Three-Dimensional Service Value Creation Model Based on Multidisciplinary Framework: Service Value Transition in Flower Tourism and Robotized Music Appreciation Services

Kotaro Nakamura[1,2], Takahiro Imahori[3], Yasuo Ikawa[2]
[1] eCraft Inc. Tokyo-Japan
[2]Japan Advanced Institute of Science and Technology, Ishikawa-Japan
[3]Nikkan Kogyo Shimbun Ltd. (Business & Technology Daily News), Tokyo-Japan

***Abstract*--This paper is focused on the process of value creation in the service business and on the shift of service value created in actual service businesses. The analysis is used to demonstrate proposed models for explaining this shift. Service value is successfully created when customers enjoy the benefits of services proposed through a system of service businesses. The model visualizes the shift of service value, focusing on the three axes of width (of the place for service providing/usage in the service interaction points), level (of user satisfaction), and autonomy (the degree of customer involvement in service co-creation) of service value, which are added one after the other as three ordinal scales integrated into a three dimensional service value model. Knowledge creation theory, social psychology, and recent advances of service theory are considered aiming to apply the model to understanding the value creation in actual service businesses and to use the new insights for promoting value creation in service organizations characterized by active customer interaction. The validity of the proposed model is tested on case studies involving accommodation and network-based services. In two cases (the flower tourism navigation service "Hana-Navi" and the robotized music entertainment service "Miuro") the model's validity is confirmed through interviews with top executives and managers, major service planners of the respective services. The service value visualization through the three-axis model and the method for investigating the related service embodiment provide common service concepts and show a methodology for systematic service planning.**

I. THE BACKGROUND OF SERVICE VALUE CREATION AND THE PURPOSE OF THIS RESEARCH

It has been remarked about the importance of evolving role of customer from passive recipient to active co-creator in the value creation process [20] and also especially in service dominant perspective[26]. Service value creation is successfully achieved when customers enjoy the benefits of services proposed through a system of service businesses by a service provider. The modern service market with its globalization and increasing freedom of choice through expanded Internet usage makes it possible to apply innovation unheard-of in the past for generating new service value, and great importance is put on refining the business positioning to deepen the originality of service value [1][4][23].

It is generally pointed out that Internet technology influences the service business model by: 1) Lifting restrictions of time and space, 2) Unifying customers and service providers (web2.0, YouTube, Google), 3) Increasing new business opportunities through concentration of information (kakaku.com)

For example, in the tourism-support service, potential customers have been cultivated by advertising seasonal pictures and images of generally famous places. However, present network technology, which can be cheaply used on high performance and low-priced electronic handy devices an individual always carries, opened the way to information services supporting tourism [9]. Moreover, the rise of amateur network publishing, such as blog systems, where anyone can upload photos and videos easily, made possible the participation of many concerned persons in the accumulation of contents.

Another example is music entertainment, which used to amount to passively listening a concert performance or AV equipment. New technology helped launch music entertainment services with no restrictions of place and time, even when moving around. iPod devices include adaptation to the individual users tastes. In recent years music entertainment environment based on service robots with network access via portable communication technology is being developed and put in practical use.

Service robots are employed not only for music entertainment but they are beginning to get trusted to cope with social innovation for the aging society in countries such as Japan, with much discussed domains being domestic support and security services for the elderly [22]. This increases the need for improved connection between the service front end directly contacting with the customers and the supporting backstage, to achieve efficient customer support [19]. One can see here a typical metaphor reflecting the trend of Japan's manufacturing industry turning towards service business.

These examples all support the critical influence of Internet technology as outlined in (1)-(3) above.

The conception and proposal of a new original service business possibility generating new service value requires knowledge from many disciplines, increasingly including technology for implementing the service system. The accumulation of interdisciplinary know-how to bridge the gap between the various disciplines has just started, and an academic definition of service value has not been established yet. For example, at the recent SSME conference in Cambridge University [1], the need to recognize the

knowledge gap between the involved disciplines, such as marketing, human resources, engineering, and IT, was pointed out as a pre-condition for future service innovation. Services science is positioned to initiate the activities for the creation of the needed new interdisciplinary bridging knowledge, which will compensate the knowledge gap and mediate between the individual disciplines.

