

<http://ansinet.com/itj>

ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Application of the IUE-SSC model in the information service industry

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Abstract: The extensive amount of academic work devoted to supply chain management, but the structure of service supply chains still remains unexplored. The aim of this study is to explain this gap with regard to the unique nature of the services industry. Based on SCOR model and ELLRAM service supply chain model, this study introduces the IUE-SSC model for service supply chains and applies it to the information service industry. The results of this study are relevant both to practitioners in the information services industry and to researchers conducting further studies in the field.

Key words: IUE-SSC model, application, information service industry

INTRODUCTION

In recent decades, supply chain management has become extremely important to companies operating in an increasingly competitive global marketplace. The need to improve operations, increasing levels of outsourcing, rising costs, competitive pressures, increasing globalization, increasing importance of e-commerce and the complexity of the supply chain emerged as the main reasons for the development of the supply chain management approach. However, despite the extensive amount of academic work devoted to supply chain management, which basically focuses on manufacturing supply chains, our knowledge of the structure of supply chains in service businesses is still scant. The aim of this study is to explain this gap, introduction the IUE-SSC supply chain model for services and try to apply it in the information service industry.

STRUCTURE DIFFERENCES IN SERVICE SUPPLY CHAINS

The structural difference of a service supply chain basically arises from the unique characteristics of services, which distinguish them from goods. These differences also change the nature of service operations in practice. Here we find it useful to briefly summarize how these distinguishing characteristics may change the structure of a service supply chain.

The principal distinguishing characteristic of services is intangibility (Wang and Jiang, 2003) Services cannot be seen, touched, smelt or tasted, as they are 'performances' rather than 'things'. Intangibility of services is the main reason why a number of logistics activities cannot be applied to service supply chains. Transportation is

evidently one of these. In a service supply chain the physical flow of the service from the supplier to the producer and then to the consumer is not possible by nature. Although, the service product may be pre-customized and then may be delivered to the consumers via branches or other intermediaries, this does not constitute a transportation activity; as the services are also cited to be simultaneous. Simultaneity reflects the fact that customers must be present for the service to be provided. In a service setting the customer usually contributes to the production process and once the production is realized it is followed by instant consumption in a simultaneous manner. This fact leads to a major structural distinction in service supply chains: the production process usually takes place only when the service provider and the service customer are both present in the service environment and these parties cannot be separated from each other in the production phase. Therefore, although it may be argued that some services may be customized and standardized before hand, the final service product is never the same for a particular consumer. In this context, each service providing unit, be it a branch or a service employee, serves as a single service factory. Heterogeneity addresses the fact that services cannot be easily standardized. Every customer experiences a different service each times he is delivered it, depending on customer perceptions, mood and service atmosphere.

Services are perishable and if a service is not consumed when available, then there is no chance to stock it for future use. Unused capacity is lost forever (Wang, 2005). This characteristic makes it impossible to store services in a warehouse, implying a total inapplicability of the warehousing function in service supply chains. Finally, service industries are labor

intensive. Hence, the impact of the human aspect in service operations is remarkable accompanying the complexity it creates. Significant human involvement in the process requires a diverse approach in the study of service supply chains. In this context, the role of human resources should be redefined as a core function.

In this context, it is obvious that there is a profound need for a unique supply chain model for services highlighting these structural differences. In this attempt, the existing supply chain literature may constitute a valuable base to identify the similarities and discrepancies between the service-oriented and manufacturing-oriented supply chains. In this manner, we will use the widely recognized Supply Chain Operations Reference model (SCOR model), developed and endorsed by the Supply Chain Council as the cross-industry standard diagnostic tool for supply chain management (Fig. 1) to serve as a base standard and then adapt it to service businesses by adding a number of original constructs.

The SCOR model describes the business activities associated with all phases of satisfying a customer's demands. This model depicts the manufacturing company as the central unit in the supply chain buying from suppliers and selling to customers, where all these units also operate in a similar manner with the manufacturer. Units in the chain may be basically engaged in five business activities, which are identified as sourcing, making, delivering, returning and planning, corresponding to procurement, production, transportation, returns management and operational and managerial planning, respectively. The two units at the two ends of the continuum are not involved in all activities: the suppliers' supplier engages only in delivery and returns and the

customers' customer only sources and returns the product. Throughout the chain, planning emerges as a central business activity.

