The Insights into Service Science and its Applications to Future Service Production

S. Rick Fernandez Hurtado, Research Center for Global Innovation & Chinese Entrepreneurship, School of Management, Shanghai University, Shanghai, 99 Shangda Road, Shanghai 200444, China, saulrick@163.com

&

Laaria Mingaine, School of Management, Shanghai University, Shanghai, 99 Shangda Road, Shanghai 200444, China, mingainesl@yahoo.com

Abstract

Based on literature review, this paper theoretically explores the insights into Service Science and its Applications to future Service Production. The insights reviewed shows that, in contrast to the fast service economy development, the advancement in service education and research are far left behind. The service sector accounts for most of the world’s economic activity, but it’s the least-studied part of the economy.

This study concludes that, the high performance service organizations are those which clarify their mission, define outcomes and focus on results, empower employees, motivate and inspire people, are flexible and adjust to new conditions, are competitive in terms of performance, restructure work processes to meet needs, and maintain communications with stakeholders.

Keywords: Service; Service Industry; Service Production; Service Innovations.

1 Introduction

Service is typically considered as an application of specialized knowledge, skills, and experiences, performed for the benefit of another. Service is perishable, heterogeneous, and intangible, commonly provided for either individuals or businesses to create desirable value to satisfy their needs.

Although a significant portion of the services provided by the service industry is consumed by individuals, such as medical, education, insurance, legal, financial, transportation, and retailing services, recently business services that serve different business units or organizations are growing substantially rapidly. For example, technical support, enterprise resource planning, call center operations, sales management, IT implementation, e-logistics, and business investment and transformation consulting are well recognized as a highly profitable business service (Qiu 2008).

Most organizations provide a service of some sort or another. For organizations such as airlines, trains, universities, car rental, health or government agencies service represents a major part of what they have to offer. They are known as service organizations. Others whose business is the manufacture of products, e.g. computers, mobile phones, washing machines, service is of lesser, albeit significant importance.

There are particular problems and challenges in managing services, namely intangibility, inseparability, variability and perishability. In particular, services have to contend with uncertainties over customer involvement and what they expect.

1.1 Statement of the study

Service Industry has been considered a significant element in the provision of employment in the world, yet from different authors it is evident that the advancement in service education and research is far left behind. The service sector accounts for most of the world’s economic activity, but it’s the least-studied part of the economy. This study therefore, reviewed Literature of the insights into the Service Science and its application to future service production.
1.2 Purpose of the study

The purpose of the study was to review the literature of the insights into Service Science and its applications on future service production.

1.3 Specific Objectives of the Study

The following were the specific objectives of the study:-
(a) To find out definitions of the service science as advanced by different authors in the Literature.
(b) To establish the organization, design, setting and costing techniques in service industry as advanced by the Literature.
(c) To sought out the views of the Literature on Innovations and service paradigm in Service Science.

1.4 Research Questions

To achieve its purpose and specific objectives, the study sought to answer the following research questions;
1. How as different authors defined Service Science?
2. What are the views of the Literature in organization, design, setting and costing techniques in service industry?
3. Do innovations in Service industry match innovations in manufacturing Industry?

1.5 Significance of the study

It was hoped that the conclusions and recommendations of the study, would assist service industry stakeholders in making informed decisions about the industry.

The study was further intended to stimulate interest on research in the Service Industry. It was hoped that the study would create interest to scholars, researchers, students and other interested parties to conduct further studies in the area.

1.6 Assumptions of the study

It was assumed in this study that the information reviewed from the Literature wholly or partially related to service industry and service productions.

1.7 Scope and Limitations of the study

The study was confined to service industry definitions, organization, design, setting, costing techniques and innovations. These aspects were described and analyzed in relation to the specific objective of the study.

For the purpose of making the study manageable and from the limitations of the time and amount of money which was available only selected textbooks, Journals, publications and selected observation areas formed part of the study.

