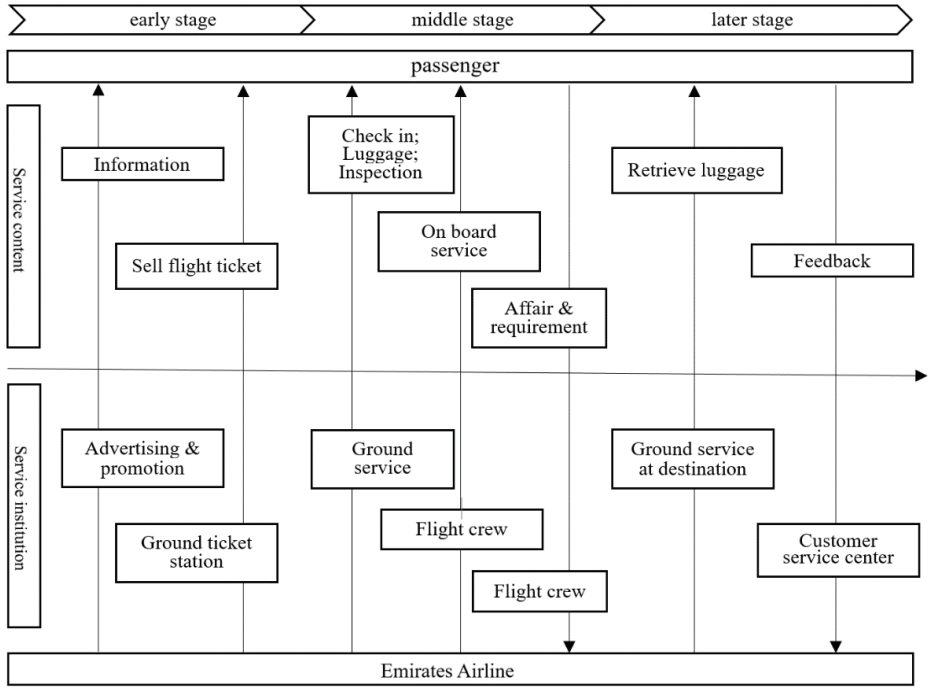

Figure 4 Service chain model in airline

In the example of Emirates Airline, the service chain is the cooperation among airline, departure ground airport and destination ground airport. At first, Emirates put up with the flight ticket information on its official website and ticket agents. Passenger can also buy ticket at the departure ground airport sale station before the flight. When customer gets ticket, the service will commence. Check-in service with luggage, security inspection service, and passport control (if go aboard) will be offered by ground airport. Then customer waiting at the departure hall, buying some duty free products at departure shopping districts. When it is the boarding time, passengers go on the plane under the guidance of ground service personnel. And next is the on board service offered by Emirates airline, including meal, drinking, Wi-Fi, entertainment, and all personal needs. When the plane arrives at destination airport, customers get off the plane and enjoy the destination ground airport service, such as retrieving luggage and exit guide. After the flight Emirates will count the flight distance into member's point card for future activity.

This complete service chain ensures the good customer experience and airline efficiency. All activities are carried out focusing on customer. And the chain process clarifies every stage in the process. With the proposed service chain model, it is easily to understand and implement for service company, with great benefit and competitive edge.

FEATURES AND KEY SUCCESS FACTORS OF SERVICE CHAIN

Since service chain was proposed, unique features have been identified in the literature (Zeithaml and Bitner 2003; Fitzsimmons and Fitzsimmons 2001).*Service is intangible.* It cannot be touched, so customers judge the service mainly based on experience and feel. From this view, service chain serves for intangible things and supply chain serves for corporeal products. *Service is heterogeneous*. Compared to uniformed products, services are more customized because no two customers are same or precisely alike. The human interaction makes service vary form one customer to another. *Service is simultaneously produced and consumed* (e.g. a haircut, a car wash). Customer's feedback and satisfaction is at the same time with the service process. Mass production is impossible. And there is less latitude in dinging and correcting errors before the customer has a chance to discover them. In this case, training, process design. And customer relations are particularly important. *Service is more perishable than products generally*. Because service cannot be inventoried, stored or kept. And this poses restrictions on flexibility and makes capacity issues very important. But on the other hand, customers sometimes pay highly attention on the service waiting time or surplus resource, which will influence their satisfaction on the next service stage. As a result, efficiently matching supply with demand is a crucial success factor for service, through minimizing waiting time and idle time, at the same time maximizing service performance and customers' experience.

