

Springer Proceedings in Complexity

Lorna Uden

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I-Hsien Ting *Editors*

The 8th International Conference on Knowledge Management in Organizations

Social and Big Data Computing for
Knowledge Management

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Editors

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Preface

Knowledge is increasingly recognised as the most important resource in organizations and a key differentiating factor in business today. It is increasingly being acknowledged that Knowledge Management (KM) can bring about the much needed innovation and improved business performance in organizations. The service sector now dominates the economies of the developed world. Knowledge management plays a crucial role in the development of sustainable competitive advantage through innovation in services. In recent years, social computing and big data are also becoming popular topics that extend the research to knowledge management. One of the goals of knowledge management is the ability to integrate information from multiple perspectives to provide the insights required for valid decision-making. Big data provides unique challenges and opportunities for achieving that goal.

The eighth KMO conference brings together researchers and developers from industry and the academic world to report on the latest scientific and technical advances on knowledge management in organizations. It aims to provide an international forum for authors to present and discuss research focused on the role of knowledge management for innovative services in industries, to shed light on recent advances in social and big data computing for KM as well as to identify future directions for researching the role of knowledge management in service innovation and how cloud computing can be used to address many of the issues currently facing KM in academia and industrial sectors.

The KMO proceedings consist of 50 papers covering different aspects of Knowledge Management including:

- C1: Service and Innovation
- C2: KM Practice and Case Study
- C3: Information Technology and KM
- C4: KM and Social Network
- C5: KM in Business and Organization
- C6: Knowledge Transfer, Sharing and Creation

Authors of the papers come from many different countries such as Australia, Austria, Brazil, Chile, China, Colombia, Finland, Hong Kong, Israel, Japan, Malaysia, Netherland, Oman, Singapore, Slovakia, Slovenia, South Africa, Spain, Taiwan, United Arab Emirates, UK and Vietnam.

We would like to thank our authors, reviewers and programme committee for their contributions and the National University of Kaohsiung for hosting the conference.

Without their efforts, there would be no conference or proceedings.

Kaohsiung, Taiwan, September 2013

Lorna Uden
Leon S. L. Wang
Juan Manuel Corchado Rodríguez
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Part I
Service and Innovation

Chapter 1

Servitization of Business: An Exploratory Case Study of Customer Perspective

Zahir Ahamed, Akira Kamoshida and Takehiro Inohara

Abstract The concept of servitization ‘adding value by adding services to products’ was first introduced by Vandermerwe and Rada in 1988, which in later became a popular topic for researchers in the academia, business and government. Today, it is widely recognized as an increasingly relevant business strategy for manufacturing firms to improve their competitive advantage in the market. In many cases, the necessity or application of servitization concept explained by researchers from organization perspective, especially for developed economy, but they were less attentive to discuss the issue from customer viewpoint in developing economy. Therefore, this paper aims to examine the needs of servitization from customer perspectives, particularly the IT industry of emerging market ‘Bangladesh’. The data was collected by the interviews of suppliers and customers in the IT industry of Bangladesh. The survey results showed that the current suppliers cannot satisfy the customer needs at this moment, because customers are not happy anymore with the IT goods only; they also require solutions, knowledge and reliability as well.

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1.1 Introduction

Servitization is defined as the strategic innovation of organization's capabilities and processes to shift from selling products to selling an integrated product and service offering that delivers value in use [1, 2]. The term 'servitization' has been explained in various forms by many authors such as 'service encapsulation' [3]; 'product-service systems' [4]; 'integrated solutions' [5]; product-service package' [6], and so on. They range from products with services as an "add-on", to services with tangible goods. They tend to be delivered using customer-centric strategies in order to provide "desired outcomes for the customer. According to Oliva and Kallenberg [7], customer orientation consists of two distinctive elements; first, a shift of the service offering from product-oriented service to "user's process oriented services", i.e., a shift from a focus on ensuring the proper functioning and/or customer's use of the product to pursuing efficiency and effectiveness of end-user's processes related to the product. Second, a shift of the nature of the customer interaction from transaction-based to relationship-based, i.e., a shift from selling products to establishing and maintaining a relationship with the customer. In other words, both a transfer from the old transaction-based mode of service to continuous connection with the customer and a shift towards process-oriented services for end-users instead of physical goods efficacy is required.

