

# A Design Process for a Customer Journey Map: A Case Study on Mobile Services

Heekyung Moon,<sup>1</sup> Sung H. Han,<sup>1</sup> Jaemin Chun,<sup>2</sup> and Sang W. Hong<sup>3</sup>

<sup>1</sup> Department of Industrial and Management Engineering, Pohang University of Science and Technology, Pohang, Republic of Korea

<sup>2</sup> School of Computer Science, Carnegie Mellon University, Pittsburgh, Pennsylvania, USA

<sup>3</sup> SK Planet, Gyeonggi, Republic of Korea

## Abstract

A customer journey map (CJM) is a widely used tool to represent user experience with a service. Although numerous companies have used this tool to improve existing services or to develop new services, the maps are neither consistent nor mutually compatible because no clear design process for a CJM has been presented. This study aimed to develop a design process and rule sets for a CJM based on a human factors approach. The 10-step process and the rule sets were built on case studies of 25 categories of mobile services. Large-scale case studies were conducted with mobile service providers and combined with the result of a user diary method that collected users' daily activities and the difficulties that the user perceived when performing a task. We suggested various methods for using the CJM to generate new service opportunities. The proposed design process and the way for opportunity discovery can help service designers to develop unified CJMs and to identify innovative service ideas. © 2016 Wiley Periodicals, Inc.

**Keywords:** Service design; Customer experience; User experience; Business opportunity; User centered

## 1. INTRODUCTION

Customer experience is the customer's subjective interpretation about any direct or indirect contact with a company's products, services, and every aspect of a company's offering, such as advertising, packaging, and customer care (Meyer & Schwager, 2007). Many researchers have been using service design tools (e.g., service blueprints, personas, use cases, storyboards, service transaction analyses, and walk-through audits) to represent and evaluate customer experience (Johnston, 1999; Samsel, 2013; Vertelney & Curtis, 1990). These

tools focus on analyzing separate aspects of services such as representative users or a service delivery process rather than on addressing holistic customer experience.

Existing tools to design customer experience such as customer experience modeling and customer job mapping are aimed to evaluate and improve current experiences with existing products or services. For example, customer experience modeling represents soft goals for each customer activity (Teixeira, Patrício, Nunes, & Nóbrega, 2011). A soft goal is the condition that the service provider would like to achieve, such as price, reliability, convenience, and speed. When using soft goals, finding new service opportunities are prone to make merely conventional remarks rather than to make creative and innovative ideas.

A similar toolkit developed in the business field is the customer job mapping, also called the customer-centered innovation map (Bettencourt & Ulwick,

---

Correspondence to: Sung H. Han

Received: 25 December 2014; revised 20 December 2015; accepted 8 April 2016

View this article online at [wileyonlinelibrary.com/journal/hfm](http://wileyonlinelibrary.com/journal/hfm)

DOI: 10.1002/hfm.20673

2008). It breaks down the job the customer wants done into a series of discrete process steps. All jobs have the same eight steps: 1) Define, 2) Locate, 3) Prepare, 4) Confirm, 5) Execute, 6) Monitor, 7) Modify, and 8) Conclude. The jobs range from simple ones, that is, reading a book, to complex ones, that is, performing an operation. After developing the complete customer job map, an ancillary step called troubleshooting is conducted to solve existing problems. This map is the best tool when analyzing one job individually, but it cannot illustrate complex relationships among various jobs. Although the conclusion of one job can trigger the start of another job cycle, the map lacks ways to link several jobs that are related closely and does not consider that one job might include other jobs, that is, that one step can be further decomposed into eight steps. Thus, this method cannot easily express a person's typical need to perform a variety of daily activities in an integrated way.

A customer journey map (CJM) is a recently emerged method for designing and assessing customer experience in the service design field (Bucolo & Matthews, 2011; Johnston & Kong, 2011). Many companies have been using this method to discover problems in existing services or to find opportunities for improvement (Holmlid & Evenson, 2008). Contrary to existing methods, a CJM addresses all aspects of customer experience. The CJM visualizes all possible points of contact (touch points) between a customer and any combination of products and services (Alves et al., 2012). The attitude and feelings of the customer are also illustrated at each touch point and both physical and emotional journey aspects are considered (Samsel, 2013; Zomerdijs & Voss, 2011). It is also used in the field of user experience design to analyze and understand a user experience from a user point of view (Mangiaracina, Brugnoli, & Perego, 2009). A CJM helps to codify current experience and to design a new customer experience to establish development priorities (Customer Champions Ltd., 2014).

The structures of CJMs are quite different depending on the designers, because the process of designing them has not been clearly defined (Richardson, 2010; Samsel, 2013). CJMs can be designed in various ways that depend on a project's aim and scope. The difficulties in creating coherent CJMs arise from its nonlinearity (Richardson, 2010); that is, it can consist of several paths that entail different activities because people have different ways of achieving goals, so the diverse use

intentions and paths of activities of various user groups must be considered.

Methods to use the CJM to identify potential business opportunities are difficult to find. Many companies have investigated no more than the customer satisfaction level (i.e., emotional aspects) at each touch point. Ross (2009) compared the companies with new product success rates in the top 25% (the Best) and all the other companies (the Rest) based on the Product Development and Management Association's survey of more than 400 firms across industries. The Best took a customer-centered approach to understand latent customer needs that are difficult to uncover; that is, these companies realized that to identify an innovative and successful business opportunity, the unconscious or latent needs of customers must be understood. The present study took particular efforts to develop diverse ways to use a CJM to discover potential opportunities based on latent customer needs.

A CJM is based solely on customer experiences (Tax, McCutcheon, & Wilkinson, 2013), so they must be collected accurately. Richardson (2010) suggested that the CJM should consist of four components: 1) actions, 2) motivations, 3) questions, and 4) barriers, and that these components should be collected by customer research, including in-depth ethnographic-style interviews and in-context observations. The CJM developed in this study is grounded in ethnographic research and task taxonomies in the field of human factors.

