A Proposal of KOSA Model for Service Innovation

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Abstract

Innovations can improve the productivity and quality of services and lead to new services. Procedures to create services innovation have been a focus of discussion all over the world. So far, we proposed several methodologies such as KIKI model [1] or Knowledge space [2] for service innovation independently. However, these methodologies should be integrated effectively for service innovation. This research proposes KOSA (Knowledge Science Oriented Service Value Creation Architecture) model, which can express a standard procedure for creating service value. Several examples show the effectiveness of KOSA model.

Keywords: Services innovation, Knowledge science, KOSA model, Service value co-creation, KIKI model

1 Introduction

The importance of innovation and scientific investigation in the service sector has been discussed all over the world. Innovation in services should have an affect on productivity and quality and lead to new services. The importance of procedures for services innovation has been also discussed. So far, we have proposed several methodologies for service value creation independently, which are new service definitions [3], the service field [4], KIKI model [1], the knowledge space [2], the recursive approach [5]. The effectiveness of these methodologies was examined through several case studies [6]. However, these methodologies are not integrated for a standard procedure to create service innovation.

On the other hand, we already proposed the old KOSA (Knowledge Science Oriented Systems Approach) model for new business creation. However, this model did not consider customers’ value creation. The KOSA model should be enhanced from the viewpoint of service value creation.

In this research, we try to integrate these methodologies into a new KOSA (Knowledge Science Oriented Service Value Creation Architecture) model as a standard procedure for service innovation. First, this paper reviews the previously proposed methodologies. Then, some examples are reported to show the effectiveness of these methodologies. Finally, these methodologies are integrated as the KOSA model.

2 Previous proposal for service innovation

We already made several proposals for service innovation. In this section, those are summarized briefly.

2.1 Two interpretation of service innovation

The term “service innovation” consists of “service” and “innovation” [3]. As the name implies, service innovation fuses the following two views.

(1) First view: Innovation in service industry

The first view of service innovation means innovation in the service industry. This is a conventional view of service innovation where new technologies such as information technology or new hardware technology are employed to create new values or improve productivity in traditional service industries such as hotel and travel businesses.

(2) Second view: Innovation through service value creation

The second view is innovation introduced through value co-creation between customers and providers from the viewpoint of SDL. Recent new services or new businesses fit this category, where new values in products or new services are created from the viewpoints of customer. This type of service innovation creates new business fields such as those created by Apple. It emphasizes new value creation by using information technology to help customers in the 21st century.

In this sense, the second view of service innovation is an important business issue with this
trend in the era of the Internet and globalization.

2.2 Definitions of service

The following three definitions of service are very useful in considering value of service in service innovation.

(1) A definition of service by a famous practitioner
There are many Japanese traditional hot spring spas called “ryokan” where traditional Japanese hospitality (omotenashi) services are provided. Kagaya is one of the most well-known “ryokan”. Sadahiko Oda, who is the chairman of Kagaya and is a well-known service practitioner, describes service as an activity that (a) provides professional techniques, (b) satisfies the customer, and (c) results in compensation [3]. These three factors in service are necessary conditions for successful service businesses and inspire fundamental philosophy in service science. According to his definition, most productive human activities are considered services.

(2) A definition of service by Kameoka
He defined service as activities to support people or organizations for them to achieve their objectives [7]. He also defined service from the viewpoints of knowledge science, where service can be defined as a knowledge creation process of creating values for customers. A service business can be defined as providing created knowledge to customers. Therefore, service is related to knowledge creation.

(3) Service dominant logic
Vargo and Lusch [8] proposed a new concept of service. This was called Service dominant logic (SDL). The most important point in SDL is that the determination of value in SDL differs from that in Goods dominant logic (GDL). The value of goods in GDL is determined by products, but the service value in SDL is determined by the customer on the basis of “value in use”. Vargo and Lusch also stressed the importance of value co-creation with customers in SDL. The service value in SDL is determined by customers. Therefore, they are collaborators in creating service value and active participants in service creation. The major characteristic of SDL is that service value can be co-created by service providers and customers.

2.3 Previously proposed methodologies

The following 4 methodologies for service value creation were proposed for considering new services.

(1) Service field[4]
The value of services provided to customers generally depends on the efficiency of services to achieve customer objectives. Even though services are identical, their values differ in terms of how customers value the services, due to different customer characteristics in different situations (place, time, or cost). That is to say, service values depend on the contexts of the situation where a service is provided. We consider that a service value depends on the relationship between the service itself and its service field where the service is provided.

