Developing ICT Car Service for Potential Users: Human-Centered Design Approach

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Abstract—ICT Car market has expanded along development of ICT technology. However, ICT Car service doesn’t considered for user needs and characteristics. In this study, presents the process and findings of applying human-centered design methodology to the potential ICT Car user. First, Hear step: variety research for user needs. Second, Create step: data analysis and presentation of solution. Last, Deliver step: test for solution through prototype. The contributions of this study are that a) presents a concrete case study of developing a mobile application based on the principles of Human-centered design and b) provide important design implications that should be considered to develop prototype reflecting and accommodating the fundamental needs of potential users.

Keywords—Human-Centered Design; User eXperiment; ICT Car; Service Design; Prototype;

I. INTRODUCTION
Cars are going to transform into a giant IT device. And it fused ICT rapidly. The ICT Car provides safe and convenient travel information, as well as driving. Also gives the satisfaction to user through increase the ease of use. However, most services do not reflect the characteristics of a user, because they are developed in accordance with function. So, in this paper, we propose the service that meets the needs of different users. To this end, we try to the user experience derives concretely and systematically through human-centered design for ICT car services.

II. THEORETICAL BACKGROUND
A. Human-Centered Design
Human-centered design for decades to create products, services, experiences, and composition of organization that have been adopted and embraced [1]. It is new approach (understanding people) as against traditional approach (outcome was centered). To Human-centered design is uniquely situated to arrive at solutions that are desirable, feasible, and viable [1].

B. Human-Centered Design Process
World typical design consulting firm IDEO has developed a human-centered design toolkit. Design process goes through three stages [2].

1) Hear: Variety field research to get the live information from a user. And it gets inspiration for core design.
2) Create: Identify the essential problem based on the collected data, and create a realistic solution.
3) Deliver: Evaluate and modify the solution proposed by prototyping for sustainable solution.

III. METHOD
ICT Car market is a new market which offers new services. Therefore, potential user types were classified based on lifestyle typology studies [3].

A. User needs and behavior analysis (Hear)
The survey was conducted in order to select the potential users, depending on lifestyle. We had a contextual interview with users who selected by survey in the driving environment, and the behavior of the driving were also observed.

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**B. Solution (Create)**

1) **Persona:** 4 personas are made through data which collected in interviews. Personas are fictional users. It provide effective and easy to describe the user’s needs [4]. One of them is shown in figure 3.

Fig. 3. Create step outcome: Persona

2) **Customer Journey Map and Scenario:** The user’s experience of using the service were listed in sequence. It is to create for you to look at a glance. In addition, detailed scenarios were created.

Fig. 4. Create step outcome: Service Flow

**C. Development prototype and Evaluation (Deliver)**

1) **Wireframe:** The screens were designed for basic UI components, such as layout, icons. The interaction design has shown a service flow, too.

Fig. 5. Deliver step outcome: Wireframe

2) **Prototype:** It was GUI design work, including visual elements that may affect the user experience. Device-specific prototypes (Smart phone/watch, IVI) were manufactured by contents.

Fig. 6. Deliver outcome: Prototype

3) **Usability Test:** Task scenario was created by main function. Potential users were evaluated service usability (qualitative: KS-SQI [5], preference / quantitative: time, error rate) according to the scenario. We were deduced pros and cons of services through result of usability testing for the purpose of service design feedback.

Fig. 7. Deliver outcome: Usability Test

**IV. RESULT**

This study defined a group of potential users in order to provide service solution for new ICT car market, and developed the services that reflect the user's needs. It was produced as a prototype, and later drew improvements of usability test. Through this study, we can find theoretical significance that identify fundamental needs of potential users based on human-centered design methodology to develop service solution. It will also provide implications for future service development and strategy for ICT car.

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