Servitization frequently occurs as a response to the financial difficulties, new customer demands and strategic product differentiation [7–9]. The concept of servitization very often discussed from organization viewpoint particularly for developed economies, where market is too competitive and companies can not gain their desired profit by selling goods only. But, there are not any significant discussions about this concept 'servitization as a value additions required by customers' in the developing economies' some industries, like as Information Technology (IT). In this article, we discussed the necessity of implementing servitization concept from customer perspective in Bangladesh IT market. In Bangladesh, the IT sector has started growing, particularly in the late 1990s, as a result of some favorable policies of the government, such as 100 % duty free of IT goods and services, tax exemption and financial support to the new entrepreneur, and so on. However, the big development of this sector has been observed since 2008 when the new government was elected and envisioned to create a "Digital Bangladesh" by 2021. Since then, the government rapidly increases the implementation of IT in various sectors, including e-governance. In line with the government vision, the private limited organizations, such as telecom, banking, garments, and so on have been implemented many large-scale automation projects, which increases IT Enabled Services (ITES) in the industry. In this context, services related to the hardware and non-hardware, i.e., service-ware realized very importance from customer perspective of Bangladesh IT industry. Thus, the objective of this study is to examine the current level of services provided by suppliers or/and sellers in the IT industry. It will also identify the necessity of servitization, i.e., services as a solution from customer perspective in Bangladesh IT market.

The paper is organized as follows. After the introduction, the servitization concept is explained from organization versus customer perspective in [Sect. 2](#), followed by methodology used in this paper in [Sect. 3](#). The background of the Bangladesh IT sector is provided in [Sect. 4](#) with the analysis of current supply chain of goods and problems observed in this system. [Section 5](#) discusses the existing level of services and desired customer needs. Discussion of the research output is presented in [Sect. 6](#). Finally, [Sect. 7](#) concludes the paper with further research questions.

1.2 Servitization: Organization Versus Customer Perspective

1.2.1 Organization Perspective

Services are essential for the growth and competitiveness of manufacturing firms, as they can contribute to the increased demand and complement the sale or lease of tangible products [8]. Traditionally, competition between manufacturing firms has tended to focus on the goods themselves. A company gained customers or increased its sales because its goods were better than those of its competitors. But, today the competition is shifting to another level, i.e., the product-service-systems (PSS). Now the question may arise why manufacturers are going to transform its business from not only producing goods to offering an integrated package of goods and services? It is observed that the manufacturing firms, especially high-tech industries are under massive pressure and realize the difficulties to achieve their desired profit from only selling goods, which forces them to respond by moving up value chain, seeking to innovate and create more sophisticated products and services so that they do not have to compete on the basis of cost alone [10]. Consequently, there are five key sets of factors that drive companies to pursue a servitization strategy; namely, financial, strategic, economic, marketing and environments.

- **Financial Benefits:** Services retain potentially higher margins than products [6, 11, 12], and generate substantial revenue from an installed base of products with a long life cycle [13, 14]. However it secures the company for regular income and balances the effects of mature markets and unfavorable economic cycles [15, 16].
- **Strategic Advantages:** Service addition helps the firm differentiate from competitors, aids the consolidation and protection of the core product businesses, and establishes intimate relationships with clients. Since services are more labor dependent and less visible rendering, and then more difficult to imitate, and hence a source of sustainable competitive advantage [7, 9, 17].
- **Economic Pressure:** Service roles in manufacturing sector are growing rapidly, as increased the share of services activities are necessary to produce goods

[18, 19]. Also, the de-industrialization and increasing international division of labor between manufacturing and services led to the declining shares of manufacturing in developed economies.

- **Marketing Opportunities:** Service component has great influence on purchasing decision and tend to induce repeat-sales, and by intensifying contact opportunities with the customer, can put the supplier in the right position to offer other products or services [16, 20].
- **Environmental Rationale:** Services make sure the use of resources more rationally and proper way [21].

Thus, by offering services, companies can gain insight into their customers' needs and are able to develop more tailored offerings which in long-run creates values for organizations.