One of the important features of the SCOR model as well as other manufacturing oriented supply chain models is that the relevant business and/or logistics activities are generally realized within the particular firm. However, due to the simultaneity characteristic of services, we find this not applicable to service supply chains and an alternative conceptualization will be discussed in the proposed model. Secondly, although five business activities identified in the SCOR model successfully draw a general framework for supply chains, a specification in these functions and activities is usually needed. Following the Global Supply Chain Forum definitions, these functions are classified as customer relationship management, supplier relationship management, customer service management, demand management, order fulfillment, manufacturing flow management (which includes sourcing, making and delivering), product development and commercialization and returns management, with respect to manufacturing industries. However, in line with the discussion regarding the structural differences in service supply chains, it is obvious that not all these functions are relevant to the services.

In this context, Ellram *et al.* translated this latter model to service supply chains and identified key functions as capacity and skills management, demand management, customer relationship management, supplier relationship management, service delivery management and cash flow management (Fig. 2). In both models, information flow emerges as a key construct, which is apparent in all phases of supply chain management.

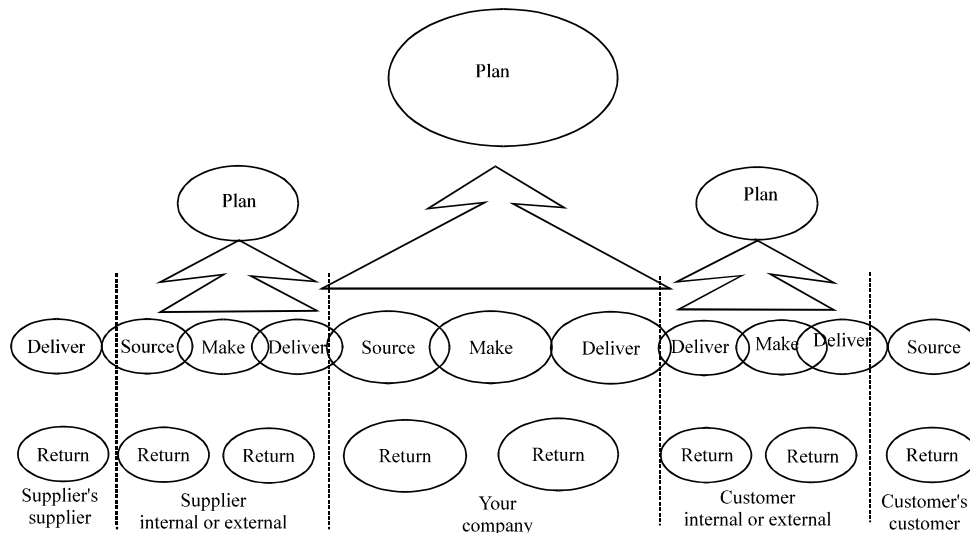


Fig. 1: The SCOR model

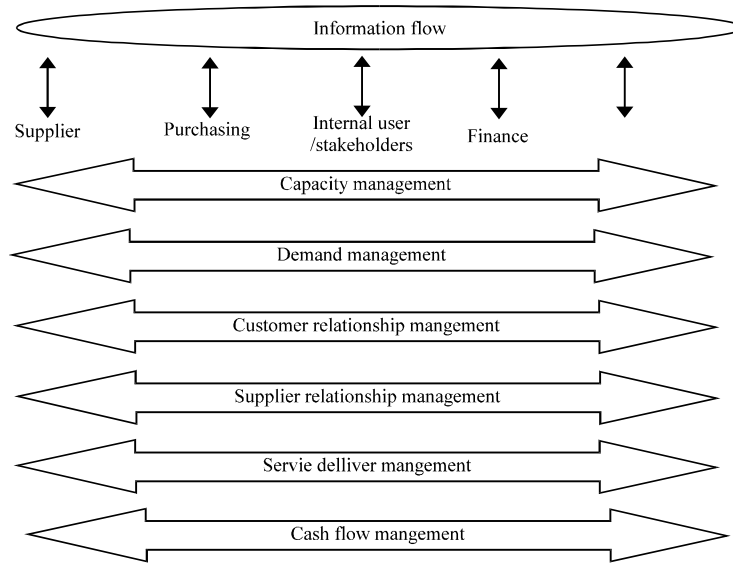


Fig. 2: Ellaram *et al.*'s service supply chain model

IUE-SSC MODEL OF THE SERVICE SUPPLY CHAINS

In this study, we aim to introduce the IUE-SSCM, which is built on the existing knowledge derived from the SCOR and Ellram *et al.* models, with an application in the information industry.