This study suggests a systematic design process for a CJM that is optimized for the service design. We defined 10 rules such as prerequisites and assumptions on which a design process for a CJM is valid. Furthermore, we introduce various creative methods for using a CJM to identify business opportunities. Large-scale case studies on mobile services are presented in the last part of this paper.

## 2. METHODS

The goal of this research was to develop a CJM from a human factors point of view. The process consisted of three phases. (1) A user diary method was used to collect user activities and the difficulties that the users perceived ("pain points") when doing a task. (2) A survey and expert opinion were used to collect verbs that correspond to the user actions. (3) A design workshop was conducted to develop a design process for a CJM.

## 2.1. User Diary Method

Ethnography analyzes human activities in a particular context in the form of verbal descriptions (Hall, 2008). It has tools such as observational field studies, contextual interviews, diary studies, and the collation of background information and documentation (Hall, 2008; Kjeldskov & Stage, 2012). This study used the user diary method to collect users' daily activities and their pain points.

One thousand and sixteen mobile device users were consulted; they consisted of four user groups: 1) high school students (aged 16 to 18 years), 2) university and graduate students (aged 19 to 29 years), 3) housewives (aged 30 to 49 years), and 4) office workers (aged 30 to 49 years). The first three groups were given seven time intervals: waking hours between 6:00 a.m. and 12:00 p.m. divided into 3-hr sections and sleeping hours between 12:00 p.m. and 6:00 a.m. Office workers were assigned eight time intervals: before heading to work, on the way to work, working in the morning, lunchtime, working in the afternoon, on the way home from work, evening, and the hours before sleeping. All participants (100 high school students, 290 university and graduate students, 126 housewives, and 494 office workers) were instructed to write their daily activities, tools, and pain points for each time interval on weekdays and weekends. Twenty-one participants (1 high school students, 4 university and graduate students, and 16 office workers), who left most of the answer sheets blank or wrote incomprehensible words were screened out.

## 2.2. Survey on Verbs

To complement routine activities obtained by the user diary method, we collected verbs that explain the physical and cognitive behaviors in daily lives. We reviewed the literature about human behavior taxonomy, including books, journals, proceedings, magazines, and Korean (over 100,000 words) and English (over 20,000 words) dictionaries. As a result, we collected 801 verbs: 192 from the literature and 609 from Korean and English dictionaries. We combined similar verbs and eliminated verbs that explain emotional states such as *cry* and *smile* and physical states such as *sleep* and *eat*, resulting in 339 final verbs.

Then three UX designers who are doctoral students used a 5-point Likert scale to score the 339 verbs according to the applicability to products and services and frequency of use in daily life. Applicability of a

verb was assessed based on whether its association with an object is restricted. A verb that could be applied to any kind of product and service is unrestricted and is worth 5 points; examples include *use*, *record*, and *write*. If a verb can only be used in a specific situation it is worth one point; examples include *drive* and *translate*. Frequency of use in daily life represents whether a verb depicts ordinary human behaviors. For example, *respond* is worth 5 points, whereas *sue* is worth 1 point. For each verb, we calculated a weighted sum of the Likert score, where applicability and frequency were weighted as 2 and 1, respectively, and then finally selected 193 verbs (see appendix) for which the weighted sum was more than 10.

## 2.3. A Design Workshop

Large-scale case studies were conducted with one of the biggest mobile service providers in Korea. The ultimate objective of the case studies was to discover potential business opportunities for mobile services in the saturated application market. Four human factors experts and two professional UX designers participated in several design workshops for the period of 4 months. On the first day, we shared knowledge about the CJM and then constructed a CJM about Travel experience. Different colored sticky notes were used to represent each component of the CJM (Figure 1). They were attached to a large sheet of white paper and connected by arrows drawn using pencils. This paper-based CJM was digitized by visual designers. After completion of the CJM, the participants discussed the design process and rule sets.

In the design workshop, we developed 25 categories of CJMs that were defined based on the classifications used in Google Play (Android), App Store (Apple), and T-store (SK Planet). They are Travel, Photo, Magazine, Communication, Video, Media, Coupon, Shopping, Finance, SNS, Schedule/Memo, Music, Education, Diary/Housekeeping Book, Transportation, Game, Medicine, Book, News, Comics, Health, Weather, Radio, Sports, and Cultural Life.

## 3. STRUCTURE OF A CUSTOMER JOURNEY MAP

A CJM has four basic components: 1) phases, 2) goals, 3) tasks, and 4) routines (Figure 2). The CJM is divided into three or more phases that explain the user experience before and after using a service. Each phase



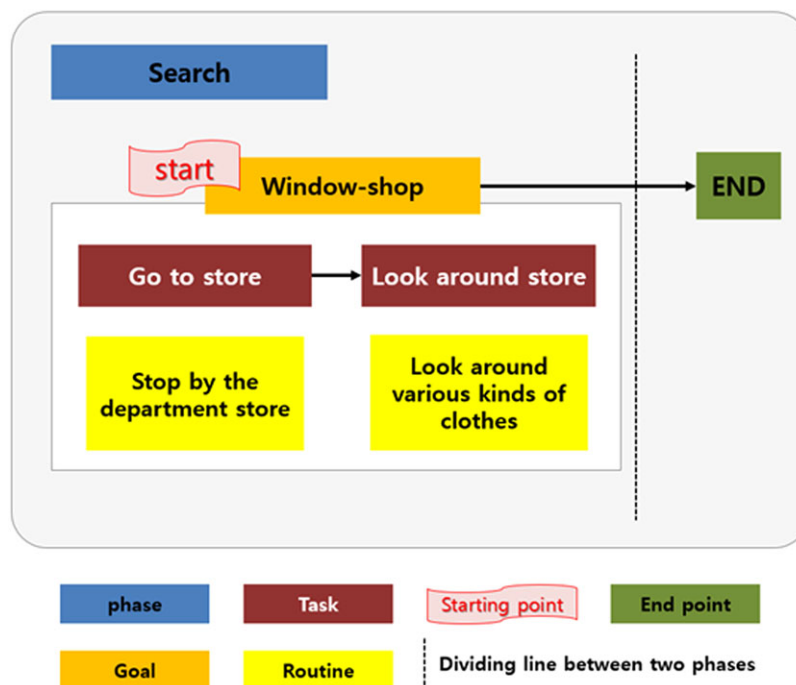
**Figure 1** White whole paper and sticky notes used in the design workshop.

is composed of a series of goals that have at least one task but can entail a series of tasks. Likewise, a task is explained by at least one routine, and it can have several routines. A routine, the smallest component of a CJM, describes the users' physical and mental activities. Two components, such as tasks and goals, are connected by an arrow separately to describe relationships between them.

