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INQUIRY INTO SERVICE PROCESSES FROM THE PERSPECTIVE OF 'STEPS'

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ABSTRACT
In this paper, our aim is to initiate research into service design by first understanding the current state of service processes. We study investigates and analyzes a wide range of service cases from the perspective of 'steps', without referring to such things as the properties or evaluations of the users. We then consider the utility of this perspective.
Here, 46 types of existing services are targeted and process steps are extracted according to, for example, changes in the medium by which the service is provided. Successive steps are evaluated according to 5 items and 16 categories for changes in medium, and cluster analysis is performed according to quantification theory type III to classify changes between steps. Relations between this analysis and existing notification methods are also examined.
Because we targeted a wide range of service cases and we were unable to touch upon such things as the properties and evaluations of users, we were only able to consider these issues in broad terms, but we believe that we have been able to hint at the importance of the perspective of 'steps' for future considerations of service processes.

Keywords: service design, experience design, product-service systems, service processes, steps

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1 INTRODUCTION

According to statistics (METI Research and Statistics Department, 2008) from the Ministry of Internal Affairs and Communications, service industries occupy a significant proportion of Japanese industry, with tertiary industries currently accounting for more than 70% of GDP in a breakdown of different industrial areas. Moreover, this trend is not limited to Japan, with tertiary industries also making up a large proportion of GDP in other developed nations such as the United States and United Kingdom, and moves to emphasize service industries in terms of policy are also evident in Asian nations such as China (METI Commerce and Information Policy Bureau, 2007). Thus services are becoming increasingly important globally. However, services differ from goods in that the evaluation of a service varies depending on the experience and expertise of the user, thus making it difficult to evaluate a service before it has been provided. It is also difficult to pattern or standardize services given that the people and circumstances involved with the provision of a service are different each time, even if the service itself remains the same. At present, attempts to increase the value of services mostly tend to rely on the experience and intuition of the service provider, so service improvements are not being conducted efficiently or adequately.

As a starting point for research on service processes, this study investigates and analyzes a wide range of service cases from the perspective of 'steps', a concept that is described in detail below, without referring to such things as the properties or evaluations of the users. We then consider the utility of this perspective.

2 POSITION OF THIS STUDY

Looking at previous research in relation to service processes, we found some studies such as (Lynn G. Shostack., 1984), (Mary Jo Bitner, Amy L. Ostrom and Felicia N. Morgan, 2007) and (Melissa Cliver, Jamin Hegeman, Kipum Lee, Leanne Libert and Kara Tennant, 2008) that related to blueprint and customer journey map. The former is an operational tool that describes the nature and the characteristics of the service interaction in enough detail to verify, implement and maintain it (DensityDesign Research Lab. and DARC, 2009a). The latter is an oriented graph that describes the journey of a user by representing the different touch points that characterize his interaction with the service (DensityDesign Research Lab. and DARC, 2009b). Although the focus of description is different each other, both of them try to grasp the overall service processes continuously and then discuss about them. And we found two studies such as (Kono, H. and Miyamoto, T., 2007) and (Nagashima, N., 2008) that divides service processes into several segments. However, they do not discuss how to segment service processes, or how to sequence segmented services.

In this study, we focus on the segments (hereinafter, 'steps') of service processes, as well as the manner of the changes (hereafter, 'inter-step changes') between a certain step and the following step (hereinafter, 'the prior step' and 'the subsequent step'), and then consider the consequences following from this approach.

3 STEPS IN SERVICE PROCESSES

3.1 How to capture service processes

First, we conducted a survey of previous researches such as (Shimomura, Y., Hara, T., Watanabe, K. and Sakao, T., 2005), (Kondo, A., 2006), (Suwa, Y., 2007), (Ueda, K., Asama, H. and Takenake, T., 2008), (Masuda, A., 2009), (Yokoyama, S., 2009), (Takahashi, A. and Matsumoto, K., 2009) and (Sumita, K., Sasajima, M., Kitamura, Y., Takafuji, J. and Mizoguchi, R., 2009) in addition to the mentioned studies in order to determine how service processes can be captured.

As a result, we were able to identify five of the main constituent elements of service processes, namely, (1) the service provider (hereinafter, 'the provider'), (2) the medium through which the service is provided ('the medium'), (3) the user of the service ('the user'), (4) the environment in which the service is provided ('the environment'), and (5)the exchanges between the medium through which the service is provided and the user of the service ('exchanges'). The relationships between these constituent elements can be expressed as shown in Figure 1.