2.0 LITERATURE REVIEW

The Literature for the review of study was drawn from Internet, books, Journals, Newspapers, Government publications, documents and works that had a bearing wholly or partially on the field of Service Science. This section-reviewed literature relating to definition of Service Industry, organization for service, design and setting of service, innovations in the Services industry, service cost estimation techniques like; top-down costing, bottom up costing/activity-based costing, mixed approach and analogy-based estimates. It ends by looking at the emerging service paradigm.
2.1 Definition of service industry

Different authors have advanced different definitions of Service industry.

From Wikipedia, the free encyclopedia:

The Service industries involve the provision of services to businesses as well as final consumers. Such, therefore, include accounting, tradesmanship (like mechanic or plumber services), computer services, restaurants, tourism, etc.

Hence, a Service Industry is one where no goods are produced whereas primary industries are those that extract minerals, oil etc. from the ground and secondary industries are those that manufacture products, including builders, but not remodeling contractors.

Qiu (2008) defines service industry as:

“Based on the Bureau of Labor Statistics, except those in the goods-producing sectors—agriculture, mining, construction, and manufacturing, the service sector encompasses all other industries including transportation, logistics, communication, wholesale and retail, trade, education, finance, insurance, real estate, healthcare, criminal justice, postal operations, government, and a variety of public utilities. The service industry has grown to dominate developed economies. In the US 80% of GDP (Note 1) in 2007 was derived from the service sector, whereas in China a rapidly growing service sector represents about 35% of the economy. Although Chinese service industry has now contributed only 1/3 of the economy, Chinese service industry has grown in the fastest pace in the world during last quarter century. Moreover, Chinese government aggressively responds to the service innovation opportunity by including a focus on incubating “Modern Services” in China’s 2006-2010 Five-year Plan”.

Vargo and Lusch (2009) articulate that the essential concept of “service” should be defined as the application of competences for the benefit of another entity and the term “service” focusing on a process rather than “services” implying “intangible goods” should be used given that the service value is always co-created during its production.

Lohr (2008) describes service science “as a hybrid field with a purpose to use technology, management, mathematics and engineering expertise to improve the performance of service businesses as well as service functions like marketing, design and customer service that are crucial in manufacturing industries”.

Macbeth (2010) describes service science as ‘… an emerging discipline that aims to combine fundamental science and engineering theories, models and applications with facets of the management field, particularly knowledge, supply chain and change management, in order to enhance and advance service innovation….’ which it is claimed is fast becoming the key driver of socio-economic growth.

From an academic standpoint, service science offers a platform for the development of a new discipline equipped with its own set of curricula. A consensus is emerging that service cannot be described and understood by a single academic discipline. Thus, service science can be defined as an integration of various disciplines such as management, engineering, accounting, finance and operations, with the aim of preparing the next wave of innovators in contributing to a service science economy. Service science aims to develop a general theory of service with well-defined questions, tools, methods and practical implications for society. Baines et al (2009)

However, in order to better understanding of the study of service under the concept of service science there is a need for a dramatic shift from a goods-dominant logic to a service-dominant logic as proposed by Irene et al (2009). The service dominant logic primarily argues that goods (tangible) are appliances used in service provision, and goods and service have a nested relationship. They suggest that economic exchange is fundamentally about service provision; in short, everything is a service. As such, they argue that customers are always “co-producers and co-creators” of value when compared to the traditional view of products where the firm and consumer are separated upon the purchase.

As such, it appears that the customer’s roles are now moving from being isolated to being connected to the firm, changing from passive to active and from being unaware to being informed. By this overlapping of the customer’s roles in the firm’s processes, organizations are beginning to recognize its interdependence with the customer.
There is some evidence that the skill sets are different between manufacturing and service and so success is not guaranteed in this process even if the economic arguments are attractive. The concept of servitization advance by Baines et al (2009) still has its origin in the product driven logic, which attribute to the failure of Adam Smith (1776) to understand how to deal with what he called ‘unproductive’ labor that is the use of resources, which did not conclude in a product to be exchanged in the marketplace. This started the trend to see the product as more important than the service.

