

Spiral Improvement of IT Solution Services based on the Service Field

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Abstract

KIKI model [1] is proposed as a standard procedure for service value co-creation in B to B (Business to Business) collaboration. In this model, collaboration can be described by 4 steps and service can be further enhanced by repeating these 4 steps. However, due to the lack of methodology for repeating them, it is vague how to turn into the next spiral properly. To solve this issue, we have applied the concept of PDCA (Plan, Do, Check, Action), which is a typical process reengineering and improvement method in business fields. Enterprise IT solution service is introduced as a case study for evaluating the proposed method.

Keywords: Service value co-creation, Service field, KIKI model, PDCA, IT solution service, Design office, MUSE

1. Introduction

The concept of the service field [1] has been proposed as a new framework for service value co-creation in the collaboration among service providers and receivers. And KIKI model based on the service field has also been proposed as a standard procedure for service value co-creation in B to B (Business to Business) collaboration. The collaboration in KIKI model can be described by 4 steps and the service that results from this process can be further enhanced by spirally repeating these four steps for service value co-creation. However, due to the lack of methodology for spirally repeating, it is vague how to turn into the next spiral properly when the service and the service field may change.

To improve this situation, we try to apply the concept of PDCA (Plan, Do, Check, Action) into enhancing service value co-creation in KIKI

model. PDCA is a typical process reengineering and improvement method in business fields.

In this paper, we introduce 3 types of changes viewpoints in CA (Check and Action) processes: i.e. (1) changes of service values, (2) changes of service fields, and (3) changes of receiver's needs, which can be retrieved by the analysis of the business transaction data from various viewpoints. Then, enterprise IT solution service that we have developed is introduced as a case study for evaluating the proposed method. In this case study, 10 years of stocked data are used to show the above 3 types of changes and the next collaboration steps have been started spirally. This indicates that the combination CA processes with KIKI model will be a practical and reasonable approach for improvement of service value co-creation based on the service field.

2. Background – IT Solution Services

We have engaged in IT solution services for a utility company as a “design office” for more than ten years. In such IT solution services, we have involved in the project from IT grand design phase and IT system construction, to operation and maintenance phase.

The name of “design office” is borrowed from construction industry. The roles of “design office” in IT grand design phase are value co-creation with the customer and substantiating his/her knowledge and needs into the grand design of entire IT services. Those needs are described into requirements, and translated into specifications for both development and operation companies. The “design office” provides project management service in construction phase and follow up services in operation and maintenance phase. Furthermore, important roles of “design office” are supporting the customer through passing on the concept to the successor as a “storyteller” and providing BPR (Business

Process Reengineering) consultation and IT system improvement services. For doing this, a consistent perspective throughout the IT solution service lifecycle is important.

Although the circumstances have been varied and the customer's needs and service requirements have been changed in the long period of service in operation, the improvements of services are to answer the needs in ad hoc manner and optimized in case and at moment. There was a lack of systematic approach to improve the services.

When the project as a case study in this paper was started in 2000, service field theory has not reported yet or there was no idea to take service viewpoints into IT system development process. In the meanwhile we have made a lot of efforts to improve IT solution business quality by adapting service concept by reverse engineering of case studies and analyzing success factors [2-4], we have met service field theory. We have applied this theory on actual projects trying to identify the service fields [5-6], and encounter the issue of the spirally improvement of service value co-creation based on the service field. In this research, we have applied PDCA concept to the improvement of service value co-creation, and could obtain the reasonable results, which are introduced in the following sections.

3. Service Field Theory and KIKI Model

The service field theory is aimed for entire optimization of service value co-creation among service providers and receivers, taking the relationship between service agents and outer circumstances into consideration, by sharing the service field among the agents.

KIKI model which is a standard service value co-creation model is used in this research. KIKI model is devised the following 4 steps for service value co-creation. And the service resulted from this service value co-creation process can be further enhanced by repeating these four steps of service value co-creation in a spiral of development. A brief introduction of KIKI will be shown as follows [1].

Step.1 (K1): Knowledge sharing related to collaboration: The collaborators in the service value co-creation process understand and share the objectives of the B to B collaboration and its

service field, which consists of service providers, service receivers, and the environment around the service. Therefore, the collaborators share knowledge and information related to their purpose.