This service field concept is based on an analogy to the electromagnetic field. Even a good service will have no service value, if there are no service fields related to it. This is expressed as 

\[
\text{service value} = \text{(service)} \times \text{(service field)}
\]

where x means the relationship between the service itself and its service field. This indicates that service value depends on the service itself and its service field.

(2) KIKI model[1]

Service value depends on the relationship between the service and its situation, and a more suitable service can be provided if the service field is identified. From such considerations, We devised the following four steps for service value co-creation in B-to-B collaborations.

Step1(K1): Knowledge sharing in collaboration
Step2 (I1): Identification of the service field
Step3(K2): Knowledge creation for the new service idea
Step4(I2): Implementation of the new service idea

The above four steps in the service value co-creation process, which is KIKI model, can be described on a two-dimensional plane.

(3) Knowledge space[2]
The concept of knowledge space makes a bridge of collected knowledge, resources or experience between alliance partners. The combined competence of knowledge will then produce the required solution as well as co-create value for recipients. Thus, all knowledge of the firm and its partners, i.e. Alliance Company and recipients, enriches the knowledge space. By using this knowledge space, the firm becomes able to deliver a valuable solution and satisfy the customer.

(4) Recursive approach[5]
The recursive approach is used to assess customer experiences and it clearly identifies the requirements of recipients. Organizations can find appropriate services or products that satisfy customer expectations. These technical achievements were made possible by introducing a concept of Kalman filter that is useful for feedback control in system theory.

Organizations (service providers) have to analyze where and what the gaps are with the aim of meeting customer requirements or eliminating them between their expectations and those of the customers. Service providers can then enhance or innovate services or products to create further offerings based on analyses of the gaps. If this process is organized recursively or continuously by service providers then such gaps may reduce over time and finally be eliminated.

2.4 The old KOSA model for new business creation process

The old KOSA (Knowledge Science Oriented Systems Approach) model [9] was already proposed for new business creation innovation process based on the integration of system science and knowledge science, which was specified as follows. This model did not consider value creation for customers.

(1) Innovation process integrating system science and knowledge science

The innovation process for new business development can be described as Figure 1. Usually, the innovation process for new business creation integrates system engineering factors (upper left) and knowledge science factors (lower right) for achieving the objective of new business development (an ideal state) from the initial stage.

(2) Architecture of the old KOSA model

By analyzing the structure of Figure 1, we could develop the old KOSA model as shown in Figure 2, which consists of 5 factors: (a) target vision, (b) knowledge space, (c) systems engineering, (d) knowledge science, (e) knowledge creation process management. In Figure 2, new knowledge for innovation is created in the knowledge space based on knowledge creation process management, which consists of SECI model, recursive approach, observability, and information potential (information field).

(3) Failure information (estimation error) as innovation in Kalman filter

Kalman filter is well known in the stochastic control theory. Kalman filter’s concept is recursive approaching to the ideal state by reducing estimation error using recursive observation. In Kalman filter, innovation means estimation error and it is important information for expanding observation space. In the case of new business creation, failure information is a source of new knowledge creation in order to overcome failure at the current situation by expanding knowledge space. This characteristic can be explained by Figure 3.

$$Y(t+1): observation \ (planned)$$

$$Y(t+1): estimation \ (realized)$$

$$Z(t) = \{Y(1), Y(2), ..., Y(t)\}: observation \ space$$

Experience space: space formed using past experience knowledge

Figure 1 Innovation process

Figure 2 Architecture of KOSA model

Figure 3 Estimation error as innovation
Recursive approach

Based on the consideration of (3), improvement of business or product specification should be done by creating new knowledge to reduce the failure. This process can be specified as Figure 4. This is feedback, spiral approach based on the experiences.

![Figure 4 Feedback approach](image)

3 Effect of methodologies for service value creation in real business

We evaluated the effect of four methodologies for service innovation through analyzing four real business cases (Hand-held Terminal based Restaurant Ordering System, Electronic Dictionaries with Full Dictionary Contents, ThumBoard (Micro Keyboard) for PalmPilot (PDA), Electronic Dictionaries with E-book Reader); two successful ones and two unsuccessful ones respectively [6].