In attempt to achieve this goal, one of the authors generalized the service business of manufacturing industry related services, applying interdisciplinary approach focusing on the "service value" delivered by service providers and its co-creation in co-operation with users [16]. This research aimed at "clarifying the present condition of service value transition, formulating the required viewpoints, and discussing the validity of the systematic methodology for visualizing the service value transition and for realizing the service itself". The present paper further refines part of the model, considering in further detail the service value creation based on a relevant interdisciplinary framework. The examples of two actual successful services (a tourist support information service and a robotized music entertainment service) are used to validate the results based on interviews about the service value transition with key-persons instrumental in the conception of the respective services.

II. POSITIONING OF SERVICE VALUE AND VISUALIZATION AND REALIZATION OF SERVICE VALUE CREATION

A. *Positioning of service value in service conceptualization*

Building upon preceding research, we consider the service in the context of the conceptual structure shown in Fig. 1, with the various blocks representing the service business, its service concept, the related service value, and the service system needed for realization.

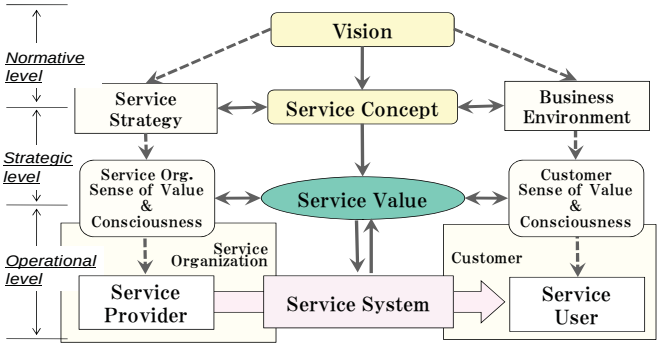

Fig.1 Positioning of the service value in this research (including final theoretical implications)

The "service concept" is a shared understanding of the service business, aiming to achieve the "vision". The latter is the image of the business as it should look after perfection, and shall be set up reflecting the service strategy and business conditions. The "service value" reflects the sense of value of the service organization and its business leaders according to the "service concept", and the sense of value of the customers. The "service value" is gradually established between a service organization and its customers in the process of repeated individual services [16].

The "service system" embodies (implements) the "service value" and is related to it in the same way as the "service delivery system" of service marketing, however here it is used in a wider meaning: It consists of the usage environment located mainly at the service front end, as well as the service infrastructure and IT systems located mainly at the backstage in the service organization, including employees [15].

B. *Visualization and Realization of Service Value Creation*

The present paper focuses on the service value creation from the point of view of persons engaged in the service business conception. The transition aspects of service value and the validity of the underlying model are validated in actual service enterprises. First we set-up the three-axis model, and then me perform synthetic verification by applying the model to four cases from two service fields (accommodation and network-based services), which require knowledge covering many technical fields. In the present paper we present in more detail only the network-based examples: the flower tourism navigation service “Hana-Navi” and the robotized music entertainment service “Miuro”. The remaining two case-studies analyze two high-level accommodation services and the details are being reported elsewhere.

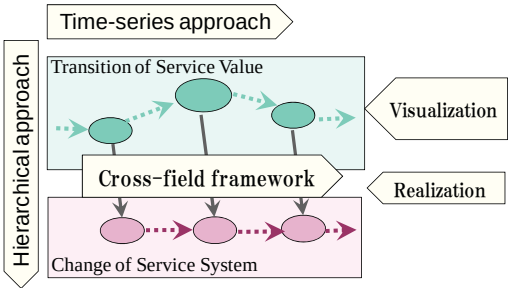

Fig.2 The methodology of approaching service value and the framework of this research