2.2 Organization for service

How and why services are organized is important. Consequently we need to analyze the structure and unearth the dominant and prevailing values and beliefs with a view to arriving at some explanation for the character and performance of the service. In all of this, there must be a determination to ascertain whether, and if so which, organizational factors lead to success or failure in providing a good service. Pither (2008) summarized the need for organization of service as follows:

"The organizational needs of these services differ substantially. Organization has to be considered at three levels: within the department, within the organization, and within the whole system. Departmental organization should consider a common management structure for all the interdisciplinary team, including the administrative and clerical staff. The leader of the service need not be a specialist, but must have a job plan that includes sufficient time for necessary managerial tasks”

2.3 Design and setting of service

Services require an operating and delivery system in order to function. That system should be designed in such a way as to offer effective customer service and an efficiently operated process. That itself represents a difficult balancing act. The drive to achieve both efficiency and service quality can become unstuck to the detriment of provider and/or customer.

As services comprise a range of elements, the achievement of a smooth running system and the delivery of customer satisfaction remains a challenge. Design formats can, of course, vary with the type of service, and even within a typical service there may be different approaches to what constitutes the best design. Whatever is decided, the design is the service. Mudie et al (2009)

The author further notes that, the setting and surroundings in which many services are delivered are often a critical component of a consumer’s service experience. Since it is often the first tangible clue that the consumer is given about potential service delivery, it shapes expectations. These clues shape consumers’ rational, emotional and behavioral responses, and for this reason the service provider would be wise to consider all elements of both the physical and ambient setting in which the service is consumed.

The control by the designer of corporate elements that form interior spaces can impact on the success of that delivery in a variety of ways. It can influence the client’s or customer perception of the particular service sector and can enhance the function, appropriateness and ambience of the activity.

Figure No. 1

![Figure No. 1](Modified from Karwan (2009))
Karwan (2009) while agreeing that the service concept has not been adequately detailed in frameworks that address service design, suggest that the issues of concept, market assessment, service encounter, and service delivery system should be kept separate (Fig. 1). Instead, the author suggests that idea of defining the service concept, as a set of elements is more consistent with the extant literature.

In studying public and non-profit organizations over more than 20 years, Popovich (2007) summarizes high performance organizations as those which clarify their mission, define outcomes and focus on results, empower employees, motivate and inspire people, are flexible and adjust to new conditions, are competitive in terms of performance, restructure work processes to meet needs, and maintain communications with stakeholders. At a broad level, these are very much the same characteristics of any high performing service organization.

2.4 Innovations in the Services industry

Innovations are the key to stay a step or two ahead of competitors. New service delivery models are, essentially driven by working closely with customers to co-create innovative and unique solutions best meeting customer inevitably changing needs. Xie et al (2009) well quoting Haqoodoom (2002), Doloreux (2004) and Dewick and Miozzo (2004) held the view that:

“Literature on innovation indicates that over the last two decades, there has been a systematic and fundamental change in the way firms undertake innovatory activities. In particular, there has been a tremendous growth in the use of external networks by firms of all sizes. Innovation is seen as a process, which results from various interactions among different actors. Inter-organizational and cross-sectoral networks, which facilitate the accelerated flows of information, resources and trust necessary to secure and diffuse innovation, have emerged as a key strategy”

But Sundbo (2008) quoting Normann (2005), Mayere, (2002) and Miles et al (2000), argued that; “The literature on innovation in services is sparse, and it does not discuss the problem fundamentally; it presupposes that service firms do innovate. Even though some literature presents the empirical results of innovation activities in service firms, it does not discuss the reasonableness of presupposing that innovation is happening in service firms. Nor does it discuss whether innovations in the services can be understood in terms of the innovation theories developed for the manufacturing sector”.

