Create Sustainable Travel Experience with Integrated Product-Service System

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Abstract: Among the economic transition from tangible objects to experience and service, user experience has became one of the important issues in design. Recently, there are several methods proposed for creating sustainable user experience. One of which is the framework of product-service system (PSS). In this research, the human centered design approach was used to explore the scenarios and ideas in the travel domain. Based on the concepts, an integrated produce-service system was developed. The customers would obtain comprehensive travel for their whole journey and after experience. For the travel companies, it will be able to increases the touchpoints and establish live-long relationship with their customers. Consequently, a possible business model for providing sustainable travel experience could be established.

Key words: Service Design, Product-Service System, Concept Design

1. Introduction

Since the Industry Revolution started in the late 17 century, corporations have a long history in devoting to make tangible objects elegant and ease of use. However, over the past half-century, the rapid development of information technology and internet, people are tend to consume more intangible goods than physical products. Pine and Gilmore [12] defined it as the experience economy. The focus of the companies are shifting to the world of interactions, experience, and then moving from experience to service in the 21 century [7].

In this transition, simple products or systems are not enough. We need to think about and combine products, services, spaces, information, and even the issues of localization and globalization [1]. One of the best examples is the Apple's great success in recent years. The outstanding customer experiences are attributed to the complex combinations of tangible products, softwares, online services (e.g., iTunes Store), the ecosystem and retail design [2]. In this change, "design has created conceptual and methodological answers to this fundamental shift. Design is now about strategies and structures, processes and interactions -- about services" [7, p. 1]. One of the approaches is the product-service system [3].

1.1 Product-Service System

Basically, the main concept of product-service system comes from the integration of products and services. The purpose is to provide sustainability and to increase customer values [9]. Comparing to traditional modals which intended to deliver tangible products, the product-service system offers integrated solutions to fulfill customers' needs [3]. In some cases, customers do not have ownerships for the products or products. Accordingly, the

product-service system has lower environmental impacts and is able to achieve sustainability. For example, the car-sharing service system fulfills people's needs in mobility and also helps to reduce the global warming at the same time. The customers can even have the chances to enjoy their trip with different kinds of vehicles provided by the company. This will help to establish sustainable relationship between the customers and the providers. In the design project presented in this paper, the framework (shown in Figure 1) proposed by Geum and Park [3] was applied to investigate the possibilities in providing sustainable experience.



Figure 1. The framework of product-service blueprint proposed by Geum and Park [3].

A PSS example of the Automated External Defibrillator (AED) is shown in Figure 8. Recently, the equipments of AED which could be used to provide emergency treatment for people have a heart attack are installed in many public places, including the MRT stations, libraries, and office buildings, etc. However, it's was found that it take more than 10 minutes for the volunteer to find and take the equipment to rescue the patient [11]. To solve this problem, an integrated product-service system (see Figure 8) was created by the Pulsepoint foundation. The system includes the AED equipments, a mobile App, the hotline of the police office (119), and the website and navigation. When a patient encounter the heart attack, he or his family can call 119 and the police officer will send the request and their address to the website. At the same time, the system will send the request to the registers who are near the location and have got the license of CPR. Then, the navigation system will lead the volunteer to take the AED and go to the patient's location. With the assistance of this system, it was found that it took only about 6 minutes for the patient to get first aid and wait for the rescue workers arrive the place.



Figure 2. The product-service system of the AED system (made by the authors based on [11]).

2. Research Aims and Approaches

In recent years, the intelligent technology and smartphone are popular in global markets. Due to the abundant applications of software and service, people's lives are becoming more and more convenient. It is forecasted that the global revenue of the smart devices will be more than 6,200 billion US dollars in 2016 [10]. In this trend, the strongest force in the growth will belongs to the applications and services. In addition, the biggest challenge is to create innovative idea that can enable people to enjoy the services and obtain the benefits of convenience. Regarding to Maslow's [8] hierarchy of human needs, we are entering a world where most of our basic needs have been met. People are increasingly expecting sophisticated experiences that are emotionally satisfying and meaningful [1]. The aim of this research is trying to investigate the possible directions of the applications in the next five years. To take this challenge, we started from the trend analysis and then assembled several multidisciplinary teams to explore the possible concepts and ideas.



Figure 3. The Maslow's [8] hierarchy of human need and the corresponding design focus [1],[6].