## 4. DESIGN PROCESS AND RULE SETS FOR A CJM

### 4.1. A Design Process for a CJM

A 10-step process for designing a CJM is a combination of top-down and bottom-up approaches (Table 1). Forward execution of the *component development* stage (from Step 3 to Step 6) is a top-down approach, because this phase begins at a predefined concept (i.e., intention) and works down to the more detailed components, such as goals and tasks. Backward execution of the component development stage (from Step 6 to Step 3) is a bottom-up approach, in that the components are defined based on predetermined subcomponents. Usually, a top-down approach is followed by a bottom-up approach. A design process and rule sets were improved during repetitive design workshops (Figure 3).



**Figure 2** Structure of a customer journey map.

**TABLE 1.** 10 Steps of the Design Process for CJM

Stages	Steps	Description
Preparation	1. Make the routine list 2. Define intentions and select the main intention	This preliminary works should be carefully conducted to draw the big picture and determine the direction of development of a CJM.
Component development	3. Define the phase 4. Define the goal (set of tasks) 5. Define the tasks (set of routines) 6. Create new routines by brainstorming	This stage is a combined approach (Top-down: Step 3 → 4 → 5 → 6; Bottom-up: Step 6 → 5 → 4 → 3) Every step in this stage is repeated for each intention in the order of the importance of the intention.
Relation definition	7. Define the relationships among the goals/tasks 8. Mark the starting and ending point of each intention 9. Draw the dividing line between the phases	This stage results in journey streams for various use intentions.
Opportunity discovery	10. Assign pain points to each goal	Pain points are used to create opportunities by finding solutions to them.

#### 4.1.1. Step 1. Make the Routine List

A routine is a complete and concise sentence that explains the user's daily activities. A combinatory activity should be divided into several routines. For example, *send a picture by e-mail* was divided into *send an e-mail* and *attach a picture*. If a routine consists of several user activities, the task and the goal in which the routine is included cannot be clearly defined.

In this study, users' daily activities were collected from the user diary study and classified into 25 categories of mobile services with standards of classification. For example, Transportation includes activities relevant to walking, driving, use of public transport, designated driving, carpooling, refueling, washing the car, and maintaining the car. Many activities did not belong to any categories because the user diary method asked participants to write every activity of the day. We excluded basic activities of daily living, such as bathing, dressing, eating, personal hygiene, grooming, and housekeeping (e.g., cooking, cleaning, doing laundry; Lin et al., 2014).

#### 4.1.2. Step 2. Define Intentions and Select the Main Intention

A CJM should represent several paths of customer's activities for various use intentions. For example, users cannot only watch a ready-made video but can also create a video clip. The main intention should be to

identify why most people use services and should cover a large proportion of a CJM.

After completion of the *preparation* stage, designers should decide which approach is conducted first. In general, a top-down approach is conducted at first on the assumption that the designers fully understand customer experience. If knowledge about customer experience is limited, then a CJM cannot easily be created by a top-down approach, so a bottom-up approach can be conducted at first. The component development stage should be conducted bidirectionally by combining the top-down and bottom-up approaches. The component development stage (Steps 3, 4, 5, and 6) is executed first for the main intention that covers much of a CJM. Then, every step in this stage is repeated for other intentions before proceeding to *relation definition* stage.

#### 4.1.3. Step 3. Divide the Phase

In a top-down approach, three or more phases are defined to divide customer experience before, during, and after a service engagement (Chung, Yoon, & Lee, 2010). In a top-down approach, several phases are defined for each intention and then combined into generalized phases on the basis of the main intention. For each phase, corresponding routines are assigned. In a bottom-up approach where Step 3 is conducted after Steps 4 and 5, phases are defined based on the goals and tasks instead of use intentions.



**Figure 3** A part of the design workshop using a top-down approach (Steps 3 to 8).

#### 4.1.4. Step 4. Define the Goal (Set of Tasks)

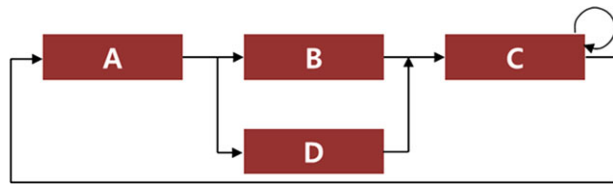
A top-down approach is used to define a series of goal statements to achieve each intention and to assign corresponding routines to each goal. Goals can be redundantly defined for more than one intention. When defining goals as well as tasks, links between the front and rear goals or tasks should be considered. In the design workshop, we considered the eight steps of job mapping to reflect a series of user activities to accomplish the job (Bettencourt & Ulwick, 2008).

A bottom-up approach is used to define goal statements by grouping sets of tasks that have already been defined. Each goal should include at least one task because the goal is achieved by conducting one or more

tasks. For example, to achieve a goal of buying a newspaper, a customer should conduct a series of tasks such as *Search information/Get recommendations/Ask colleagues or friends, Compare newspapers, Decide which newspaper to buy, Buy a newspaper*. If a goal has only one task, the task of defining goals should consider the possibility of integrating that goal with surrounding goals.