1.2.2 Customer Perspective

Nowadays customers simply demand more and more services related to the products. They do not simply want to buy a computer or server; they also want solutions and guarantee that it works. They want ease of use, maintenance, repair, support, and knowledge how it works better. This section mainly discusses the necessity of these services from customers' perspective in the IT industry of Bangladesh. It is observed by the interview results that most of the customers just want more service and are no longer satisfied with the products alone. They want service that goes along with it, i.e., the service that addresses the underlying needs. More specifically, the customer's needs observed in this market are pre-sales services, such as consulting or/and configuration of systems, after sales services, i.e., maintenance and technical assessment, and knowledge or training for getting better performance, and finally quick response in any emergency case, like as systems fall. After interview and discussions with customers, it is clear that customers are not getting these services along with products that realize very importance for Bangladesh IT market. In this context, the application of servitization concept 'integration of goods and services offering from one space' can be one of the key strategic choices for product suppliers that can satisfy the current level of customers requirements and meet on demand market needs of Bangladesh IT industry. The following keys values can be derive by the implementation of servitization strategy in Bangladesh IT market that we identified from customer perspectives after analyzing market condition.

- Simplicity of the transaction and cost effective, which is the main concern of the customers' in Bangladesh market.
- Reducing transaction time and easy to get the desired services from one space.
- Increasing the reliability of goods and services and quick response in any emergency case.

Hence, the implementation of servitization strategy or increasing the level of product-service operations (PSS) is just on-demand market needs to satisfy the customers in Bangladesh IT industry.

1.3 Methodology

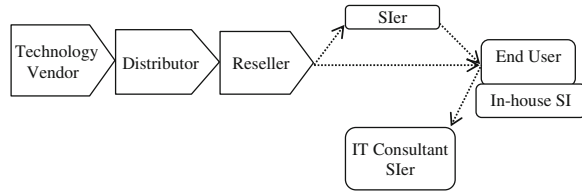
The methodology used in this paper was interviews and discussion with end users and suppliers of Bangladesh IT market. We conducted a total of 17 in-depth interviews, separated into two distinct phases. Each of the interviews lasted between 90 and 120 min, and was recorded and subsequently transcribed verbatim. The initial exploratory stage commenced in August 2012. This was composed of 7 semi-structured interviews across the selected IT goods suppliers and service engineers or/and systems integrators (SIer) in Bangladesh. The questions were asked to the respondents about the current process of supplying goods, services offering, difficulties face in supply chain system, and customer satisfaction or interaction level between suppliers and end users. The survey result shows that product suppliers or sellers cannot meet the customer needs due to the current business model or process, market condition, and infrastructure as well. The second phase of the research was composed of a further 10 semi-structured interviews carried out in December 2012. The interviewees in this phase included vice president of project management, IT engineers, IT administrators, systems engineers, and general infrastructure managers. The questions focused on the respondents' career background, current systems and services they use, problems they often face, and their desired level of services and solutions to the providers. The feedback from the interviewees' reveals that customers are not happy anymore with products only, they also want related services, such as consulting, maintenance and support, and training and knowledge services.

1.4 Bangladesh IT Market

Bangladesh is one of the next 11 emerging countries in the world, just after the BRICS [22]. The country has more than 160 million populations with GDP growth rate approximately 6.6 %, i.e., world's 5th position in fiscal year 2012 [23].

During the late 1990s, Bangladesh has seen an increasing growth of the IT industry. Initially, the favorable tax policy of the government of Bangladesh in 1998 accompanied by the global affordability of personal computers have had tremendous impact on the usage of computer. The favorable import tax policy on computers and computer accessories during that time was one of the timely steps taken by the government of Bangladesh. From then on, in accordance with the global trends, both private and public sectors in Bangladesh caught up with effective utilization of information technology. However, the big revolution of IT industry in Bangladesh has been observed in 2008 when the new government was

Fig. 1.1 Product supply chain system in Bangladesh IT market



ected and envisioned to create a “Digital Bangladesh” by 2021. In this context, with government IT supportive policies, many automation projects such as e-governance projects are implementing continuously that increases the demand for IT services in Bangladesh. Consequently, many large-scale automation projects have been implemented in telecom, banking, and garment/textile sectors and domestic demand for software and IT Enabled Services (ITES) increased rapidly. As a result, today the size of the IT market in Bangladesh, excluding telecom, is estimated to be around \$3.2 billion [24–26], in which 61 % comprises by hardware, 29 % by software, and 10 % by ITES [27–29].