We find it necessary to define what service supply chain and service supply chain management are. In this context, we primarily propose that.

The service supply chain is the network of suppliers, service providers, consumers and other supporting units that performs the functions of transaction of resources required to produce services; transformation of these resources into supporting and core services; and the delivery of these services to customers.

Following the original definition acknowledged in the Global Supply Chain Forum and our definition of supply chains, we propose that: service supply chain management is the management of information, processes, resources and service performances from the earliest supplier to the ultimate customer.

Following these definitions and the structural differences discussed before, we construct our model to cover three basic units in the chain: The supplier, the service provider and the customer (Fig. 3). The service provider is the focal company in the supply chain that performs the service and it claims the manufacturer's role in the traditional supply chain literature. The supplier is the company which supplies additional services to the service provider and/or directly to the service provider's

customer where these additional services contribute directly to the production of the core service in the chain. In other words, the service supplied by the supplier should constitute some part of the core service. In this manner, the supplier is usually involved in the delivery of supporting services.

Notably, a number of activities are essential to the service supply chain management. From the service provider's perspective, some of these activities exist through the whole chain, while some others may only be fulfilled in certain phases of the process. In the model, we identify these activities as: demand management; capacity and resources management; customer relationship management; supplier relationship management; order process management; service performance management; and information and technology management.

Demand management: Demand management, which is the preliminary function of supply chain management, can be defined as the focused efforts to estimate and manage customers' demand, with the intention of using this information to shape operating decisions. It is the operational management of demand information and includes not only forecasting but also generating forecasts, managing them, reconciling new information with the forecasts and keeping them up-to-date. In service industries, the successful management of demand is vital due to a number of difficulties that arise from the unique characteristics of services. There is little doubt that the success of all other supply chain activities depends on determining demand and planning the other processes

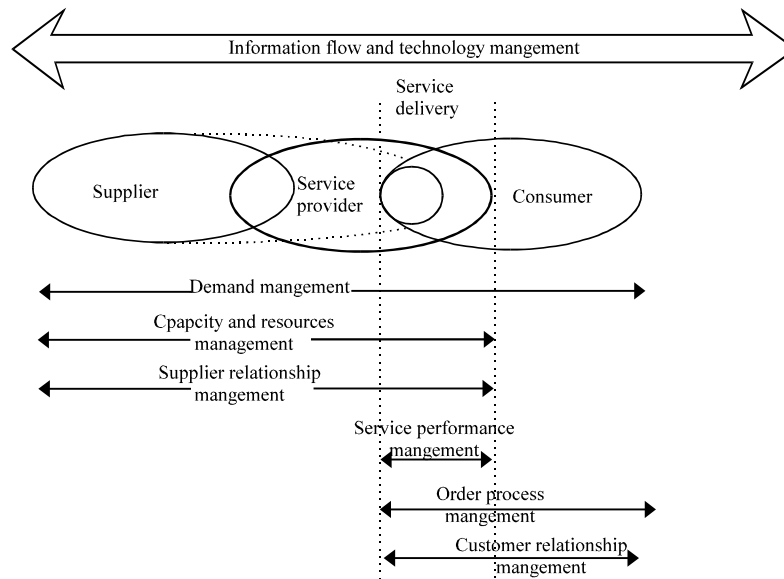


Fig. 3: IUE-SSC model

according to determined demand. In this context, the importance of demand management is also significant in service supply chains. In a service flow, the functions of demand forecasting, determination and planning are needed prior to actual service delivery. Also, the supporting functions in the service supply chain, which are directly related to the product supply chain, should also be taken into consideration.