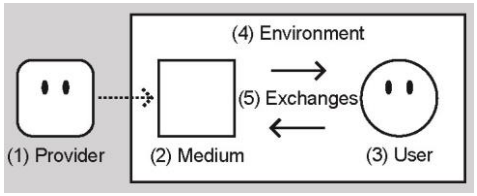

Figure 1. Relationships between main constituent elements of service processes

3.2 How to capture steps

We next considered how to capture steps, based on the constituent elements for capturing service processes that were identified in the previous section.

As a result, in this study we have decided to take a step to be "a state where there is no change in the three constituent elements of (2) 'medium', (4) 'environment' and (5) 'exchanges', excluding the other two constituent elements, namely, element (1) 'provider' (changes in which are not directly relevant to the user) and element (3) 'user' (which is not relevant when focusing on a particular user). In other words, we decided to view a service process as having progressed to the next step when any of the following took place: for element (2) 'medium', a change to the 'person or thing' providing the service; for element (4) 'environment', a change to the location where the service is provided; for element (5) 'exchanges', an interruption to a sequence of exchanges. (Figure 2)

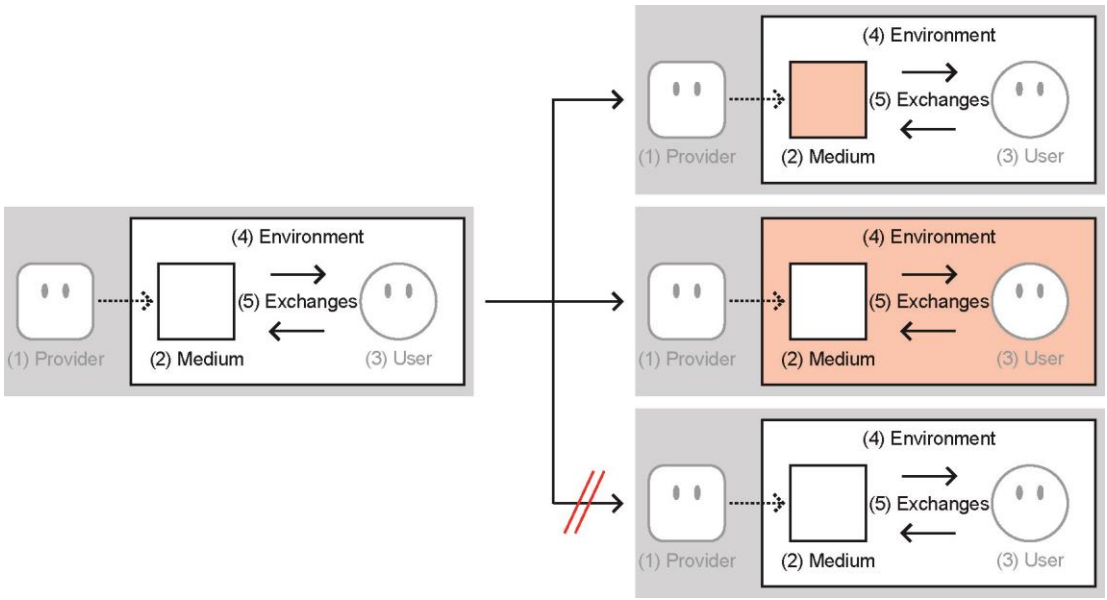

Figure 2. Three kinds of capturing steps

3.3 Capturing inter-step changes

Finally, we considered how to capture the manner of the changes between steps, based on the method for capturing steps that was identified in the previous section.

As a result, for element (2) 'medium', we came up with six types of inter-step changes, namely, from one person to another, from a person to a thing, from a thing to another thing, from a thing to a person, from a person to the same person, and from a thing to the same thing. For element (4) 'environment', we came up with two further perspectives on the manner of the changes, namely, a perspective relating to the distance from the prior step to the subsequent step (sub-element (4i) 'distance') and a perspective relating to the presence of other users when the transition to the subsequent step takes place (sub-element (4ii) 'other users'). For the former perspective, we came up with three types of inter-step changes: the case where the location of the subsequent step is visible from the prior step, the case where the location of the subsequent step is not visible from the prior step, and the case where the locations are the same. Similarly, for the latter perspective we also came up with three types of inter-step changes, namely, the case where there are a small number of other users, the case where there are a large number of other users, and the case where there are no other users. For element (5) 'exchanges', we came up with three types of inter-step changes: the case where the subsequent step takes place