While the product planners then were not clearly aware of concepts of “value in use” or “value co-creation with customers”, Table 1 shows what happened and what did not happen in this context among this company, customers, and their partner companies during the period of product planning and following product development processes.

We could draw some common elements and

<table>
<thead>
<tr>
<th>Case</th>
<th>Co-creation of Knowledge</th>
<th>Proposition of Value in use</th>
<th>Contribution by Outsiders</th>
<th>Primary Unit of Exchange</th>
<th>Business Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1 Restaurant Ordering System</td>
<td>Yes, many. But, most customers’ know-how are masked</td>
<td>Yes, it is valid till today due to the customization for each customer</td>
<td>Yes, an advice from outsider in other industry was triggered</td>
<td>Service Value for accurate &amp; quick order-taking at Restaurant Chain</td>
<td>Very Good. Created a market</td>
</tr>
<tr>
<td>Case 2 Full Contents E-Dictionary</td>
<td>Yes, a few. Some knowledge are protected as IP</td>
<td>Yes, it is valid till today though many of them are copied by others</td>
<td>Yes, an advice from engineer who did not know industry was triggered</td>
<td>Service Value for combination of full size dictionaries from other publishers</td>
<td>Very Good. Yet, soon Profit became lower</td>
</tr>
<tr>
<td>Case 3 ThumBoard® for PalmPilot®</td>
<td>Little though some IPs were registered by two companies</td>
<td>Little. Timing was too late due to slow down of PDA sales</td>
<td>None</td>
<td>Service Value for add-on function as small keyboard for PDA models</td>
<td>Very Poor. Timing was too late. Yet, was it really a reason?</td>
</tr>
<tr>
<td>Case 4 E-Dictionary with E-Book Reader</td>
<td>Almost none. NIH Syndrome between two companies</td>
<td>Small. Timing was too early (No Japanese E-Book Reader was ready)</td>
<td>None</td>
<td>Service Value f/ combination of dictionaries &amp; e-book reader in one case</td>
<td>Poor. Timing was too early.</td>
</tr>
</tbody>
</table>
factors in successful and failed cases on Table 2. Among them, it appears that the cases in which knowledge co-creation process with customers (recipients of service) worked smoothly were mostly successful. Successful cases employed four methodologies for service innovation.

Table 2 Comparison of case studies

<table>
<thead>
<tr>
<th>Case</th>
<th>Knowledge Space worked?</th>
<th>Service Field identified?</th>
<th>Knowledge Co-creation (e.g., KIKI) achieved?</th>
<th>Recursive Approach worked?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
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<td>4</td>
<td>×</td>
<td>Δ</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

4 KOSA model for service innovation

4.1 Necessity of integrating methodologies into one framework for service innovation

From discussions in Section 3, the methodologies for service innovation are very effective for creating service innovation. These methodologies should be integrated into one framework for creating service innovation systematically. On the other hand, the old KOSA model contains factors used in the methodologies, which are the knowledge space, recursive approach, SECI model and so on. Therefore, the old KOSA model should be enhanced to the new KOSA (Knowledge Science Oriented Service Value Creation Architecture) model by considering the viewpoint of service value creation. Also, these methodologies for service innovation should be integrated into this new KOSA model.

4.2 The new KOSA model for creating service innovation

The new KOSA model is shown in Figure 5. The service value creation process can be expressed by KIKI model. Methodologies for service

![Figure 5 KOSA model architecture](image-url)
innovation such as knowledge space or recursive approach are corresponding to each step K1, I1, K2, I2 in KIKI model. Persona marketing is employed in K1 to specify the customer characteristics. The service field is applied in I1 to identify the customer’s need for value creation. The knowledge space is the framework for knowledge creation by integrating various knowledge and technologies in K2. The recursive approach is employed for enhancing service value in the spiral development. Also, an analysis of experience value on the provided service is applied to the spiral development. The new service development in KIKI model should consider the definitions of service and the characteristic of service “value in use”.

5 Conclusion
Now, in the era of S-D Logic, working with customers and partners to co-create new knowledge for service value is essential. To make it happen, a new framework KOSA (Knowledge Science Oriented Service Value Creation Architecture) model is proposed, which can express a standard procedure for creating service value by integrating methodologies such as Knowledge space, KIKI Models, Service field and Recursive approach in Service System. The proposed KOSA model should be demonstrated to be effective though further researches.

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References