Capacity and resources management: Capacity management is the ability to balance demand from customers and the capability of the service delivery system to satisfy the demand. Because of the characteristic fluctuations in the demand for services and the fact that services are produced and consumed simultaneously, service businesses continuously face the problem of matching their capacity and demand. Undoubtedly, a service firm's capacity is not only dependent on labor, but on other resources that are accessible to the company. As mentioned before, these resources also include all tangible objects, facilities, funds and services outsourced from other firms. A successful capacity and resources management requires that all these resources are organized effectively and efficiently to operate at optimum capacity that meets the fluctuating demand.

Customer relationship management: Customer Relationship Management (CRM), which includes the processes that focus on the interface between the firm and its customers, seeks to create customer demand and facilitate the placement and managing of orders. Other

than determining demand, improved communications with customers and better predictions of customer demand are needed; which leads to customer relationship management.

Identifying key customers and customer groups through customer relationship management is a key step in supply chain management. Customer service, which is the nodal point of marketing and logistics, aims to develop a continuous source of customer information. Determining the key customers or classifying customers according to their different characteristics leads to development of partnering programs and increases interaction between the focal company and its customers.

In service industries, customer relationship management is a critical function due to extensive human involvement in the delivery phase. In this context, it includes not only external customers, but internal customers (i.e., the employees) as well. Effective management of customer relations requires acquiring adequate information from these customers, appropriately classifying and monitoring them and accordingly implementing corporate strategies. The importance of this function also highlights the vitality of market research in service industries.

Supplier relationship management: Recent business forces lead to inter-firm relations because the business environment is making it more complex and expensive for one firm to go it alone. Therefore, the buyer-supplier relationship is becoming more critical for all companies in the supply chain. In this context, Supplier Relationship Management (SRM), which can be defined as an integrated solution that bridges product development,

sourcing, supply planning and procurement across the value chain, provides the interaction between the focal company and the potential suppliers.

Supplier relationship management's basic aim is to arrange for and manage various supply sources for various goods and services. This function includes many processes such as design improvement through the joint selection of components, contract management, supplier evaluation and negotiations with suppliers, procurement and control of supply chain performance. In a service context, a successful SRM system should enable service firms and their suppliers to collaboratively create and deliver services faster and at the lowest total cost.

Supplier relationship management (Demirkan and Cheng, 2008) is unquestionably critical to service supply chain management. This is basically due to the nature of the service delivery process, in which suppliers have a great dominance in the chain. As mentioned before, in service supply chains suppliers contribute directly to service delivery and usually in direct contact with customers. Hence, a failure in the supply side may simultaneously turn into a failure in performance. To prevent such an occurrence, sustainable relationships built on coordination, collaboration, responsiveness and trust should be maintained with the suppliers, which is the focus of supplier relationship management.

Order process management: We define order processing as the function that entails the system which an organization has for getting orders from customers, checking on the status of orders and communicating to customers about them and actually filling the order and making it available to the customer. The order process management function covers many sub-processes such as order preparation, order transmittal, order entry, order filling and order status reporting and has many intersections with other functions of supply chain management. Thus, it has a great impact on customer's perception of service and customer satisfaction which are decisive and shared aims of the firms in a supply chain.

Because order processing tends to be based on automated systems, it is strictly dependent on information flows in the chain and technological advancements in logistics. Yet many businesses find that their order processing function is not working properly, despite the advances in technology and information systems. This is generally due to the lack of strong linkages between the order processing function and other logistics functions such as demand management, production and procurement.

Service performance management: Service performance management can be regarded as the key function in the

service supply chain. Because of the nature of service businesses, the service production process requires both customer and producer to be present. In addition, performance and consumption occurs simultaneously. Service performance management in the service supply chain is similar to the production function in manufacturing-oriented supply chains, however because suppliers and buyers are required in the process besides the producer, it has a unique nature. In addition, its similarity with the production activity makes it a core rather than a supporting activity.

Human resources should assume a critical role in service performance management. This is due to the extensive involvement of the human factor both as service personnel and customers in the production of services. Therefore the functions of human resources management act as an interface to the achievement of service delivery and performance.

Information and technology management: Supply chain management is to a large extent about the management of information flow. Therefore, successful management of this flow is rapidly becoming a powerful tool for logistics and supply chain operations. It is obvious that information systems benefit vastly from advances in technology and today management of technology is also crucial to maintain effective and efficient information systems. The key drivers for information and technology management can be summarized as the efforts to improve customer satisfaction through product availability, delivery accuracy, responsiveness and flexibility, improvement through feedback and to increase sales revenue and improve efficiency of operations. Management of information and technology is critical to service supply chains as the success of the key functions in the chain such as demand management, capacity management, CRM, SRM and order process management are dependent on an effective flow of information.