Step.2 (I1): Identification of the service field: The service field is identified using various technologies such as data mining and questionnaire analysis or collaborations between providers and receivers of the service. What kind of service is needed for the receivers is investigated.

Step.3 (K2): Knowledge creation for the new service idea: Suitable service behaviors are designed after understanding the service field. Through participants collaborating in the service value co-creation process, new knowledge for service is created by combining various service ideas and technologies.

Step.4 (I2): Implementation of the new service idea: The created new service idea in Step 3 is implemented by considering business model, pricing of services or required IT systems. Collaborators in service value co-creation process evaluate the results of knowledge creation step for the required service and take them into account in the following process for enhancing services.

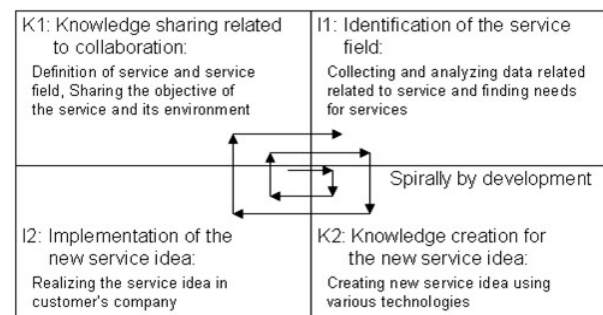


Fig. 1 KIKI model

The above four steps in the service value co-creation process can be described on a two-dimensional plane, as shown in Fig. 1. To take turn into a next step is as follows;

K1 --> I1: As the objective of the service and its environment are defined, it is feasible to collect the data related to the service.

I1 --> K2: As service needs have found in I1 step, this is the most interesting step to create new service ideas.

K2 --> I2: If new service ideas and the tech-

nologies to realize them are determined, it is concluded to time and labor.

I2 --> K1: It is necessary to take into consideration such as problems and issues of existing services, current circumstances and future trend in a comprehensive way. But, it is difficult to determine the next direction without reasonable and stable approach methods.

We use MUSE communication tool [4], a variation of brainstorming method [7] for I2 --> K1 development. In using MUSE, appropriate people are teamed and discuss the future service and service field based on the present situation and facing circumstances. Although gathering their opinions in natural language on cards and well organized in a relation map using KJ-method [8], those opinions are rather subjective depending on participants and we felt the necessity of certain verification to get understanding of top management in reasonable way.

4. Applying PDCA (Business Improvement Method) in KIKI Model

PDCA, a typical business process improvement method, is based on actual business transaction data and analysis. The PDCA steps are as follows;

P (Plan): To design and plan the services and determine measurement factors and indicators of service evaluation.

D (Do): To provide services and stock the results of services as data including basic data for service evaluation.

C (Check): To analyze data and verify the services executed properly as planned or not.

A (Action): To revise and improve the services which could not be executed as planned and take in the next P (Plan).

And this cycle continued for further improvement of the business process. From the viewpoint of service improvement, KIKI model and PDCA cycle have similar characteristics. By contrasting both methods, K1 and I1 in KIKI model correspond to P in PDCA cycle, K2 and I2 to D, we are aware of the lack of CA processes in KIKI, as shown in Fig. 2.

Through this research, we have investigated that to carry out CA processes in KIKI model, it

is necessary to gather and analyze the data relating (1) service values, (2) changes of service fields and (3) changes of needs. The followings are the viewpoints to gather and analyze the data;

(1) Service values: indicators of service evaluation themselves, i.e. analyzed transaction data from various viewpoints with the axis of time stamp, contents of service, provider who serve, receiver who served, income and outgo (expenses) etc.

(2) Changes of service field: changes in service agents, modification of objective values or changes of business model, etc. Those are not numerical form of data and further investigation is necessary to treat as data.

(3) Changes of needs: changes of social situation, needs for new services or improvement. Those are also non numerical form of data, but converting into numerical data will be in trial as a next research theme.