1.4.1 Current Supply Chain of IT Products

The IT industries of Bangladesh comprises distributors, dealers, resellers of computer and allied products, locally assembled computer vendors, software developers and exporters, internet service providers, ICT based educational institutions and training houses, ICT embedded services providers, and so on. In this section, we analyzed the current value chain of supplying goods in the IT industry of Bangladesh that we portrayed in Fig. 1.1 based on interview results of suppliers.

In Fig. 1.1, it is observed that the current products supply chain process takes many steps to reach the products on end user’s hand, which shows many disadvantages and low values from customer perspective. For example, in the current supply chain system, the lead-time is very high, margin on margin in every step, and less reliability of goods and services. In addition to these, customers cannot get any other services related to the products except warranty in this process. Thus, customers want to reduce the transaction time and expect more valued goods and services from one space, such as consulting, training, maintenance services and so on. The next section, we identified the current level of services and customer needs in Bangladesh IT market based on the interview result of end users.

1.5 Identifying Service Level and Customer Needs

The level of services in Bangladesh IT market is observed very poor. The suppliers cannot provide any additional services along with products except warranty; even that does not work properly very often. An IT administrator comments that “when

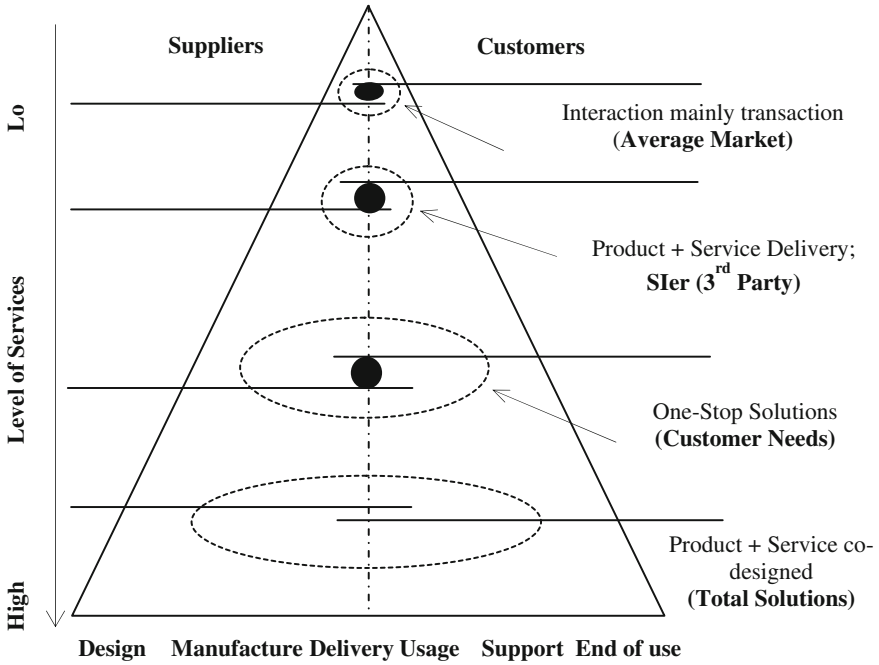


Fig. 1.2 Current level of services in Bangladesh IT market

we claim for any replacement of product, the supplier usually takes long time as it consists many parties in whole supply chain system, and sometimes they excuse as there is no availability of that model or goods anymore in the market”. So, the customers are bound to buy the new one, which makes them dissatisfied. It is basically happened for the reason of poor commitment, lengthy process, and many doors that customers have to go to fulfill their desired needs, such as consulting, system integration, maintenance and so on. The following Fig. 1.2 represents the current level of services and customer needs of Bangladesh IT market.

In Fig. 1.2, it is observed that average level of services in Bangladesh IT market is still very low and need to move more advance level. In order to get the customers’ desired services, they need to go to system integrators, i.e., 3rd party service providers, which incurred high cost and time. In this context, the majority of customers want these services with products from one-stop door. More specifically, the key customer needs are identified in the following based on interview and discussion with IT users.

- Consulting services, i.e., pre-sales services. For example, if a customer decided to buy a server, they require the configuration of the server or pre-verified template before the final buying of the products.