#### 4.1.5. Step 5. Define the Task (Set of Routines)

A top-down approach is used to define a series of tasks that should be conducted to achieve a goal. When



**Figure 4** Three types of relationships among the goals and tasks (Sequential:  $A \rightarrow B \rightarrow C$  and  $A \rightarrow D \rightarrow C$ ; Parallel: B and D; Circular: C and  $C \rightarrow A$ ).

routines from Step 1 can be assigned to multiple tasks, routines should be separated into multiple routines with different meanings.

On the contrary, a bottom-up approach is used to define tasks by grouping similar routines that were defined before.

#### 4.1.6. Step 6. Create the New Routines through Brainstorming

A top-down approach might generate tasks that have no routines; new routines are defined to explain those tasks. In addition, we can create new routines that do not belong to any of the tasks that have been defined. In the design workshop, 193 verbs were used for efficient brainstorming. This process helped designers to imagine new routines by looking back and forth between verbs and CJMs. For example, verbs could be used to connect the subject and object of existing goals or tasks. After creating the new routines, a bottom-up approach can be started by conducting Step 5 instead of proceeding to Step 7. Newly defined routines can trigger the creation of new tasks and goals.

#### 4.1.7. Step 7. Define the Relationships among the Goals/Tasks

After all components (phases, goals, tasks, and routines) are defined, arrows are drawn to represent sequential, parallel, and circular relationships among the goals or tasks (Figure 4). If one goal or task can be repeated, then a circular arrow was drawn in its upper-right side. If a series of goals or tasks can be repeated, an arrow that connects starting and ending goals or tasks is drawn. At the same time, these goals or tasks should be defined as mandatory or optional. Mandatory goals or tasks are connected by main arrows in a line; optional goals or tasks are indicated below the main arrows (Figure 5). Optional goals or tasks can



**Figure 5** Two types of goals and tasks (Mandatory: A, B, and C; Optional: D).

also have optional goals or tasks; that is, goals and tasks have many-to-many relationships.

#### 4.1.8. Step 8. Mark the Starting and End Point of Each Intention

For the main intention, the starting point is marked on the mandatory goal in the first phase of a CJM. For other intentions, the starting point could be marked on the optional goals in any phase of a CJM. To specify different end points of intentions, an END mark is placed at the end of a CJM. The ending goal of each intention is connected to the END mark by arrows.

A path along the arrows from the starting point to the END mark must not be broken. We can obtain the journey stream that represents complete use scenarios for each intention. The journey stream for a main intention is called a main journey stream.

#### 4.1.9. Step 9. Draw Dividing Lines between the Phases

Dividing lines between the phases are drawn to clarify the phases to which the goals, tasks, and routines belong. Phases should be divided by the goal, which means that the dividing line should not cross the middle of a goal.

#### 4.1.10. Step 10. Assign Pain Points to Each Goal

The pain points are assigned to relevant goals because the pain points collected from the user diary method are related to each task and to the process of completing several tasks. Designers can create opportunities by finding solutions to those pain points.

### 4.2. Rule Sets of Designing a CJM

A design process for a CJM is valid on several prerequisites and assumptions. The process entails 10 rules: five

**TABLE 2.** 10 Rules for Designing a CJM

Categories		Rules
Component rules	1	One routine should not be a combination of several user activities.
	2	A task should include at least one routine.
	3	A goal should include at least one task.
	4	A phase should include at least one goal.
	5	A phase should be composed of the complete goal(s), which is the smallest unit of a CJM.
Journey stream rules	6	The starting point for main intention should be placed on the mandatory goal in the first phase.
	7	One complete journey stream should be defined in an unbroken line by following the arrows from the starting point to the end mark.
	8	Every goal or task should be connected with at least one other goal or task.
Execution rules	9	If designers lack knowledge about customer experience, the bottom-up approach (Step 6 → 5 → 4 → 3) can precede the top-down approach (Step 3 → 4 → 5 → 6).
	10	The top-down approach and the bottom-up approach of the component development stage should each be conducted at least once.

for components and their relations, three for a journey stream, and two for execution of a design process (Table 2). *Component* rules refer to the relationships among components (Rules 1, 2, 3, and 4) and define the smallest unit of a CJM (Rule 5). *Journey stream* rules define prerequisites for starting point, EDN mark, and arrows between them (Rules 6 and 7) as well as connections between components (Rule 8). *Execution* rules suggest recommendations about execution of the top-down and bottom-up approach (Rules 9 and 10).

## 5. CASE DESCRIPTION: MEDIA

In the design workshop, we developed 25 categories of CJMs and, at the same time, verified the design process. The CJM that visualizes customer experience with the media service consists of three phases: 1) preparation, 2) watching, and 3) utilization. Three major intentions were defined: 1) watching specific content such as drama, music video, and movie; 2) watching a TV program; and 3) watching real-time media in spare time (Figure 6, circles with a dashed line). Three different journey streams were created by connecting goals along the arrows from the starting point to the end mark. The list of pain points was noted in speech balloons next to the goals. The main arrows between mandatory goals (Figure 6, dark gray lines) was distinguished from the arrows between optional goals (Figure 6, light gray lines).

A first part of a journey stream for the intention of *watching specific contents such as drama, music video,*