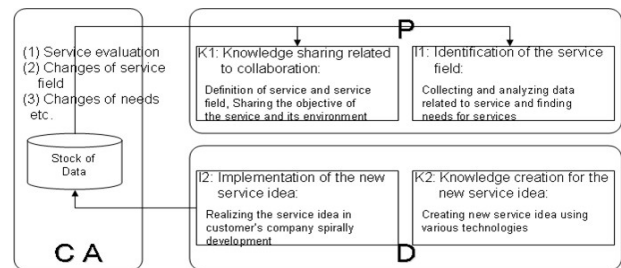


Fig. 2 Contrast of KIKI model and PDCA cycle

From these viewpoints;

(1) From gathered data in PDCA, considering the meaning of process improvement and raising service value simultaneously, are valid and effectively used as service evaluation data in KIKI model.

(2) The agent in charge of service improvements must be aware of those changes and should take into consideration as external data.

(3) Although those changes are beyond the scope of evaluation of initial plan, actual changes have arisen and the information must be utilized properly.

The changes of (2) and (3) are not retrieved directly from the stocked data. Human sense is necessary to catch a sign of changes, future circumstances, and to verify them reasonably by filtering and converting non-numerical information into data.

Further research in spiral improvement of

service value co-creation based on the service field will be continued according to the above consideration.

5. A Case Study

5.1 A case of utility company

As a case study, we discuss the case of a utility company. This project was started by a facility management division manager's wish to build a stable database (DB) through which people could utilize up-to-date data to obtain fresh information that they needed. After the 10 years in operation of this IT system, now it is in progress that PDCA cycle for enhancement and optimization of facility maintenance work process by visualizing the stocked data and through the awareness from the data.

The IT system we have developed consists of an integrated database that manages all the data on facilities, equipments, and work tasks in relation to facility management and four interconnected subsystems (planning, facility construction, operation, and facility maintenance) to support an efficient and speedy work process [9]. Fig. 3 illustrates an overview of the system. The objective of the system is to realize PDCA (Plan, Do, Check and Action) cycle for managing lifecycle of facilities, through reengineering and improving work processes.

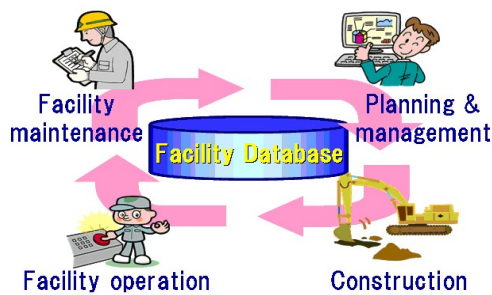


Fig. 3 Overview of facility management system

5.2 Service and service fields in this case study

In the grand design phase, a catchphrase “From Construction to Maintenance” was adopted. This means that the period of high economic growth has been ceased, and we should change the facility management style. This means that, it is more important to focus on maintaining currently available facilities rather than to construct new

facilities. Therefore, to maximize the reliability of the facility according to the condition and risks of each facility is considered as an objective value, not quantity or age of facilities.

In 2011, the facility division separated facility maintenance capability and a new subsidiary was established. The objective of this company, who is now a service provider for facility management division, is to provide facility maintenance service in balancing both reliability of facility and economic efficiency simultaneously. Changes of service and the service field are shown in Table 1 and 2, and an image of both balancing reliability of facility and economical efficiency is illustrated in Fig. 4.

Table 1. Initial service and service fields

Initial stage	
Objective value	Maximize reliability of facility
Service provider	Facility management division
Service receiver	Facility management division



Table 2. Present service and service fields

At present	
Objective value	Balance reliability of facility and economical efficiency
Service provider	Facility maintenance subsidiary
Service receiver	Facility management division

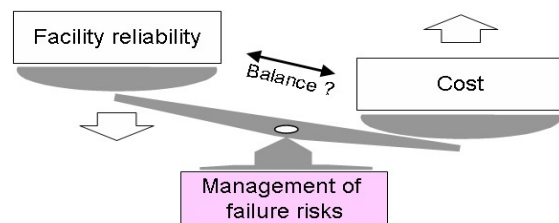


Fig. 4 Image of balancing reliability of facility and economical efficiency

5.3 Business process improvements through PDCA cycle

We have designed both the services and measurement factors and indicators of service evaluation simultaneously in the grand design phase. We are supposing that transaction data of business activities will be analyzed in C process in PDCA cycle from various viewpoints with the axis of time stamp, contents of service, a provider

who serves the service, a receiver who is served, income and outgo (expenses) and so on.