within the same day, the case where the subsequent step takes place on the next day or a later date, and the case where the gap between steps is limited to the time required to transition to the subsequent step. In addition to the three constituent elements selected in the definition of 'step', we also decided to add a sixth element that makes the subsequent step itself subject to change, namely, element (6) 'the manner of selecting the subsequent step' (hereinafter, 'selection'). In terms of the manner of inter-step changes, we came up with three types of changes: the case where there are options but the subsequent step has been designated, the case where there are options and the subsequent step can be freely selected, and the case where there are no options. Table 1 summarizes these results.

Table 1. Elements and types for capturing inter-step changes

Element		Type		
(2) Medium		a person → another person	a person → a thing	a thing → another thing
		a thing → a person	a parson → the same parson	a thing → the same thing
(4) Environment	(4i) Distance	the location of the subsequent step is visible	the location of the subsequent step is not visible	the same
	(4ii) Other users	a small number of other users	a large number of other users	no other users
(5) Exchange		within the same day	next day or a later date	the time required to transition to subsequent step
(6) Selection		designated	freely selected	no options

4 CONSIDERING SERVICE CASES FROM THE PERSPECTIVE OF STEPS

4.1 Selecting service cases for investigation

In order to collect a wide range of service cases, five graduate students held a brainstorming session to identify service cases regarded as being likely to have multiple steps, referring to Lovelock's classic service categories (Christopher H. Lovelock, 1983).

As a result, we were able to identify a total of 46 service cases, including 24 cases corresponding to 'services directed at people's bodies' (such as 'airplane', 'hospital', and 'intercity bus'), 12 cases corresponding to 'services directed at goods and other physical possessions' (such as 'car park', 'dry cleaning', and 'rental car'), 8 cases corresponding to 'services directed at people's minds' (such as 'watching a baseball game', 'movie theater', and 'church'), as well as 2 cases of 'services directed at intangible assets' (such as 'municipal council'). Table 2 summarizes these results.

Table 2. 46 service cases

Service categories	Service cases		
Services directed at people's bodies	1 Airplane	2 Hospital	3 Intercity bus
	4 Hotel	5 Subway	6 Ferry
	7 Ropeway	8 Train	9 Restaurant
	10 Car dealer	11 Fast food	12 Bowling alley
	13 Tennis court	14 Hot spring	15 Beauty shop
	16 Driving range	17 Expressway	18 Pool
	19 Fitness club	20 Internet cafe	21 Buffet
	22 Strawberry hunting	23 Karaoke	24 Amusement park
Services directed at goods and other pysical possesions	1 Parking lot	2 Dry cleaning	3 Rental car
	4 Gas station	5 Self-service gas station	6 Mobile phone shop
	7 Motorcycle shop	8 Delivery to home of the pizza	9 Photo studio
	10 Car wash	11 Glasses store	12 Rental DVD shop
Services directed at people's minds	1 Watching a baseball game	2 Movie theater	3 Church
	4 Motorboat race	5 Pachinko	6 Lotto
	7 Wedding ceremony	8 Museum	
Services directed at intangible assets	1 Municipal council	2 Licensing center	

4.2 Considering service cases

4.2.1 Considering service cases in terms of the number of steps

For the 46 service cases that we collected, we identified the procedural actions that take place within each service case, based on the consensus of the five graduate students above. We then identified steps by re classifying these procedural actions based on the method for capturing steps defined in this study (Table3).

As a result, we were able to identify a total of 189 steps, with each service case having a minimum of 2 steps and a maximum of 8 steps. Looking at the number of service cases corresponding to each number of steps, we found that there were 5 cases with two steps, 13 cases with three steps, 14 cases with four steps, 6 cases with five steps, 5 cases with six steps, no cases with seven steps, and 3 cases with eight steps (Table4).

From the perspective of processes, services that simply have fewer steps can be described as more desirable for users. For service cases with relatively more steps, it is probably necessary to consider ways to reduce the number of steps.