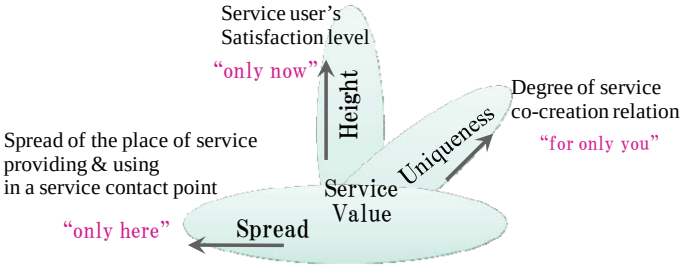

Fig.3 A viewpoint for grasping service value transition

III. THE THREE DIMENSIONAL MODEL FOR SERVICE VALUE VISUALIZATION

A. *Three dimensional model*

When visualizing the transition of service value, we assume that it suffices to arrange the model in a way paying attention to the three aspects of service spread, service level, and service originality/uniqueness, understood respectively as "the spread of service providing/usage place in the service contact points", the "level of service user satisfaction" or "service needs level", and the "co-creation phase" (with the customer).

From the customer's service value viewpoint, this can be can put in another way using the modern catch-phrases "only here", "only now", and "for only you": The "service providing/usage place in the service contact points" [18] is "only here", the "service needs level" [7] is "only now" with supreme satisfaction, and the "co-creation phase" [26] is "one meeting", "for only you", respectively.

The proposed service-value model is three dimensional, as shown in Fig. 4. The individual axes correspond to the aforementioned three viewpoints and are equipped with ordinal scales representing category sequences from the theory of knowledge creation, social psychology, and a modern service theory, respectively [14].

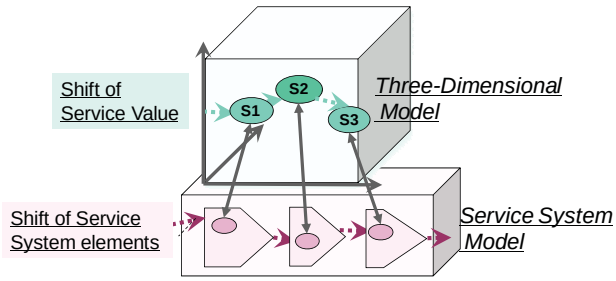

Fig.4 Proposed three-dimensional model for service value

In the present research we assume that the transition of service value can be successfully analyzed by means of the aforementioned three-axis model, as shown in Figs. 5 and 6. These figures contain the explanation of the category sequences on the three ordinal axes. In addition, a relevant multidisciplinary background must be considered, too.

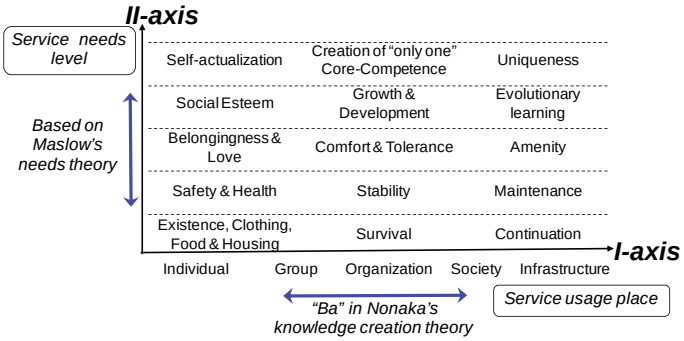

Fig.5 Explanation of ordinal axes I and I I

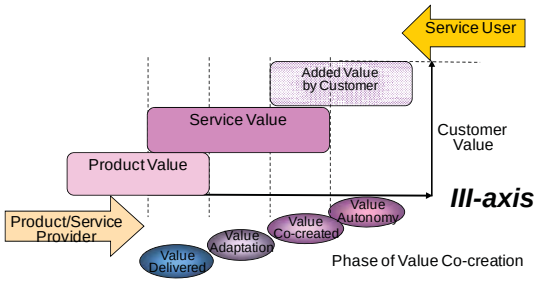

Fig.6 Explanation of ordinal axis III

B. *Service realization model for service value embodiment*

The proposed service realization model for service value embodiment has been reported already elsewhere [12], and we do not discuss it here. A brief outline is shown in Fig. 7 for reference.