2.1 Approaches

The Human-Centered Design toolkit published by IDEO [5] was applied in this project. In general, our exploration included following four steps:

- 1. First, several methodologies were applied in the user study to investigate users' desirability. We visited five users at their homes and collect data with the contextual inquiry approach [4]. We also meet three experts to obtain their opinions on users' need and future trends.
- Second, based on the results of user study, dozens of ideas were developed through the brainstorming and discussion. Those ideas were then evaluated and analyzed to form conceptual themes. Third, several opportunities were envisioned.
- 3. The one focused on the sustainable travel experience is presented in this paper. Globally, tourism is a \$3-billion-a-day business and is one of the main industry fueling the growth of countries at all levels of development [15]. Therefore, the development of the new concepts and technology can potentially benefit.
- Finally, the viable business strategy was developed. Based on those results, the potential applications
 of technologies were investigated and highlighted. Those contents will be demonstrated in the next
 section.

3. Design Concepts

3.1 Scenario and System Structure

-Reviewer's Comment: The process and rationales how to compose scenarios in Figure 3, 4 must be described in 3.1 in more logical and understandable ways.

This concept presented in the following section is a product-service system focused on the travel experience. In the beginning, a persona [12] of elderly customers and their family were defined based on the data collected in user study. The children are going to organize a family trip to celebrate their grandparents' retirement. They searched some data on the internet and then they visit the travel company to discuss their initial planning.

In order to help the customers evaluate the selected places, the travel agents will invite them to take a virtual trip in the experience lab (see Figure 4a). In the room, the customers will be able to see the scenes, feel the temperature, windy, humidity, and hear the sounds. The simulation was generated with the realtime data captured

at the specific destinations. With this ambient technology, the customers will be able to walk in the virtual environment to and select the best choice based on their hand-on experience.



Figure 4. The usage scenario of the design concept.

After the customers satisfy and choose the proper travel package, they will freely rent several portable devices from the travel company. Those recording products (as shown in Figure 4b) will automatically help the travelers to record and capture the scenes during the trip, including the visual scenes, flavor, sound, temperature, and three dimensional data of touched objects. All of the contents will be encoded with the GPS information and uploaded to cloud server when the internet connection is available (see Figure 5). In the server, there will be several intelligent softwares that will analyze the data, identify the contents (such as the persons in the picture or video) and encode it relatively. There will also be an iMovie application (as the Function 3 shown in Figure 5) which could mix the contents, add effects, and produce rich multimedia. The customers can watch them on their mobile devices, home TV (see Function 4 in Figure 5), or multiple sensory display (see Figure 4c). They can even back to the travel company to revive their trips in the experience room.

More over, based on the three dimensional data collected by the customers with the handheld 3D scanner device rented from the travel company, there will be an additional service which could produce specific objects with the 3D printing (see Function 5 in Figure 5). The customers can order those reproductions as souvenir or special gifts for their friends.



Figure 5. The system structure and main functions of the design concept.

3.3 Product-Service System and Business Model

Based on the scenario and system structure, the product-service system was built and shown in Figure 6. In this concept, the system increases the connections and number of touch points between the travel company and the customers. Excluding the traditional role in helping the customers to make various kinds of reservations, the travel company could provide much more invaluable services to enrich their travel experience. For example, when the customers have finished their journey and back to home, the company can make them surprised with the multimedia movies generated by the automatic editing application in the cloud server. In addition, the company could also provide sustainable solutions to build long-term relationships. First, it could collaborate with the gift companies to produce the unique souvenirs and gifts based on the 3D data and printing technology. Second, an automatic reminder application could be developed for the travel company to contact with their customer at the proper time. For example, it could choose a special photo from the customers' trip and print it as a special postcard to them on their birthday or on the memorial day of that trip. With those additional intimate services, it's probably to build life-long connections with the customers. Therefore, a sustainable business model (as shown in Figure 7) could be established.



Figure 6. The product-service system of the design concept.



Figure 7. The business model of the design concept.

4. Conclusions

In recent years, user experience has become one of the important topics in design. To address this issue, there are more and more successful cases developed with the integration of product-service system. In this research, the framework proposed by Geum and Park [3] was used for investigating the possible solutions available in near

future. One of the results which focused on the travel domain was presented in this paper. In this concept, the travel company will provide comprehensive assistance and supports to the customers' travel. In the beginning, they can choose the proper trip with the trials in the company's experience lab. During the travel, the portable devices will automatically capture the interesting scenes and upload the data to the cloud server. The system will mix the contents and turn them into rich multimedia. After the trip, the customers can revive the traveling by watching them on TV, mobile devices, or the travel company's experience lab. They can even order the unique souvenir for friends with the three dimensional data collected with the handheld device in the trip. Based on the integrated produce-service system, it will be able to increases the touchpoints and enhance the connections between the customer and the business. Consequently, it will also help to provide sustainable experience for the customers. In the next step, we plan to collaborate with a travel company and related stakeholders to implement the system and evaluate the effectiveness issues.

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