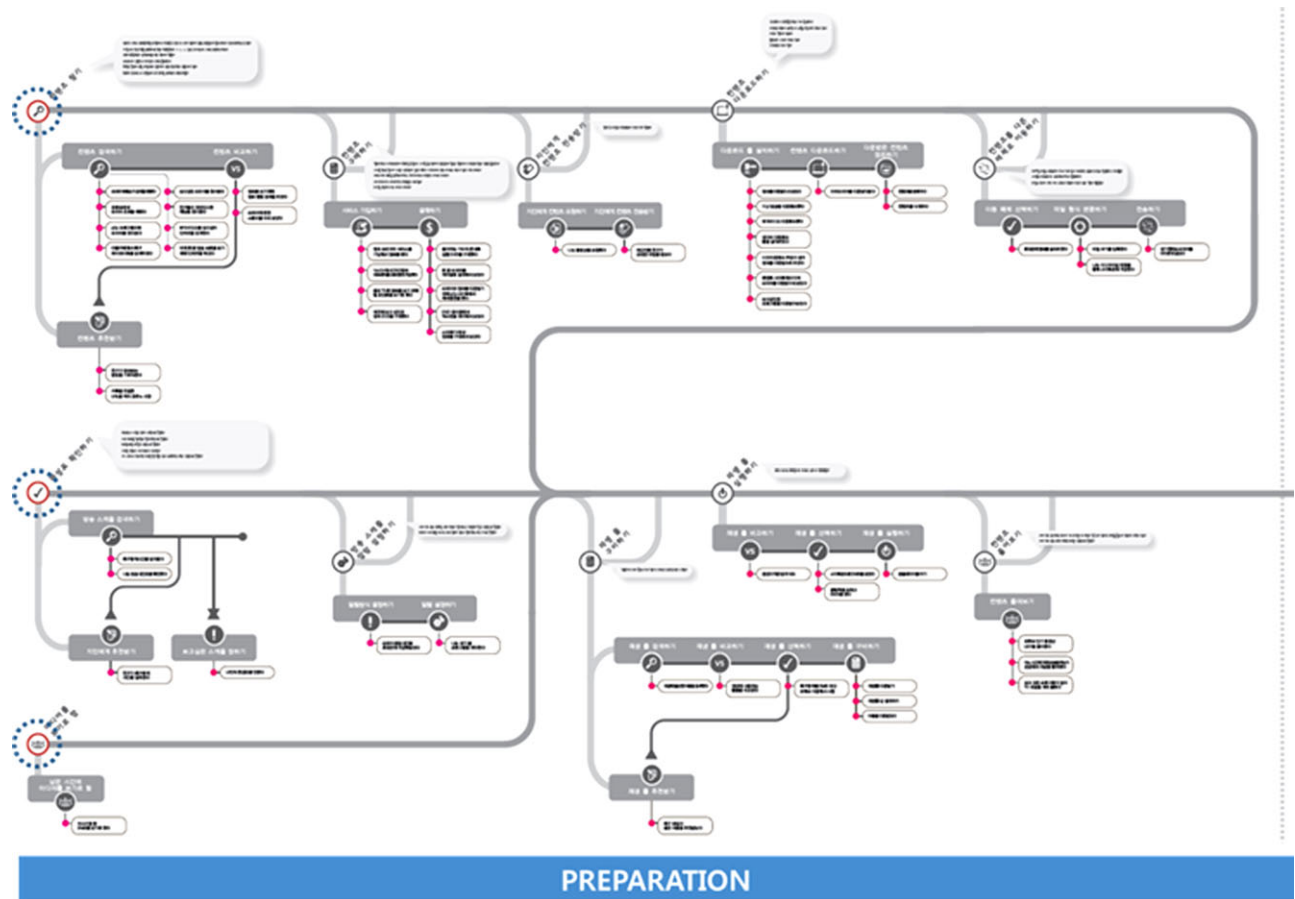
*and movie* is illustrated in Figure 7. The goal of *Find contents* includes three tasks, such as *Search contents*, *Compare contents*, and *Get recommendations*. Those tasks have several routines, for example, *Get recommendations* has two routines, such as *Get information about free contents* and *Get a URL for a variety show*.

## 6. DISCUSSION

### 6.1. Features of a Design Process for a Customer Journey Map

The design process developed in this study has several distinctive features. First, it is a customer-driven design process because the important sources of routines and pain points are the results of the ethnographic research. Besides the user diary method used in this study, various user research methods in user-centered design, such as focus group interview, observation, and shadowing, can be integrated into the process to investigate what users do (Daae & Boks, 2014). The framework of a CJM is built on what the customer actually does because a large number of routines are defined based on users' daily activities. Pain points are directly related to the explicit needs, of which the customer is aware. Although the customers are not involved in a design process, designers can consider what the customers actually want.

Second, the process is a hybrid approach that combines top-down and bottom-up strategies for designing a CJM. The strategic or ultimate goal of the



**Figure 6** First phase, *preparation*, of the customer journey map about *Media*.

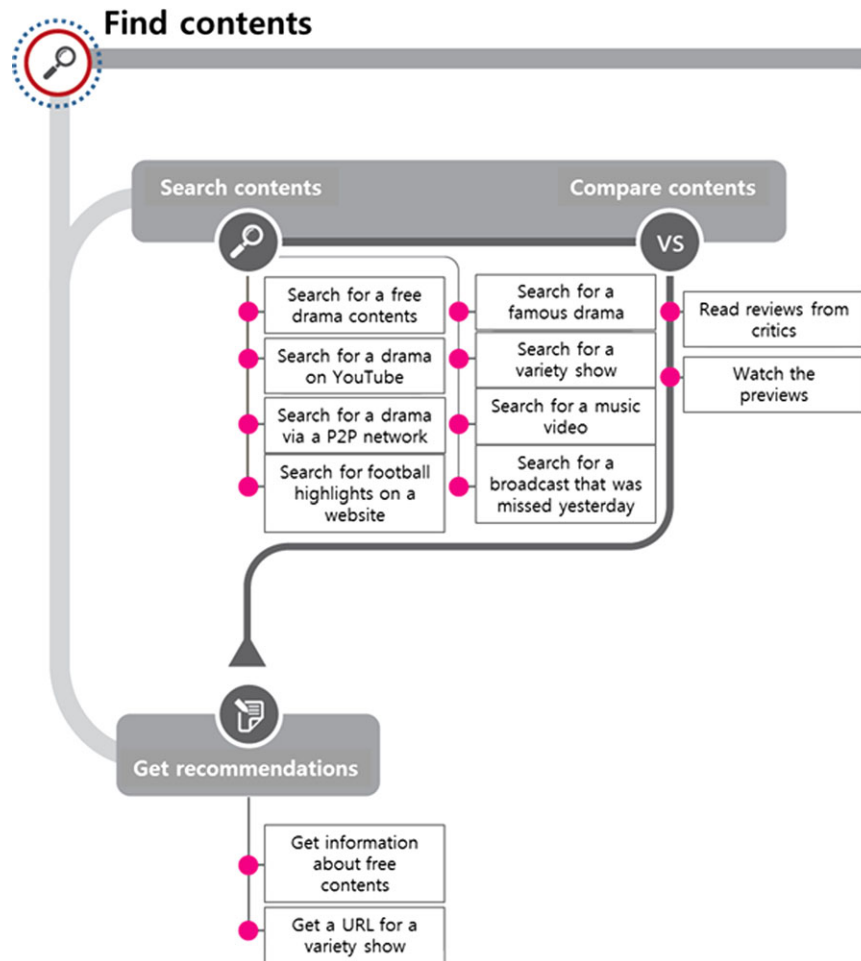
companies can be pursued by a top-down approach while encouraging the participation and motivation in a design workshop by a bottom-up approach. The top-down approach leads designers to develop CJMs systematically and consistently; concurrently, the bottom-up approach allows designers to think creatively. In Step 6, “Create the New Routines through Brainstorming” (Section 4.1.6), to resolve the dependency on designers’ knowledge and experience, which is a major weak point of a bottom-up approach, we used verbs defined based on a human behavior taxonomy.