- Support and maintenance services, i.e., after sales services. Customers want the guarantee of the products that it works better and quick replacement or recovery in case of any problems during the warranty period.
- Technical assessment, i.e., periodical check. Customers want periodical assessment of their systems or products that it performs appropriately. They also want training and/or knowledge about the products or handling the systems to gain better performance.

Thus, it is observed that the necessity of implementation of servitization concept, i.e., product-service operation in Bangladesh IT market is crucial. The execution of this concept will create value for both customers and suppliers in long-run business perspective.

1.6 Discussion

Servitization or product-service operation is crucial in hi-tech industries, such as information technology (IT). The necessity of services in this industry is realized very important in Bangladesh market. This paper is tried to seek the customer needs, i.e., desired services in this particular market through field survey. The key customer needs identified in this market are solution services. Here, the ethical meaning of 'solution' is to solve the customer problems that can be software or services such as consulting, support and maintenance, technical assessment, knowledge, training, and so on. The paper also identified the problems existing in the current IT market in Bangladesh. These problems are lengthy process of supply chain, high transaction cost, and less reliability of goods, and lack of services. Thus, the significance of servitization or value proposition of existing goods through services offering in this market is crucial.

The real value of this article is presented for both organization and customer perspectives. For existing organizations or new entrepreneurs who do see the provision of services as a key to their future business in Bangladesh IT market, it is very informative and helpful to understand the current market condition and customer needs as well. On the other hand, customers will be benefited to understand and perceived the values of implementing servitization strategy in Bangladesh IT market. It will reduce the cost of goods, minimize transaction time, and increase the reliability of goods and services, which makes the customers more satisfied.

1.7 Conclusion

Servitization is the innovation of an organization's capabilities and processes, to better create value through a shift from selling product to selling product-service systems (PSS). The concept basically recognized as one of the relevant business strategies for developed economy or western countries [30]. But, in this article, we

show that the servitization concept cannot frame by any specific economic condition, i.e., developed economy or western countries. The importance of this concept or implementation should be consider based on customer needs in every individual market or/and industry perspectives.

This paper's purpose is to identify the necessity of servitization from customer perspective in Bangladesh IT market, which is growing rapidly. We discussed the current level of services provided by suppliers in Bangladesh IT market. The survey result revealed that suppliers or/and sellers are not provided any additional services with product except warranty, even that is not working properly in some circumstances. We also identified customers' needs and expectations, which are not provided by suppliers yet. The most important needs realized by customers are consulting, maintenance, and training and knowledge services. These services denoted as the process of value creation of existing products, i.e., servitization of business [2]. Thus, the necessity of implementing servitization strategy in Bangladesh IT market is very important, which in long-term perspective crucial for organization and customers as well.

The research result can be used to design services with existing products required by customers, and help companies to mitigate the customer needs in Bangladesh IT market. The expected benefits from this research are to help enterprise managers and decision makers to response the current market needs properly and achieving the objective of implementing servitization strategy both organization and customer perspective

Since our empirical study analyzed data collected from 1 industry, i.e., IT in Bangladesh market, it would be interesting and valuable to conduct similar surveys in other regions for comparative studies. Furthermore, we may extend our study in the future by increasing the number of sampled industries, such as telecommunication, electronics, automobiles, and so on. In the future is important to make further research on service design and processes to meet the specific needs of Bangladesh IT customers. What kind of challenges associated with the implementation of servitization strategy in Bangladesh IT market?

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Chapter 2

A Service Field Concept for Service Value Creation

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Abstract Service sector is growing up during the trend of service in economic activities. There have been many researches in order to increase service value. However, there is no mathematical model to identify and measure the service value for maximizing it effectively. This paper proposes a concept of service field for creating service value. Then the concept is applied to service matching in service mediators and information value creation in information business. This mathematical model seems to be effective for analyzing service value theoretically.

2.1 Introduction

Recently, the importance of service innovation has been discussed in various areas. This is attributed to the increasing of the ratio of service industry in GDP due to the expansion of information industry or knowledge industry [1]. Under such circumstances, new concepts related to service science such as Service Dominant Logic (SDL) [2], Persona marketing [3] or Service as a theater [4] have been proposed. In such new concepts, the “value in use” concept is very important, that is, how service receivers feel the value of provided services is an essential issue. Such service value creation is the common issue for every service business, and should be investigated more.