Table 3. Identified steps of 46 service cases

Service cases	Step1	Step2	Step3	Step4	Step5	Step6	Step7	Step8
1 Airplanes	Reservation → Payment	Check-in	Baggage check-in	Security check	Board	Travel	Disembark	Baggage pickup
2 Hospitals	Hospital reception desk	Medical examination	Accounts	Drugstore reception desk	Medicine receipt → Accounts			
3 Intercity buses	Reservation → Payment	Reception desk → Embark	Travel	Disembark				

Table 4. Relationship between number of steps and service cases

Number of steps	Number of service cases
1	0
2	5
3	13
4	14
5	6
6	5
7	0
8	3
Total	46

4.2.2 Considering service processes in terms of inter-step changes

We identified the locations of the inter-step changes for the 189 steps that had been identified earlier. We then took these inter-step changes as a sample, and applied Hayashi's quantification theory type III and cluster analysis by creating data with evaluation items where the item-categories were the four constituent elements considered in the method for capturing inter-step changes and 18 types of manners of changes based on the consensus of the five graduate students above. Furthermore, we added symbols such as 'Airplane/1' to the sample to indicate the inter-step change between Step 1 and step 2 for the 'Airplane' service case, for example.

As a result, we were able to identify the locations for a total of 143 inter-step changes, with each case having a minimum of one location and a maximum of seven locations. Moreover, we were also able to classify inter-step changes into four groups: 29 inter-step changes were classified under Group A, including 'Licensing center/1', 'Ferry/2', and 'Movie theater/2'; 87 inter-step changes were classified under Group B, including 'Ropeway/2', 'Wedding ceremony/2', and 'Pool/3'; 10 inter-step changes were classified under Group C, including 'Intercity buses/1', 'Lotto/2', and 'Hotel/3'; and 17 inter-step changes were classified under Group D, including 'Beauty shop/7', 'Gas station/1', and 'Mobile phone

shop/1'. And we considered characteristics of each group based on a state of the dispersion of the items and categories. Group A: most of the subsequent steps are selected. Group B: user moves to the subsequent step to see the situation of the circumference. Group C: user judges it from oneself and move to the subsequent step. Group D: user moves to the subsequent step according to instructions. Figure 3 (left) shows the scatter diagram (I-II) for the sample, and Figure 3 (right) shows the scatter diagram (I-II) for the items and categories.

Looking at the groups of 'inter-step changes' included in the 41 service cases for which at least two inter-step changes were identified, as shown in Table 5, we found 17 cases with inter-step changes in one group, 19 cases with inter-step changes in two groups, 5 cases with inter-step changes in three groups, and no cases with inter-step changes in all four groups. Thus there are service cases that that include more than one manner of inter-step change, and we can see that users experience a range of manners of inter-step changes while they use services.