The last feature is generality, which means that the process and the rule sets developed in this study were successfully applied to a wide range of products, services, and product service systems. Although the 25 categories defined in a case study originated from the application market, we included online and offline activities related to the category by considering that business opportunities could arise from offline tasks. For example, when developing the CJM about *Book*, the routines were defined with regard to both paper

books and e-books. To avoid overspecialization on a particular product or service, the processes and rule sets were revised while developing the 25 categories of CJMs; some categories are related to the interaction with a specific product, such as *Book*, *Comics*, and *Magazine*, whereas most categories do not involve specific products, such as *Weather*, *Sports*, and *Finance*. This general nature implies that a CJM can be an efficient tool for manufacturing companies that find opportunities of the servitization, that is, the movement from selling product toward integrated offerings of products and services (Saccani, Visintin, & Rapaccini, 2014).

## 6.2. Insights from the Design Workshop

As the design workshop proceeded, some patterns of components (i.e., tasks and goals) were found. For example, to make a decision to do something, people gather information in advance in three ways: 1) search information (e.g., Internet or books), 2) get recommendations, and 3) ask for information. Then



**Figure 7** A first part of journey stream for the use intention of *watching specific contents such as drama, music video, and movie*.

people compare several alternatives and decide what they are going to do. Finally, they put their decision into action. A series of successive tasks are the general pattern that is applicable to any situations in which decision making is needed, such as buying a product or a service, going to a hospital, and signing up for a course. Another pattern found in CJMs was that the goal of *using a product or a service* proceeded to the goal of *sharing the user experience* and *keeping or discarding it*. By regularizing such repetitive patterns, the efficiency of the design workshop could be improved.

CJMs that address experience with mobile services are intricately connected with one another. One goal or task can be related to the similar goal or task in another category of CJM. For example, while traveling, people engage in many types of activities, such as taking photographs and calling their families. The routine, *Take a picture* in the CJM of *Travel* category can be

connected to any goals in the CJM of *Picture* category. If a traveler does not have a camera, the experience related to taking a picture would start from the goal *Obtain a camera* in the CJM of *Picture* category. If a traveler has a camera and knows how to use it, the experience would start from the goal, *Take a picture*, which is in the middle of the CJM of the *Picture* category. The development process of a CJM would become much easier by referring to relevant CJMs that were designed in advance.

### 6.3. Discovery of New Business Opportunities

The most important work for service design begins after the creation of the CJM; this work is to identify business opportunities to improve the customer experience. Previous studies have focused on

identifying problems in existing services by surveying the level of customer satisfaction and by collecting pain points (Samsel, 2013; Tassi, 2009). This is effective in improving existing services but is less useful in creating innovative services. Thus, we suggest various methods of using a CJM to find opportunities. Those methods are classified into two approaches: passive and active. The passive approach is to find existing problems or customer needs based on a developed CJM; the active approach is to find new and novel service ideas by altering a CJM.

The most basic method in a passive approach is to find solutions for goals that have a serious pain point or many pain points. Service opportunities can be created to assist or replace a series of tasks in those goals. Another simple and easy method is to make offline tasks available online. All kinds of online and offline activities are depicted in a CJM, so tasks that are not supported by online or mobile services can be identified easily. The last method is to suggest new opportunities that take care of entangled tasks all at once. In some cases, a user must conduct a series of cumbersome tasks unnecessarily to achieve the goal. The user would willingly use a service that processes these tasks all at once.

Taking an active approach requires a designer's creative thinking skills. The first method is to develop integrated services that connect distant or disconnected tasks by drawing new arrows. This process requires finding associated tasks on the CJM even though they are distant or disconnected. Furthermore, services can be developed to support associated tasks that exist in CJMs of different service categories. For example, similarities among different CJMs can be analyzed by mathematical techniques such as multidimensional scaling (MDS; Section 6.4). Another method is to apply creative thinking tools such as synectics or forced associations to altering a CJM. Those techniques were invented to link unrelated elements or concepts in unique combinations (Bonk & Smith, 1998). This process can lead to new and novel ideas by encouraging designers to produce analogies and metaphors between disparate concepts. A brand-new service idea can be created by linking unrelated goals or tasks at random from the CJM.

#### 6.4. Multidimensional Scaling Analysis

To analyze CJMs from a macroscopic viewpoint, MDS was conducted to explain proximity (e.g., similarities

or dissimilarities) among CJMs (Kruskal, 1964). We counted the number of goals defined for each CJM and the number of links that connect common goals between two CJMs. The number of links was converted to a distance value. A large number of links between two CJMs mean that they are closely related (are separated by a small distance). As a result of the MDS analysis, we obtained a two-dimensional representation of the relative locations of 25 categories of CJMs (Figure 8).