APPLICATION OF THE IUE-SSC MODEL IN THE INFORMATION SERVICE INDUSTRY

With the rapid development of the information construction and the mergence of global economy, the various industries meet the war which is no space-time, no boundary, dynamic. Every industry must face environment which one should evidence and develop. In this situation, the information industry which is the one of the important industries in whole national economy must involve in the competence of the world information industry. With enforced strength, the information industry should provide the information service which is personality, specialization, all-inclusive and in-time.

Information service supply chain includes these function activities as follows.

Demand management: The information demand of customers is divided into three levels (from up to down): The objective level demand which is demand in the daily work; the cognitive level which is the demand through recognizing the customers' own information demand. Based on these demand, the customers use consulting service and enlightenment and express his information demand. This is called expression level demand. With the development of the information technology and market and the deeper level of customers' demand, the information service should more deeply satisfy the demand. In the internet times, it's important the how to recognize the customers' demand. In the service processing, the forecasting, decision and planning all should take precedence of the actual service delivery.

Capacity and resources management: The core enterprise in the information service supply chain should keep the capacity maximum. The core enterprise in the information service supply chain can build the information resources through three levels ASP information system platform: Intranet ASP, Extranet ASP and the information resources based on Internet. It can provide the information service through the information integration and the function of the system platform. Intranet ASP is the basic. It's the basic demand to build and perfect the Intranet of the core enterprise. It includes the advanced management thought and information technology. It's also an information resource which can provide the information in-time and can not be used up.

Customer relationship management: The customers of information service industry include the medium customers and the ended customers. It's the dynamics to meet the information customers' demand maximum extend. The specific content of the customer relationship management is to manage the customer's information, to recognize the customer again, to find out the customer's goal and demand, to grasp the customer's psychology and behavior, to learn to think as a customer and exploit the new service project based on the customer's value. The best is to practice in the consume activities, keep the intimate relationship with the customers, trace the consume activities and make deeply study, develop and guide the potential information demand.

Supplier relationship management: The supplier of the information resource may be the consulting industry, the post and communication industry, pressing, information, document, research, education, government, enterprise,

finance, market and so on. These industries interrelation through its' own ASP service system on line with the core enterprise of the information service supply chain. The show of information service supply chain management is information service flow, information increment flow, communication information flow and fund flow.

Order process management: The order process of information service industry is based on the Auto-system. The customers send the orders to on the net and ask to response in-time. The difficulty of the information service suppliers is rising. The order process should be quick and accurate and void wasting the customers' time and the unnecessary spending. So, the order process should be well-designed, accurate-managed and cooperate with other logistics activities.

Service performance management: The core enterprises of the information service supply chain have the strong ability of developing the new information products. It can continually meet the new demand of the customers and have the ability of continued development. The core enterprises can cooperate with other information enterprises. The products of the core enterprise are well popular with the customers and attract other information enterprises. It can improve the quality of information, reduce the cost of acquiring the information and raise the whole benefit of the information service supply chain. The critical key of lasting-development of the core enterprise is the rich-experience information technicians, managers and the assistants.

Information and technology management: The advanced manage thought is the soul of operating the information service supply chain management. But, the information technology is the basic tools and measure. The manage thought and manage system which can be used in the information service supply chain are the CE, JIT, ERP. The operation of the technology-based information service supply chain is achieved through the various information technologies and applying and integrating the system. Such as Internet/Extranet/Intranet, EDI/EC, Web data base technology, XML, QR, CAD. These manage thoughts and technologies which are well used can improve the benefit and efficiency. The ended goal of information service supply chain management will be realized.

CONCLUSION

The importance of effective supply chain management is becoming more critical for all manufacturing companies as well as service companies. In

order to gain competitive advantage through effectively applied supply chain management, all service industries seek for new approaches to achieve effective reorganization, restructuring, reengineering and redesigning applications for the overall industry system processes. Future research should be directed to the service industry-based supply chain management strategies.

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