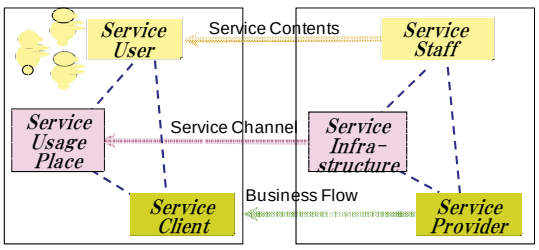

Fig.7 Explanation of service realization model

C. Method for externalizing service value and its transition

In order to externalizing service value, service value transition and KFS in service system in each service business, we adopted interview method key-persons and investigation of related literature. The interviews consisted of present condition of service business, the circumstances by the present, the change of business conditions, their recognition way service value, changing point coping with the shift of service value. The interviewer held the thought based on service conceptualization in Fig.1, but it did not carry out forcing the conceptualization to the interviewee. We interviewed key-persons involved in the conception of the respective services including top executives and several service staffs essential in value creation within the organization in service system. The data provided orally during the interviews was used for extracting service concept, service values, and transition of service values.

D. Service value transition analysis

The information acquired by the above method was applied to confirm that the value shift can be adequately described within the model. This is outlined in Fig. 8. The change of details marked as 1), 2) and 4) in Fig. 8 are used to extract information about the service value, and this is qualitatively compared to the shift of mapping description on the three-axis model, followed by analysis of similarities and differences of the respective service transition in this three dimensional space. As to the change of service value related to the shift of system elements marked as 3) in Fig. 8, we followed qualitatively their influence on the three-axis model expression in each case.

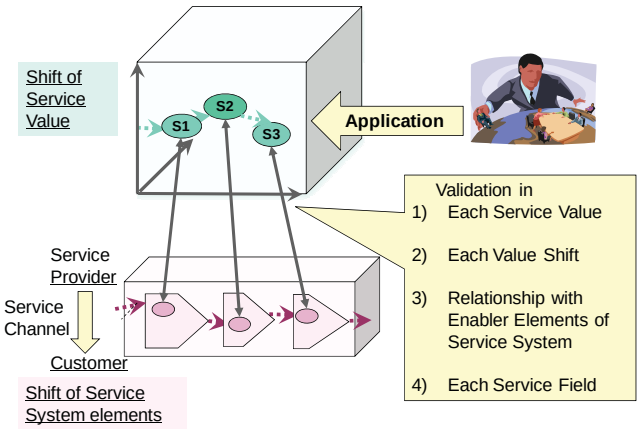

Fig.8 Model validation in real service cases

IV. CASE STUDIES OF SERVICE VALUE TRANSITION: INTERNET BASED INFORMATION SERVICES

The usefulness of visualizing the service value transition was demonstrated through interviews with service concept designers from the Internet-based information technology (IT) service industry, including the use of service robots [13][17]. Two examples were selected as typical success cases in this field: the flower tourism information service Hana-Navi [24] and the Miuro robotized music entertainment service [27], as summarized in Fig. 9.

Flower Tourism Navigation "Hana Navi."

"Sympathetic community media"

Summary of Company and Interview	
Company	Net-in Kyoto Inc. (Ukyo-ku, Kyoto-city, Japan)
Operation	Kyoto Flower tourism Committee
History	Launched 1997, Committee 2008
Interview	Date: March 20th ,2009 Interviewee: CEO Mr.T.