Qiu (2008), quoting Spohrer et al. (2007), and US (Note 2) 2003, states that; “In contrast to the fast service economy development, the advancement in service education and research is far left behind. The service sector accounts for most of the world’s economic activity, but it’s the least-studied part of the economy. According to the (Note 2) project report, the service industry employs a large and growing share of national workforce (about 80% in the US in 2006), and is the primary users of (Even in most manufacturing industries, the service functions (e.g., sales, logistics, distribution, and customer service) focusing on increasing customer values have become leading sources for improved business competitiveness.

Although it is well understood that the rate of innovations and level of productivity in the service infrastructure (e.g., finance, transportation, communication, and healthcare) have an enormous impact on the productivity and performance of all other segments of the economy, the research and education in both academics and industries are not focused on or organized to meet the needs of service businesses. It was suggested that universities and industries should immediately and appropriately address the challenges in service education and research (NAE 2003)”.

Although the literature does not offer a thorough discussion of innovation in service firms, it can nevertheless be deduced that innovations are taking place. Sundbo (2008) argue that this is so in knowledge intensive business services. In some fields, particularly in (Note 3) based services, the service firms are leading innovators. Although many of Sundbo's examples are technological innovations, he also asserts that they in the services are often combined with organizational innovations.

However, driven by today’s new business environment that includes advanced telecommunications, accelerated business globalization, increased automation, and rapid technology innovations, emphasis in the service sector has evolved from a traditional labor-based business to
sources of innovations, collaboration, and value co-creation, driving the emergence of service-value networks (i.e., service systems) at a pace never before seen in history (Spohrere et al 2008).

The importance of innovation has always been emphasized since the Peter Drucker era. Drucker (2002) described innovation as “the effort to create purposeful, focused change in an enterprise's economic or social potential”, and is spurred by new opportunities. As such, the survival of a business lies in its ability to continually innovate and capitalize on potential opportunities in a forever changing landscape. He stated in the context of diffusion that an innovation must be communicated through certain channels over time among members of a social system for it to be adopted. At the time of his research, the failure rate of new consumer products was estimated at 92%, and marketers were seeking greater understanding for shepherding innovation.

Thus, innovation is not just about creating new products and service to capture new opportunities, but it also involves its successful adoption. Yet, in spite of its importance, the terms service innovation, innovation in service innovativeness in service and innovative service, which refer to a new or significantly improved service concept or process, drew neither the attention nor clear definition in the past. This may be due in part to technology not having matured to enable many of the service of today.

Chen (2010) begins by stating that all definitions include the development and implementation of “something new,” and can be focused to include service concepts (i.e., changes to service characteristics), client interface (i.e., means of interaction), the delivery system (i.e., internal work processes and arrangements) and technological options (i.e., new opportunities linked to technology). It can be further characterized as a new service application that was created with the intention of deriving benefits from it.

It is obviously a trend that leading and competitive services provided by service systems are all remarkably delineated with information-driven, customer-centric, e-oriented, and satisfaction-focused characteristics. A variety of high-tech services enabled through service-value networks in the high value areas have been emerging recently, such as online information and knowledge service, IT outsourcing to post-sales training, on demand innovations consulting (e.g., work helping customers reengineer products, automate business processes, improve goods and services delivery efficiency, and design and deploy supportive IT systems). Vargo and Lusch (2009)

In evidence, IBM Global Consulting, Google, eBay, Amazon, YouTube, Yahoo, and online distance education well represent these emerging services. Note that traditional services providers (e.g., Airlines, UPS, Wal-Mart, McDonalds, travel agencies, etc.) are also transforming themselves into service-value networks to gain competitive advantages. It is well understood that the quality of their provided services largely depends on very large-scale public information infrastructures and complex services systems in order to satisfy the diverse needs of worldwide customers. (Qui 2008)
available from other reliable sources. The disadvantages of this approach are the huge cost and long time required for costing complex service.