Apart from the characteristics of service, there are four features of service chain at an integrate layer. *Service chain is proactive*. Company should serve customer proactively with sufficient preparation. And most of service companies notices that commenced to do proactive service already. A passive service is firm offer relevant service after customer orders it, such as repairing. It is common in certain specific business that needs customers' order first. But for

major service, such as airline, hospital, bank, it will be better to provide proactive service. The proactive service is company prepare all service from customers' perspectives, and customers choose desired service by themselves. It is one of the trait of service chain currently. *Service chain need foresight*. Because of no inventory on service, the chain will and has to react quickly to customers' variable demand, which need precise foresight and forecast. *Service chain is integrity*. It is supposed that company offer omni-bearing and 24-hour services to customer. Service should be continuous on service process, focusing on customer satisfaction.

There are also some external environmental factors that have effect on service chain. The *political factor* will affect service chain directly. It is confirmed that developed countries support service sector and the policy encourage service sector and in return, service industry become the pillar industry. The supportive policy will create a loose environment for service industry and attracting great deal of foreign capital, which forms good competition environment. Apart from this, policy that bring service industry system revolution and technology improvement is also beneficial to service chain. The *basic infrastructure* will influence service chain potentially. It includes communication, network and relevant supporting facilities. The operation cost can be significantly reduced by well-developed infrastructure, and it will enhance the service chain competitiveness. Because good information communication can make sure the information transmitting speed and company can get first-hand information, which is a competitive edge. The *human resource* can be another factor that decides the quality of service chain. Well-educated labor will bring more productivity and effectiveness to service company.

CHALLENGES

The same as manufacturing company, service corporations also require plan and arrange their resource to offer an efficient service to customers. The main focus is on human not product, if to mention the difference between service chain and supply chain. People are core and crucial to service business. And without inventory or safety stock, service supply is more difficult to match with demand accurately. What make is more difficult is the customized consumer service feature brings more unstable or emergency services. The enterprise needs to plan the staffing to meet with demand and on the other hand reduce idle resource and staff. This is a huge challenge for material flow and information flow to make certain everything reacts fast. On the financial aspect, it is unavoidable to spend cost on idle resource in certain field. For example, in the hospital, it is tough to forecast the demand for doctor in the midnight, but the hospital must arrange duty doctors day and night in order to deal with emergency in midnight. This compensation costs huge for hospital but it cannot be avoided.

Most service company don't need too much tangible assets; such as machine or product line. Many of them depend on Internet to provide and store information. So the safety of information in computer and on Internet can be great potential hazard for company. The data and information is not as tangible document that only one piece and difficult to get without key. The data can be hacked by vicious hacker and cause great lost for company. So the safety of data and information should be protected carefully.

Service chain concentrates on customer and it is definitely customer-oriented business, which requires close to customer. So service chain has to be adapted to local culture, costume, and specific preference. This require managers have multicultural handling experience and compatibility. A stubborn centralized director will have negative effect on service performing. Service quality is important but what more essential is customers' preference. A mismatch service will never satisfy customer no matter how good quality it is. So manager should identify regional cultures and preference to exactly give what they want.

CONCLUSION AND RECOMMENDATION

The paper elaborates the idea of service chain with literature review on relevant papers and the proposed service chain model illustrates the process and responsibility of each organization and party on the chain.It is apparently that the integration of various organizations brings the scale of economy. Service chain can be seen as the parallel chain to the supply chain concentrating on the service while supply chain focuses on products. But corporation can exstract and combine two chains with implementing supply chain in upstream and service chain in downstream. In the early, middle and later stage of service chain, all activities and responsibility are clarified and can be used as basis for performance evaluation. There are several traits of service and it distinguishes the service chain and supply chain (service and product). The key factor, political factor, basic infrastructure and human resource that deciding and influencing service chain are not supposed to ignore but be taken seriously. Implementing service chain will bring service company huge benefit but there are still some challenges for future development. Maximize the advantage effect of service chain will save quite operation cost of service company and improve customer satisfaction and loyalty, which is essential to service companies.

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