Network Music Player "Service Robot "miuro"

"Listening devices as ubiquitous partners"

Summary of Company and Interview	
Company	ZMP Inc. (Koishikawa Bunkyo-ku, Tokyo)
Employee	17 people
History	Launched 2001, Miuro sale2006, Excellent award 2008
Interview	Data : April 1st ,2009 Interviewee: CEO Mr.S. Director Mr.N

Fig.9 Summary of the services used for model validation

In this section we apply the insights from the interviews to plot the trends of service value shift for both services on the three dimensional model. Generating the three-axis models for both cases allows us to examine each service's positioning within the wider field of internet-based information services. Furthermore, the dynamics of service value creation is studied in both cases. We identify the key service value elements of each service, as well as the changes undergone by the respective service system realization [15]. This is used to present synthetic consideration for the validity of the three-axis model through comparison with other service theories.

A. Service value transition in flower tourism information service Hana-Navi

Figure 10 shows the service value mapping of the flower tourism information service Hana-Navi on the three axes of the three-axis model. For easier graphical presentation, the figure shows two-dimensional projections of the actual three-axis shift. Three stages (S0, S1, and S2) are identified, as shown below:

	Service Value:		
	Service usage place	***Service needs level***	***Service-co-creation phase***
S0	*members of the general public looking at hotel advertisments and the web*	*acquisition of flower information*	*Delivered level*
S1	*flower-loving tourists*	*viewing and enjoying seasonal flowers*	*Co-creation: social participation of taxi drivers, participants of promotional tours, etc.*
S2	*Movie-loving families and women of child-rearing age / tourists interested in Kyoto as a whole*	*comfort, belongingness, love*	*Adaptation / Co-creation: flower and town sightseeing information dispatch by dividuals and NPOs*

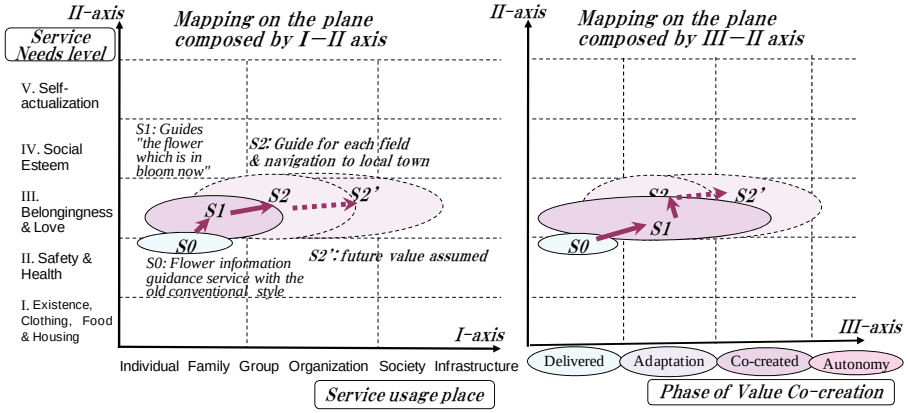

Fig.10 Service value transition of the flower tourism information service Hana-Navi mapped on the three-axis model

In Fig. 10, S0 indicates the service value of older conventional flower information guidance services. With the start of the Hana-Navi service, there was a shift to S1, as verified in the present study. S2 shows the shift to new service value expected as the Hana-Navi service develops and spreads from now on. Furthermore, we attempt to predict further service value that may be targeted in the future, as indicated by S2'. For example, at the present S1 stage the service is expected to provide guidance about "flowers in bloom now" without limitation to specific sightseeing spot or time. Such a service is valuable to a wide category of flower-loving visitors visiting Kyoto for recreation. A major feature of the service is that service value creation is driven and co-created by social participation, such as volunteering taxi drivers inputting the minimum necessary information of “flowers in bloom now”, as well as businesses, shopping streets and supportive customers participating in the pilot experimental tours.