2.5.3 Mixed approach
Mixed approaches are based partly on bottom up and partly on top-down approaches. The mixed approach could avoid some of the disadvantages of both methods. A mixed method could be cheaper than using only bottom up approach and it could be more accurate than using only top-down approach because it can reflect variation in resource consumptions. Top-down costing can be used where resource variation is reasonably small, and/or when the level of aggregation is relatively high, as well as where bottom up costing would be very expensive and/or would not be worthwhile. On the other hand, bottom up costing can be used where the precision/accuracy of resource measurement is important, and data collection is feasible in an economically sensible way. Study using mixed approach could suffer from the weaknesses of both methods. Local data may not be externally valid, whereas aggregate data may not be locally representative and could over or underestimate real resource utilization.

2.5.4 Analogy-based estimates
In some cases, when similar service or activities have already been valued and the unit costs calculated, information can be extracted from published reports or analysis. It may be helpful to contact the authors directly to discover more details about the costing exercise in order to assess the quality and reliability of these estimates. However, published studies may suffer from weaknesses as good internal validity and poor external validity.

It can be seen that, while costing service mixing different approaches used for product cost estimation is more desirable than relying on single approach. Most of the techniques stick on retrospective approaches (basing on past historical data, similar service or equipment data) and do not relate to customer requirements for future. Thou the researcher would stick to the opinions of Datta et al (2010) as very recent studies on service costing techniques, opinions of subject matter experts are of significant importance in estimating costs of service. In-service costing literature, the studies do not report the applicability of different estimating techniques at different life-cycle stages of service.

The total cost of a particular service is determined by the quantity of resources consumed and the unit cost of the resource items. Therefore, costing usually encompasses five major distinct steps as discussed by Brouwer et al (2007):

- Portray the decision problem and establish objectives of costing (selection of study perspective, time horizon and explicit statement about the assumptions applied are also an essential part of this step);
- Detailed description of the service(s) for costing (final cost object);
- Identification and classification of resource items and units of resources utilized to deliver a particular service or goods. The units of measurement (units of input) can be an activity or physical resources such as spares, consumables, etc.
- Measuring resource consumption in natural units; and
- Placing monetary value on these resource items (goods, activities, and/or service and calculating the unit costs of a particular service.

The researchers being aware of the time difference when Brouwer et al (2007) undertook their studies and the current prevailing situations in the Service industry concurs that the same steps are well applicable in the emerging situation of 2011 and beyond.

2.6 The emerging service paradigm
As stated earlier, in spite of the dominative role of services in today’s economic activities, research on understanding how enterprises could invest effectively to create service innovations and realize more predicable outcomes has made a little and slow progress, which could be a big obstacle for the developed countries to develop, and sustain their future service-led economic growth (Irene et al 2009, Sundbo 2008, Spohrer et al 2007, Lohr 2006). Ironically, there is even a lack of a widely
accepted definition of service, not to mention the unified theory and principles towards engineering, operating, and managing service systems.

Note that today’s service concept evolves beyond the traditional non-agricultural and/or non-manufacturing performance for the consumer’s benefits. For example, many new emerging high value areas, such as IT outsourcing to post-sales training, on demand innovations consulting (including knowledge services helping customers improve their products, business processes, goods and delivery, and IT systems), are well recognized as a service (Qui 2008).

Although little progress has been made yet in service and service systems as a whole, research work in pieces has been separately done in many disciplines for years. By exploring the marketing shift from the exchange of tangible resources, embedded value, and transactions based “goods” to the exchange of intangible resources, the co-creation of value, and relationships based “service” (Irene et al 2009). It is with these ideas that the researcher embarked with this research with a notion to have a unified research on service science and applications of those ideas in future service production.

Using service science as a label it is clear that there is an emerging focus in a variety of industry and academic settings, and that others are beginning to take the issues seriously, although in other literatures some of the labeling is a bit different (Macbeth 2010). There are already some crossovers between the Operations Management field, which historically took a product, and manufacturing focus and the Marketing view with its interest in customers in both business and end user market places.