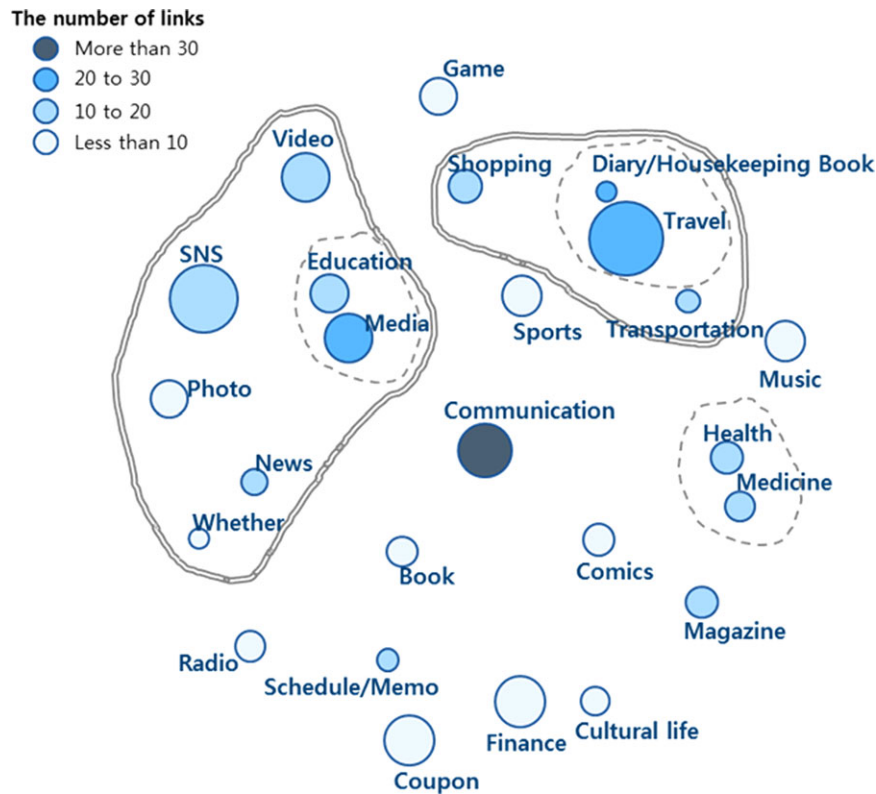
CJM of *Communication* category was located in the center because it was evenly connected with other CJMs, having the largest number of links (34) with other CJMs. The MDS diagram shows that the *Communication* service can be associated with various services, especially *Media*, *Book*, *Comics*, and *Sports*, which are close to *Communication*. This suggests the need for a service development to take advantage of the *Communication* service, which is the basic and important feature of the mobile service.

Several groups were formed by gathering closely located CJMs. Some CJMs with a large number of links are surrounded by CJMs with relatively fewer links. For example, the CJM of *Travel* category was closely related with CJMs of *Shopping*, *Dairy/Housekeeping Book*, and *Transportation* (Figure 8, double line). Some pairs of CJMs showed a high correlation, for example, *Education–Media*, *Health–Medicine*, and *Travel–Diary/Housekeeping Book* (Figure 8, broken line). This close association suggests an opportunity to provide an integrated service that supports closely related service categories.

## 7. CONCLUSION

This study defined a 10-step process for designing a CJM that depicts all experiences that a customer has with a service. A CJM consists of four components: 1) a phase, 2) a goal, 3) a task, and 3) a routine. By connecting goals with arrows, we can obtain a journey stream that represents complete customer experiences for each intention. The process and the rule sets were revised during the design workshop, repeatedly held with one of Korea's biggest mobile services, to develop 25 categories of CJMs. Last, we introduced passive and active methods to generate new service opportunities and analyzed similarities among CJMs.

In this study, the design process and the rule sets were applied to mobile services in the current



**Figure 8** Multidimensional scaling diagram for the 25 CJMs. (The size of the circle points for each category is proportional to the number of goals defined for each CJM.)

application market. The results of this study could be modified and applied to other types of services or products. For example, different natures between public and private services should be considered when applying the process and the rule sets to public services such as environmental protection, military, and police services. Also, characteristics of customers such as age, gender, nationality, and property need to be considered because they can influence user experience.

We anticipate using CJMs to develop additional new methods to improve existing services and to develop new services. A software tool should be developed to integrate the process, rule sets, and ancillary materials,

including verbs and routine list; this tool would be helpful to identify links among CJMs and to analyze the verbs used for brainstorming.

## ACKNOWLEDGMENTS

This work has been funded by the SK Planet, one of Korea's biggest mobile service providers, and supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (NRF-2013R1A1A2013231).

## APPENDIX

### A List of 193 Verbs

Accept	Cancel	Disappear	Forecast	Magnify	Recall	Show
Accomplish	Carry	Disconnect	Forget	Maintain	Receive	Solve
Accustom	Change	Distinguish	Get	Make	Recognize	Spend
Acknowledge	Charge	Download	Get out	Make an effort	Recommend	Stand by
Admire	Check	Eat	Give	Maximize	Record	Stop
Admit	Collaborate	Eliminate	Go	Measure	Reduce	Substitute
Adopt	Collect	Embellish	Grow	Mention	Refer	Suggest
Advocate	Come	Emphasize	Have	Merge	Reinforce	Summarize
Analyze	Communicate	Enforce	Hear	Minimize	Reject	Supervise
Appear	Compare	Enjoy	Help	Miss	Relate	Support
Apply	Comprehend	Enter	Identify	Move	Repeat	Surmise
Appreciate	Compute	Entertain	Ignore	Need	Request	Take care of
Arrange	Conform	Enumerate	Improve	Observe	Reserve	Teach
Arrive	Consider	Evaluate	Include	Obtain	Reset	Throw away
Ask	Construct	Evolve	Indicate	Occur	Resolve	Touch
Aspire	Consume	Expect	Input	Open	Respond	Trade
Associate	Contact	Experience	Insert	Perform	Retain	Transfer
Assort	Control	Explain	Inspect	Persuade	Review	Transmit
Attempt	Coordinate	Explore	Install	Plan	Revise	Treat
Avoid	Cope	Express	Interpolate	Play	Scan	Update
Back up	Copy	Extend	Interrupt	Prepare	Search	Upload
Be addicted	Decrease	Extract	Itemize	Preserve	Segregate	Wait
Begin	Define	Facilitate	Judge	Prevent	Select	Watch
Believe	Delay	Feel	Know	Prohibit	Sell	Write
Block	Design	Filter	Lack	Promise	Send	Yield
Borrow	Detect	Finish	Learn	Propel	Set aside	
Break	Determine	Focus on	Like	Put	Share	
Buy	Direct	Follow	Lose	Read	Shop	