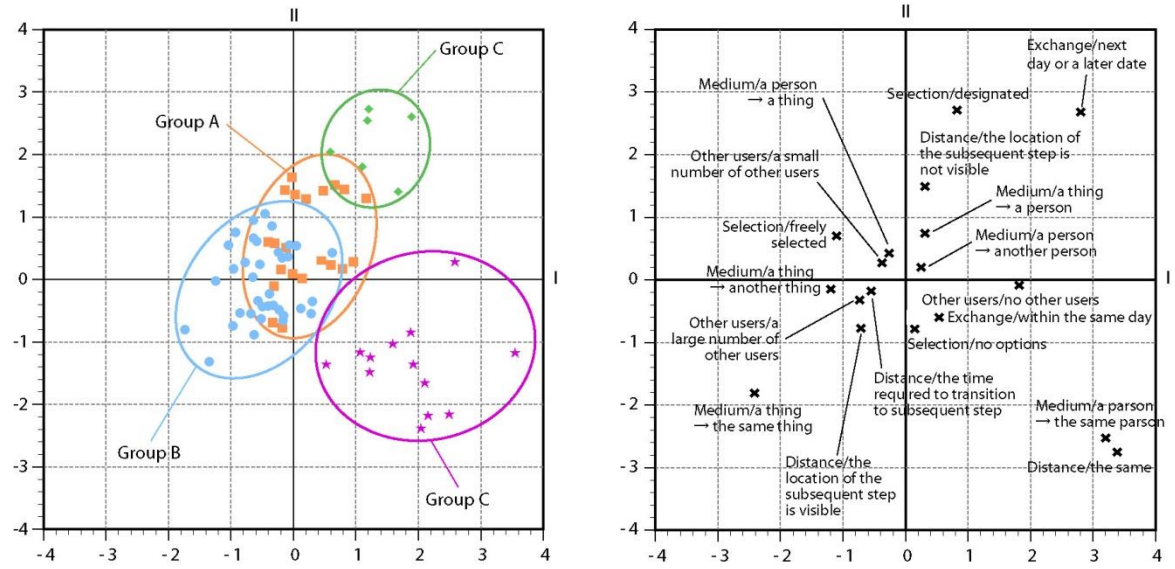

Figure 3. The scatter diagram (I-II) for 143 Inter-step changes (left), items and categories (right)

Table 5. Relationship between the groups of 'inter-step changes' and service cases

Number of the groups of inter-step changes	Number of service cases
1	17
2	19
3	5
4	0
Total	41

4.2.3 Considerations based on inter-step changes and notification methods

To focus on the manner of inter-step changes, we considered the relationship with methods for notifying users that the service has moved to the next step in the service process.

1. Notification methods

Five graduate students conducted a brainstorming session to consider the different types of "notification methods for subsequent steps observed in inter-step changes" for the 143 locations where inter-step changes were identified. The brainstorming session also identified each "notification method for inter-step changes". Note that because different notification methods are likely to be used depending on the (1) provider even for the same service, we decided to identify general notification methods based on the consensus of the five graduate students. Moreover, in cases where several types of notification method can be found in a single inter-step change we decided to list all of the notification methods found.

As a result, we were able to identify five types of notification method: "number", "flow line", "marker", "arrow", and "sound." (Table 6) Looking at the "notification method for subsequent steps observed in inter-step changes" for the 143 locations where inter-step changes were identified, we

found one location with no notification method, 75 locations with one type of notification method, 40 locations with two types of notification method, 23 locations with three types of notification method, 2 locations with four notification methods, and 2 locations with five notification methods. Looking at the number of each type of notification method, we found 22 locations with numbers, 7 locations with flow lines, 88 locations with markers, 42 locations with arrows and 83 locations with sounds.

Table 6. Five types of notification method

Number	Flow line	Marker	Arrow	Sound
				–

2. Inter-step changes and notification methods

Looking at the relationship between the categories for the four groups of inter-step changes and the types of notification methods, we found that the following results (Table 7). Group A included 13 number locations, 2 flow line locations, 21 marker locations, 12 arrow locations, and 23 sound locations. Group B included 9 number locations, 5 flow line locations, 55 marker locations, 27 arrow locations, and 39 sound locations. Group C included no number locations or flow line locations, 9 marker locations, 2 arrow locations, and 3 sound locations. Group D included no number locations, flow line locations, or arrow locations, 2 marker locations, and 17 sound locations.

Thus it appears there appears to be not so much association between the category of 'inter-step linkage' and the type of 'notification method'. This indicates that (3)'users', who use a range of services in their daily lives, may find different notification methods used even for 'inter-step changes' with the same properties, or conversely the same notification method may be used even for 'inter-step changes' with different properties. Thus it likely to be necessary to consider the method for notifying subsequent steps in conjunction with inter-step changes.

Table 7. Relationship between the categories for the four groups of inter-step changes and the types of notification methods

	Number	Flow line	Marker	Arrow	Sound
Group A	13 (44.8%)	2 (6.9%)	21 (72.4%)	12 (41.4%)	23 (79.3%)
Group B	9 (10.3%)	5 (5.7%)	55 (63.2%)	27 (31.0%)	39 (44.8%)
Group C	0 (0.0%)	0 (0.0%)	9 (90.0%)	2 (20.0%)	3 (30.0%)
Group D	0 (0.0%)	0 (0.0%)	2 (11.8%)	0 (0.0%)	17 (100.0%)

5 CONCLUSION

This study used three different perspectives to consider the processes that users experience when using a service: the number of steps, inter-step changes, and the notification methods for inter-step changes, looking at existing service cases. Because we targeted a wide range of service cases and we were unable to touch upon such things as the properties and evaluations of users, we were only able to consider these issues in broad terms, but we believe that we have been able to hint at the importance of the perspective of 'steps' for future considerations of service processes.

In the future, it will be necessary to consider these issues in a way that also incorporates the properties and evaluations of service users and providers, as well as refining the constituent elements for comprehending service processes.

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