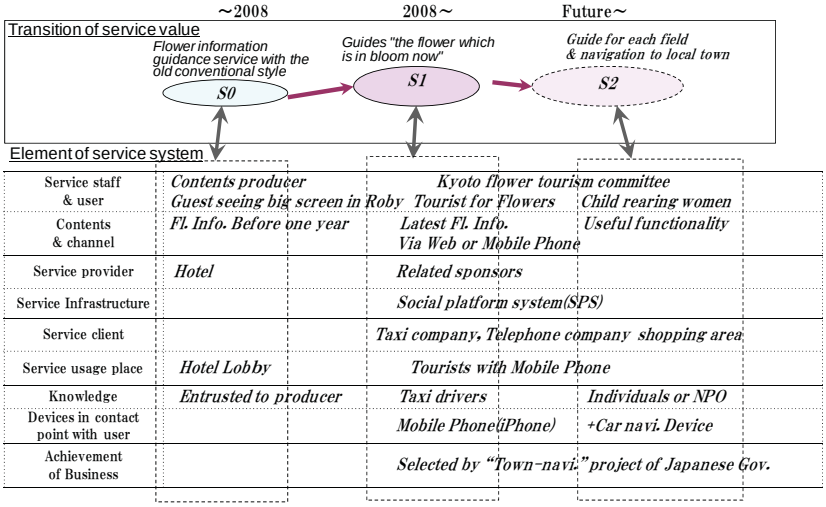

Fig.11 Service system transition in the flower tourism information service Hana-Navi

B. Service value transition in the robotized music entertainment service Miuro

In this subsection we analyze the robotized music entertainment service Miuro based on the interview data. Again the service value transition in the three-dimensional model space is presented in Fig. 2 by means of two two-axis projections. Here S0 indicates the iPod service, S1 corresponds to the start of the Miuro service, S21 is the upgraded service presently under trial, and S22 is a projection for the expected further progress of service value.

At stage S21 the place where the service is provided / used is not changed from S1: the target is individuals or families enjoying music at home. However new service value is provided and the comfort of users is enhanced by the implementation of Miuro's ability to discern situations.

This function opens the way to aiming for a new stage, and to increase autonomy by inviting emotional empathy to the robot Miuro. By doing this one can pursue meeting higher-level needs and cultivate a feeling of belongingness. At this stage Miuro stops being simply a music entertainment tool and rises to the stage of a pet robot with improved autonomy. This brings the service to the possibility for "autonomous" co-creation phase, where users flexibly enjoy music through Miuro.

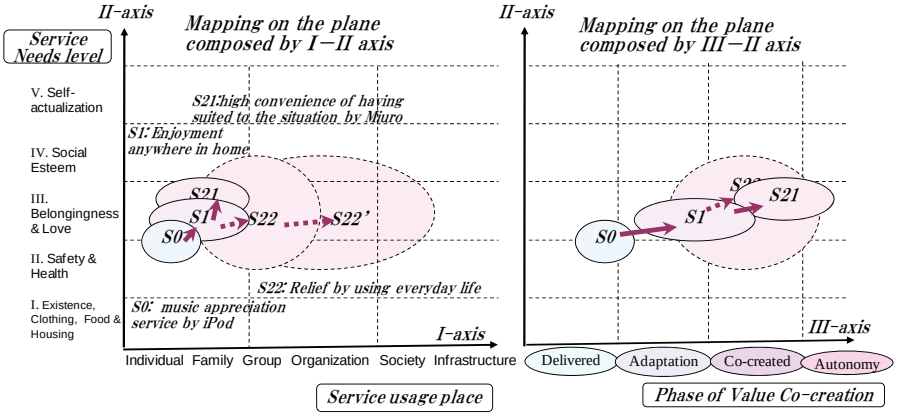

Fig. 12. Service value transition of the robotized music entertainment service Miuro mapped on the three-axis model

<u>*S21 value: <High convenience through situation recognition by Miuro> (Under trial)*</u>

"Even if one has a full iTunes library, choosing music requires significant effort. This matters very much. I decided to pursue a service choosing the music for the user. Users change music according to the situation: whether they work at a desk, sit in the living room, or work in the kitchen. Miuro grasps users tastes, and can discern situational information. The ultimate purpose of Miuro is improved convenience and convenience, by having the robot play the music reflecting the situation."