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Previous researches related to service value creation are followings. Service quality is one of measure on service value. Hatakeyama [5] proposed that service quality depends on the difference between the pre-expectation of a service and the after evaluation of provided service. If the after evaluation is better than the pre-expectation, then the customer feels satisfaction and the service quality is high. However, the pre-expectation and the after evaluation depend on human's feeling and it is difficult to formulate this relationship theoretically. Context-aware service [6] is one of services which are aiming at higher service value by considering the situation (time, place, people, cost, and so on).

Generally, the value of provided service is different according to the situation (human's characteristics, place, time, cost, etc.). Even if the same service is provided, the service value is different due to human's characteristics or the situation [7, 8]. The "value in use" concept in SDL depends on the situation. Also, context-aware service considers the relationship between the service value and the situation. However, there are no previous researches which give the theoretical framework for service value creation, which considers the situation-dependent characteristics of service value. Also, there is no mathematical model for service value.

In this paper, a new mathematical model for service value based on a concept of service field is proposed. This service field concept is an analogy of the electro-magnetic field in physics, where the electro-magnetic power is determined by the relation between the charge of electron and the electro-magnetic field. According to this concept, the service value is determined by the inner product of a customers' requirement vector and a provided service vector.

First, a service field concept is shown and a service value is determined by the relationship between service itself and the service field which is the situation of provided services. Next, a mathematical model for service value based on service field is discussed for enhancing service value. Moreover, this concept is applied to service matching in service mediators and information value creation in information business.

2.2 A Service Field Concept

In SDL proposed by Vargo, service value is determined by the customer on the basis of "value in use". Many service science researchers are looking at this concept to maximize human satisfaction in service system. This corresponds to the concept of 'value in use'. SDL gives a new viewpoint to service, and goods are some of factors in provided services to customers from the point of SDL. This concept is very suitable for explaining the twenty first century's global business.

The 'value in use' concept in SDL greatly depends on the contextual situation. Generally, the value of a provided service is different according to the situation (human's characteristics, place, time, cost, etc.). Even if the same service is provided, the service value is different due to human's characteristics or its situation.

A concept of service field, which is related to “value in use”, is analogous to the field theory in physics, where the electro-magnetic power is determined by the relation between the charge of the electron and the electro-magnetic field. According to this analogy, the service value is determined based on the relation between the provided service and the situation in question.

In the electro-magnetic field theory, the electro-magnetic power F is given by the Eq. (2.1):

$$F = q(E + v \times B) \quad (2.1)$$

where

F electro-magnetic power, q charge in electron,

E electronic field, B magnetic field, v velocity

In the electro-magnetic theory, even if the charge q is large, there is no electro-magnetic power when there is no electro-magnetic field. This relationship can be applied to creation of service value. Even if the service quality is high, there is no service value if the service is not required by customers, that is, there is no service field. The service value is determined by the relationship between a service and its service field, which shows how customers need service.

The service field model can be specified as

$$(\text{Service value}) = (\text{Service}) \times (\text{Service field}) \quad (2.2)$$

where \times denotes the relationship between service and service field. The concept of service field is shown in Fig. 2.1. Here, a high service value is generated when services are provided based on high potential values in the service field. A high potential means that the demand for provided service is high. Otherwise, provided services cannot create high service value. Consequently, in order to maximize service value, its service field should be identified, and suitable services should be provided depending on customers' characteristics or requirements in a given situation.

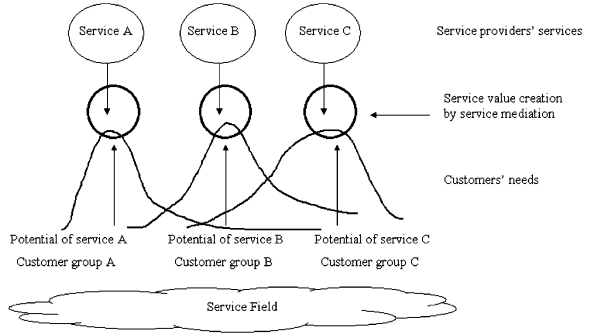
2.3 Service Value in Service Field Concept

If we consider the potential of service field, there are some similarities between the classical field theory and the proposed service field. The following discussion presents the analogy between a new service field and the traditional field theory in physics. The variables are relative but different in two diverse fields. Table 2.1 shows the comparison of variables, which is discussed by Wang et al. [9].