### References

- Alves, R., Lim, V., Niforatos, E., Chen, M., Karapanos, E., & Nunes, N. J. (2012). Augmenting customer journey maps with quantitative empirical data: A case on EEG and eye tracking. *Proceedings of DIS 2012*, June 11–15, 2012, Newcastle, UK.
- Bettencourt, L. A., & Ulwick, A. W. (2008). The customer-centered innovation map. *Harvard Business Review*, 86(5), 109–114.
- Bonk, C. J., & Smith, G. S. (1998). Alternative instructional strategies for creative and critical thinking in the accounting curriculum. *Journal of Accounting Education*, 16(2), 261–293.
- Bucolo, S., & Matthews, J. H. (2011). A conceptual model to link deep customer insights to both growth opportunities and organisational strategy in SME's as part of a design led transformation journey. *Proceedings of Design Management toward a New Era of Innovation*, December 3–5, 2011, Hong Kong, China.
- Chung, K., Yoon, S., & Lee, J. (2010). A holistic approach to design of hospitality services. *Korean Journal of Hospitality Administration*, 19(5), 203–217.
- Customer Champions Ltd. (2014). Customer journey mapping (CJM). Retrieved December 18, 2014, from <http://www.customerchampions.co.uk/customer-journey-mapping-cjm/>.
- Daae, J., & Boks, C. (2014). A classification of user research methods for design for sustainable behavior. *Journal of Cleaner Production*, 106, 680–689.
- Hall, G. (2008). An ethnographic diary study. *ELT Journal*, 62(2), 113–122.
- Holmlid, S., & Evenson, S. (2008). Bringing service design to service sciences, management and engineering. In B. Hefley & W. Murphy (Eds.), *Service science, management and engineering education for the 21st century*. New York: Springer.
- Johnston, R. (1999). Service transaction analysis: Assessing and improving the customer's experience. *Managing Service Quality*, 9(2), 102–109.

- Johnston, R., & Kong, X. (2011). The customer experience: A road-map for improvement: Focused on Application for Hotel Services. *Managing Service Quality*, 21(1), 5–24.
- Kjeldskov, J., & Stage, J. (2012). Combining ethnography and object-orientation for mobile interaction design: Contextual richness and abstract models. *International Journal of Human-Computer Studies*, 70(3), 197–217.
- Kruskal, J. D. (1964). Multidimensional scaling by optimizing goodness of fit to a nonmetric hypothesis. *Psychometrika*, 29(1), 1–27.
- Lin, L.-P., Hsu, S.-W., Hsia, Y.-C., Wu, C.-L., Chu, C., & Lin, J.-D. (2014). Association of early-onset dementia with activities of daily living (ADL) in middle-aged adults with intellectual disabilities: The caregiver's perspective. *Research in Developmental Disabilities*, 35, 626–631.
- Mangiaracina, R., Brugnoli, G., & Perego, A. (2009). The ecommerce customer journey: A model to assess and compare the user experience of the ecommerce websites. *Journal of Internet Banking and Commerce*, 14(3), 1–11.
- Meyer, C., & Schwager, A. (2007). Understanding customer experience. *Harvard Business Review*, 85(2), 117–126.
- Richardson, A. (2010). Using customer journey maps to improve customer experience. HBR Blog Network. Retrieved December 18, 2014, from <http://blogs.hbr.org/2010/11/using-customer-journey-maps-to/>
- Ross, D. (2009). Customer needs and innovation effectiveness. White paper, Innovare, Inc. Retrieved December 18, 2014, from [http://www.innovareinc.com/downloads/Customer\\_Needs\\_Innovation\\_Effectiveness.pdf](http://www.innovareinc.com/downloads/Customer_Needs_Innovation_Effectiveness.pdf)
- Saccani, N., Visintin, F., & Rapaccini, M. (2014). Investigating the linkages between service types and supplier relationships in servitized environments. *International Journal of Production Economics*, 149, 226–238.
- Samsel, S. (2013). Improving UX with customer journey maps. Retrieved December 18, 2014, from <http://symetria.pl/blog/english/improving-ux-with-customer-journey-maps/#comments>.
- Tassi, R. (2009). Service design tools: Communication methods supporting design processes—customer journey map. Retrieved December 18, 2014, from <http://www.servicedesigntools.org/tools/8->
- Tax, S. S., McCutcheon, D., & Wilkinson, I. F. (2013). The service delivery network (SDN): A customer-centric perspective of the customer journey. *Journal of Service Research*, 16(4), 454–470.
- Teixeira, J., Patrício, L., Nunes, N. J., & Nóbrega, L. (2011). Customer experience modeling: Designing interactions for service systems. *Proceedings of INTERACT 2011*, September 5–9, 2011, Lisbon, Portugal.
- Vertelney, L., & Curtis, G. (1990). Storyboards and sketch prototypes for rapid interface visualization. *Proceedings of CHI 90*, Seattle, WA.
- Zomerdijs, L. G., & Voss, C. A. (2011). NSD processes and practices in experiential services. *Journal of Product Innovation Management*, 28, 63–80.