	Service Value:		
	Service usage place	***Service needs level***	***Service-co-creation phase***
S0	*individuals who want to enjoy music while moving*	*Relief & Comfort*	*Provided or Adaption level*
S1	*individuals & families who want to enjoy music at home*	*Relief - Comfort - Love*	*Adaption to the home life by Miuro - Co-creation level"*
S21		*Comfort - Belongingness - Love to family or Miuro*	*Co-creation - autonomy level by turning Miuro into a pet robot*
S22	*individuals & groups who want to enjoy music in everday life*	*Relaxation - Health - Growth*	*Co-creation – autonomy by "partner robotization"*

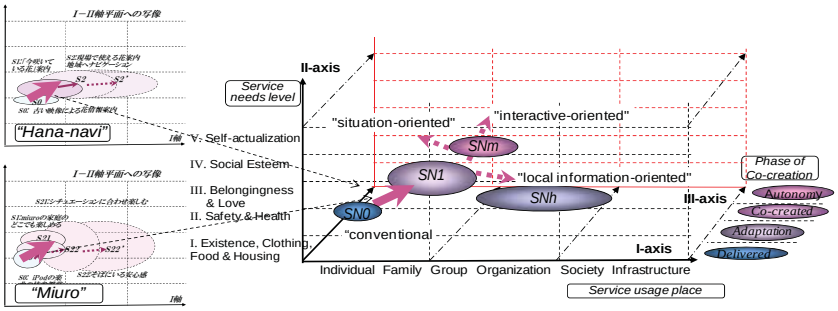

Fig.13 Example of service value transition in the Internet-based information service field

C. Service value transition in the Internet-based information service field and model verification

The successful application to both cases discussed above validates the three-axis model if neglecting a few rare cases where polysemy may allow multiple positioning choices. The results can be generalized to get a broader picture of the Internet-based information service filed, as shown in Fig. 13. The common track at the earlier stages is in agreement with the general tendency of such services. The differences at the more advanced stages reflect the specific positioning strategies of the individual services: transition from "interactive-oriented" to either "situation-oriented" or "local information-oriented". Providing such a synthetic overview demonstrates and validates the merits of the three-axis model.

V. CASE STUDIES OF SERVICE VALUE TRANSITION IN HIGH-LEVEL ACCOMMODATION SERVICE

Aiming at further synthetic verification of the three-axes model, the same modeling approach as the one used for the description of Internet-based information services was applied to two case studies of successful high-level accommodation services: the hotel service of "Ritz Carlton Osaka" [8][21] and the traditional Japanese inn service "Tawara-ya" [10].

This resulted in a deeper understanding of the trends and positioning for future service value transition in the high-level accommodation service. The applicability of the three-axis model was validated in a similar manner to that outlined in Section IV.

Here we omit the details and present only the general trend of value transition as shown in Fig. 14. The common track of both cases is in agreement with the general tendency of high-level accommodation service. Here, too, the difference reflects the original positioning strategy of each business towards either "social relationship oriented" or "individual purpose oriented", validating again the three-axes modeling approach as a promising service planning tool.