From the analogy of the traditional field theory, we can calculate the potential value A_G as following formulation

$$A_G = -\frac{Gm_1m_2}{r} \quad (2.3)$$

Fig. 2.1 Service field concept [7]



In this equation, G is the service index constant. The potential value A_G depends on the distance r . In order to evaluate r , we introduce two vectors which represent the provided service attribute vector s and the customer requirement attribute vector a .

i -th provided service attribute vector = $s_i (s_{1i}, s_{2i}, s_{3i}, \dots, s_{ni})$

j -th customer requirement attribute vector = $a_j (a_{1j}, a_{2j}, a_{3j}, \dots, a_{nj})$

For example, let's consider 8Ps in service marketing to understand the service attribute vector and the potential of service field. We stimulate 8Ps (Product, Pricing, Productivity and Quality, Place, Physical evidence, Promotion, Process, People) as service attributes in general services. Here, let's assign 8Ps to components $\{s_{ki}, k = 1, 2, \dots, n\}$ of service attribute vector s_i . With each attribute, customers and providers have different perspective and expectation. The relationship between provided service attribute vectors and requirement attribute vectors is shown in Fig. 2.2 geometrically. The smaller the distance r_{ij} is, the more preferable for a_j the provided service s_i is. In Fig. 2.2, s_2 is preferable for a_1 and s_1 is preferable for a_2

In reality, there are many service offerings and many requirements from customers. However, matching them perfectly is a concern of both firms and customers. The gap r between services s and customers' requirement a is the issue for the matching. When gap r is small, there is more potential that service is delivered to suitable requirement. Therefore, r in Eq. (2.3) can be defined by the distance between a (requirement attribute vector) and s (provided service attribute vector). To optimize the service value, r (the gap between these two vectors) should be minimized:

$$r = |s - a|, r^2 = \sum (s_n - a_n)^2 \tag{2.4}$$

To maximize the service potential, r needs to be minimized as much as possible. Therefore, this leads to the Hypothesis 1.

Hypothesis 1: Service offering should be closed to customers' needs. The closer they are to each other, the more the service value co-created to satisfy customers is.

From the Eq. (2.4), the following relationship can be obtained,

Table 2.1 Variable comparison

Traditional field theory	New service field
Attraction	Attractiveness
m' (statistic objects)	s (service providers)
m (kinetic objects)	a (customers/targets demand)
Position (of objects)	Demand (of services)
r (distance between m' and m)	r (gap between the services and the customers demand)
A_G (work of attraction)	A_G value of services

$$r^2 = |s - a|^2 = |s|^2 + |a|^2 - 2(s \cdot a) \tag{2.5}$$

The distance r is deeply related to the inner product ($s \cdot a$) of the provided service attribute vector s and the customer requirement attribute vector a .

$$(s \cdot a) = |s||a| \cos(\alpha) \tag{2.6}$$

Therefore, the potential of service field can be determined by $|s|$, $|a|$, and $\cos(\alpha)$. In order to maximize the service value, the distance r must be minimized. This means that the inner product of ($s \cdot a$) must be maximized. Based on these considerations, there should be three strategies to get high value services:

Strategy 1: $|a|$ is as big as possible;

Strategy 2: $|s|$ is as big as possible;

Strategy 3: $\cos(\alpha)$ is as max as possible $\Rightarrow (\alpha)$ is as min as possible.

From the three strategies, we have the following hypotheses:

Hypothesis 2 : If the requirements of customers are large, it is possible to match services with customers' needs because the gap between them will be small.

This hypothesis is based on **strategy 1**. If a is big, the gap r will be small, therefore, there will be a greater chance for matching services and customers's requirements.

Hypothesis 3 : If services offering is good and have large value, it is possible to match good services with customers' needs to create high service value.

This hypothesis is based on **strategy 2**. If s is big, the gap r will be small, therefore, customers will easily accept and match with good service provisions.

Fig. 2.2 Attractiveness of services to customers' requirement