Number of records stocked in facility management database has been exceeded mega scale of order. Information consists of facility profile data such as model, manufacturer, capacity, facility condition data such as failures, disorders and pending items, and facility maintenance data such as patrol, inspection and repair or exchange and so on. We have analyzed and evaluated the facility and work process from various viewpoints with the axis mentioned in the above.

As results of this analysis, the following situation was revealed and we could have found signs of work process improvement from various aspects.

(1) The life span of facility used in utility business is 30-50 years as a freshness date and more over as an expiration date. There exists over 100-year hydroelectric power station. Because of the redundancy of facilities in case of incident of power failure and the operation with allowance, facility degradation is very slow and no sign of degradation showed in data especially in static equipments. Therefore, facilities of which risk is low and in healthy condition could extend the period of overhaul and inspection. This is one of the approaches to change from TBM (Time Based Maintenance) to CBM (Condition Based Maintenance) and maintenance costs can be deduced definitely.

(2) We have noticed that every recorded data passed the mark after the repairs and maintenance. It is necessary to record data before the repairs and maintenance as well as those of after the maintenance works, and allowance and trends of adjustments should be measured and examined.

(3) In the past, when the failure or disorder had occurred, it was inviolable rule to go the facility site and see by their own eyes and then think how to do. In other words, "behave first and think later". However, the new work style; "think first and behave later" is now generally accepted. This means that we investigate the data from sensor on site, facility carte, and finding the similar failure or disorder of the same model in other sites or restoration procedure. According to the above information it is able to prepare the repair parts or necessary tools and arrangements of the labors of outside contractors. With those preparations, we go to the facility site and adjust the situation promptly and in accurate manner.

We would like to mention that these fruits are brought by the new visualization system. Tremendous amounts of data are handled by BI tool (Business Intelligence tool) and expanded on memory using unique associated search techniques. The characteristics of this system are easy to use and no disturbance of thinking with quick response. This system is not aimed for professionals of analysis but for ordinary workers who engage in facility maintenance. The fact that all employees and managements could access the facility condition and maintenance activities accelerates the movement of new work style.

5.4 Improvements of service fields

As mentioned in the previous section, it is necessary to focus on (1) service values, (2) changes of service fields and (3) changes of receiver's needs for the improvements of service fields.

(1) As service values, the results of PCDA is to be applied as it is. Because both of PDCA and KIKI model aim the improvements of service, these results are very natural.

(2) The changes of service fields are drastic. Separation of the division was enforced and organized new subsidiary which was dedicated to facility maintenance. Although this change of service fields was caused by the external data, we could observe the sign that the business model has been changed through the PDCA evaluation data. For example, due to the service provider change, importance of income and outgo increases as an evaluation factor and weighting point of balancing reliability of facility and economical efficiency has been varied in evaluation process.

(3) As the changes of needs, the influence of social situation, especially that of Great East Japan earthquake, truly impacted the needs. The paradigm shifts occurred from safety to security, the tide of cost and energy saving has been surged and the importance of balancing reliability of facility and economical efficiency increases more than ever. Importance of accountability and transparency of business activities increases, the necessity of the cost reduction are accelerated as well. Those factors are caused by the service model change in (2).

Through those investigations in this research, we have recognized that in addition to the pri-

mary defined service field for entire facility management, new dedicated service field for facility maintenance should be defined. To review the details in the concentrated field helps the attentive and precise value co-creation. On the other hand, it is important to integrate the details into entire service from the bird-eye view. We convince that overall optimized service value creation can be achieved through those activities.

6. Conclusion

We have investigated that the combination of CA process and KIKI model will be a practical and reasonable approach for spiral improvement of service value co-creation. PDCA evaluation data is valid and effective in improvements of service value co-creation.

In this research, we have not tried to investigate the non numerical form of data which will be the next research theme. It might be useful using text mining method converting opinions and requirements into pseudo numerical data, or importance of opinion and strength of relationship of opinions might become measurable. Those will be visualized in the system mentioned in the section 5.3.

However, the most important factor is the customer's will. We would like to continue IT solution services for customers who are willing to achieve their objective goal through successive improvements of service value co-creation.

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