Vargo and Lusch (2009) argue for the necessity of evolving a service-dominant logic in marketing to replace the goods-dominant logic. They emphasize that general concepts, worldview, and small set of fundamental propositions, along with their empirical support, about the service should be established. They have comprehensively reviewed literature in the relevant areas and present the foundational premises of the emerging service paradigm:

1. Skills and knowledge are the fundamental unit of exchange,
2. Indirect exchange masks the fundamental unit of exchange,
3. Goods are distribution mechanisms for service provision,
4. Knowledge is the fundamental source of competitive advantage,
5. All economies are services economies,
6. The customer is always a co-producer,
7. The enterprise can only make value propositions, and
8. A service-centered view is inherently

It is a feeling of the researcher that through the service paradigm advocated by Vargo and Lusch (2009) a service should be established that all stakeholders could learn from.

3 Method

A review of the Literature was adapted for this study. Review of the Literature was appropriate for the study since as Laaria (2005) quoting Wiersma (2002) observed, ‘Literature review were conducted to determine the status given and were concerned with the gathering of facts rather than the manipulation of variables’. In the study the researcher was interested in getting facts from literature on the insights of service industry and its application to future service production.

Furthermore, according to Good (2006) a literature review was useful in that it not only secures evidence concerning existing situations or current conditions but also identifies standards or norms with which to compare present conditions in order to plan the next step.

Studies were identified through an electronic search of the databases such as Science Direct, Web of Science, library files and reference list. In addition, the literature review was extended to the Internet, by use of Google, Yahoo, Baidu, and other Internet search engines, as well as searches to large service industries like Wal-Mart, McDonalds, Shanghai Subway, Travel Agencies, Airlines etc., web pages for unpublished online information. Review of Textbooks, Journals, Publications, Newspapers, and Master/Doctorial dissertations in Shanghai University Library was also considered.

An observation was made on the services provided by large service industries in Shanghai city. As Bell (2007) pointed out, “much is learned by observing what people actually do and how they do it”.

www.theinternationaljournal.org > RJCBS: Volume: 02, Number: 07, May-2013 Page 39
Observations were done in MacDonald, Wal-Mart and Shanghai subways stations. These observations give in-depth knowledge when reviewing literature.

4. DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

The literature reviewed shows that there are organizations that are basically concerned with providing services. These organizations are referred to as service industry, for them service represents a major part of what they have to offer. Their services are consumed by the individual, such as in medical, education, insurance, legal, financial, tourism, transportation and retailing services. Other whose business is the manufacture of product, e.g. cars, computers, and mobile phones etc., service is of lesser significant importance. But the literature as reviewed that; all organizations provide a service of some sort or another.

Although the literature as shown that no specific definition of the word ‘service’, there is consensus that service involves application of specialized knowledge, skill and experience for the benefit of others. A consensus is emerging that service cannot be described and understood by a single academic discipline.

The literature reviews that more should be done on the areas of innovations in service industry. As Drucker (2002) observed in his days, “the survival of a business lies in its ability to continually innovate and capitalize on potential opportunities in a forever changing landscape”, the survival of service industry lies on innovations to suit the ever changing world.

In conclusion, it can be argued that over 80% of employment opportunities available in the world today are found in the service industry. Therefore, there is need for a coordinated framework for all sectors involved in service industry to learn from each other. It is recommended that more research should be done in this sector. Of importance, studies should be done to establish innovations adapted by short and medium service industries providers, with a view of encouraging them provide more services. The co-operation Networks and Innovation Performance between these firms can be of high interest.

REFERENCES

8. Good (2006), Good C. V; Essentials of educational research: Methodology and Description. Merrid Pub. New York, USA.
9. Karwan (2009), Karwan K.R; Integrating Service Design Principals and Information Technology to improve delivery and productivity in Public sector Operations: The case of South Carolina DMV: Journal of Operations Management; University of South Carolina, Colombia USA.


16. Ramsay (2009), Sholto Ramsay; Tracking the Evaluation of the Service Marketing, Helpmego ltd, U.S.A


Notes:

Note 1: Gross Domestic Product

Note 2: National Academy of Engineering

Note 3: Information Technology