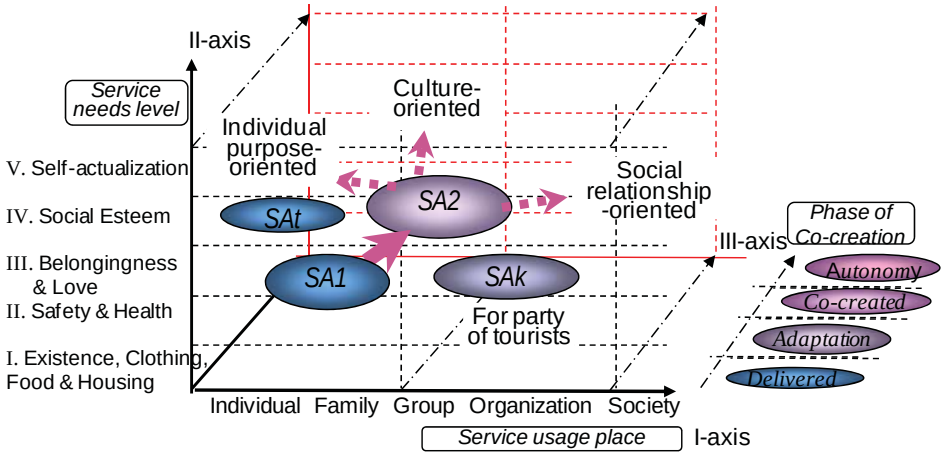

Fig.14 Example of service value transition in iigh-level accomodation service field

VI. DISCUSSION AND CONCLUSION

A. Comparison of the three-axis model with other service theories

Starting from the eight-element model of service marketing [5], we explored the relationship of the eight elements of this model to the three axes of the model adopted in the present study, using the data from the case studies presented above.

The results are shown in Table 1. We found a strong relationship between our first axis and Lovelock & Wirtz's second and fifth elements ("place and time", and "physical environment", respectively), our second axis mostly corresponds to their elements number one ("service product"), three ("price and cost"), four ("promotion and education"), and eight ("productivity and a quality of service") , and our third axis is similar to their sixth and seventh elements ("service process" and "people", respectively).

From this, taking into consideration the individual service values, the value transition observed in the various service case studies, and the distribution of the various service fields in the two models, we confirmed that our three axes are mostly independent and are not subordinated to each other.

Next, we compared our three-axis model to the axes of other similar service-positioning research. Our model was found to include the contents of all eight elements, but at a higher level of abstraction. This became clear also by comparison with Teboul's service intensity matrix [25]. The three-axis model goes one step further by including the aspect of co-creation.

TABLE.1 COMPARISON OF THE THREE-AXIS MODEL WITH OTHER SERVICE THEORIES

		Coverage of each axis in both model				
		Three-dimensional model			Intensity matrix	
8P elements of service	Items of each axis	Ⅰ. Place of service providing and using	Ⅱ. Service user's satisfactory level	Ⅲ. Degree of service co-creation	Product / Outcome	Intensity of interaction
4P of goods + 4P	Ordinal scale Main points	Individual-group-organization-society	Maslow's needs theory	Delivered – adaptation-co-creation-autonomy	Customization - Standardization	Low level - high level of interaction
1) Product elements	Combination of Tangible & intangible, core / additional		○		△	
2) Place & Time	Where, when, how (channel, means)	○	Dependent of 2) & 3) mix		△	
3) Price & other user outlays	Change for customer, place, time, demand		○		△	
4) Promotion & education	Customers' preference and understandings		○			
5) Physical environment	Service scapes for experience& satisfaction	○				
6) Process	Effective enhancement of customer values			○		○
7) People	Flexible interaction between employee & customer			○		○
8) Productivity & quality	Solution of trade-off		○			

B. Implications and limitations of the present research

The implications of the present research can be summarized as follows:

1) Service-value creation in service fields with interdisciplinary background occurs along the key axis of service value, established and offered to customers by new service business vision, and realized through the service system.
2) The transition of service value can be adequately described in terms of the three axes of service width, level, and originality.
3) A three-dimensional model with appropriate category sequences on the three axes is effective for visualizing of service value transition and trends.
4) The transition of service value is accompanied by changes in the elements of the service system, so that the visualization is enhanced by including links to the service realization.
5) The practical implication is that visualizing the service value in a three-axis space along with the system realization provides a methodology for common service concept and systematical approach to the conceiving of new services, helping to catalyze value creation inside and outside a service organization [3].

The limitations of the present research point to future research subjects:

(1) The three-axis model can be applied only to service transformations involving change along at least one of its three fundamental axes. Less fundamental transitions are not easily expressed.
(2) The description of service value contents is limited to elements that can be expressed in terms of the category sequences on the three ordinal axes. To avoid problems of polysemy one must use clear wording.

ACKNOWLEDGMENT

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