

# A New IT-Convergence Service Design Framework

Hwa-Jong Kim

**Abstract**—In many countries, digital city or ubiquitous city (u-City) projects have been initiated to provide digitalized economic environments to cities. Recently in Korea, Kangwon Province has started the u-Kangwon project to boost local economy with digitalized tourism services. We analyze the limitations of the ubiquitous IT approach through the u-Kangwon case. We have found that travelers are more interested in quality over speed in access of information. For improved service quality, we are looking to develop an IT-convergence service design framework (ISDF). The ISDF is based on the service engineering technique and composed of three parts: Service Design, Service Simulation, and the Service Platform.

**Keywords**—Service design, service simulation, service platform, service design framework.

## I. INTRODUCTION

IN many countries, *digital city* projects provide more efficient network access and new business models to the cities[1]. In Korea, u-City projects have begun in more than 30 cities including Seoul, Pusan and Incheon over the last several years. The purpose of u-City is to improve the competitiveness of the city by digitalization. Many high-tech solutions such as radio frequency identification (RFID) or ubiquitous sensor network (USN) are being utilized by the u-City projects.

Kangwon Province started the ubiquitous Kangwon (u-Kangwon) project in 2005 and has continued to improve its reputation as one of the major tourist draws in Korea. Kangwon has more than a hundred beaches, dozens of ski resorts, and beautiful mountain ranges. The population of Kangwon is about 1,500,000, while the annual number of traveler-days spent in Kangwon is about 80,000,000. More than 11,000,000 cars pass through Kangwon every year. To keep up with the growth of dynamic outdoor activities such as rafting, hang-gliding and cycling, we hope to provide visitors with more intelligent and timely information through u-Kangwon.

After a test service of u-Kangwon (specifically the *u-Tour & Commerce* service), we found that the clients were dissatisfied. Over half of the clients did not enjoy the high-tech ubiquitous information system. The service provider also hesitated to use the u-Kangwon. This was because the lightning fast nature of our information system put much pressure on the service providers to stand behind their claims. Accordingly, we

modified the u-Kangwon project to be more practical and attractive to the clients. For this we adopted a service engineering approach: an IT-convergence service design framework (ISDF) in the second phase of u-Kangwon. The ISDF is essential for service providers to co-design, co-simulate and co-operate a service with clients. The ISDF approach is also expected to be useful for satisfaction evaluation and risk management of services.

Related works are as follows. Chin et al. emphasized the need of a tool for modeling services, which will be used for rapid and accurate design, verification, validation, and deployment of services[2]. The service provider and client should coordinate their work through knowledge sharing processes, especially in the multidisciplinary approach of service science[3].

Design method and principles were applied to the design of services via creative, human-centered and user-participatory methods[4]. A service system concept was introduced for modeling the people and their roles as knowledge workers in the global service system[5].

Bell defined a service-oriented modeling framework as an efficient software development practice to provide strategic solutions to enterprise problems[6]. The service blueprint is used as a framework to integrate processes, applications, and infrastructure to deliver integrated services to various customers, employees, suppliers, and portals[7]. Saffer explains service design in terms of interaction design of touchpoints, which are composed of environments, objects, processes, and people[8].

In Section 2, we briefly explain the limitations of *u-Tour & Commerce*. In Section 3, we introduce the ISDF to improve the productivity of services. Conclusion follows in Section 4.

## II. U-TOUR & COMMERCE CASE

### A. Objective

The objective of *u-Tour & Commerce* system is to provide ubiquitous access of tour information at anytime, anywhere and through any device. Before a trip, a traveler usually uses the Internet to find a good place to visit or for reservation. But during a trip, it is hard to be connected to the Internet. Rather, mobile phone can be a good access channel for continuous access of the travel information. The *u-Tour & Commerce* was designed to support:

- Convenient access of tourist information
- Synchronize of the service contents independent of

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the media (web and mobile)

- Combining tour information and e-commerce
- Immediate information update by the service provider
- Provides location-based services

With the high-tech (ubiquitous) information access system and fast feedback from user to service providers, we hoped the service quality would be improved. We also expected competition among the service providers would finally result in service quality improvement.

#### B. Limitations of the High-tech IT System

We invested \$2,000,000 over the last three years to develop the *u-Tour&Commerce* system and operate a pilot test service at a famous local festival in Kangwon Province. The result was not satisfactory.

In view of clients, the most important reason of not using the system widely is that people are not interested in fast and convenient access of the information. Rather, they are more interested in the quality of the service they will encounter. This means an efficient information system is not a key factor for successful use of high-tech IT system.

The service providers also worry about quality assurance. It is much harder to vouch for such variable services as restaurants or hotels. So the service provider hesitated to advertise and guarantee their service quality through our information system.

### III. A NEW IT-CONVERGENCE SERVICE DESIGN FRAMEWORK

In the second phase of *u-Kangwon* starting in 2008, we adopted a service engineering approach, the ISDF to improve the service quality. The ISDF is composed of three parts:

- Service Design
- Service Simulation
- Service Platform

The ISDF is shown In Fig 1. When a new service is to be provided, the ISDF first analyzes the service concept to design the service process. The service simulation then tests the service under various conditions. The service platform is the model test bed of services. Ubiquitous IT technology such as RFID or USN may be applied to the design of the service platform for intelligent services.

The ISDF can be a good communication tool between the service provider and clients to share their service know-how and co-develop the service knowledge base for further use.

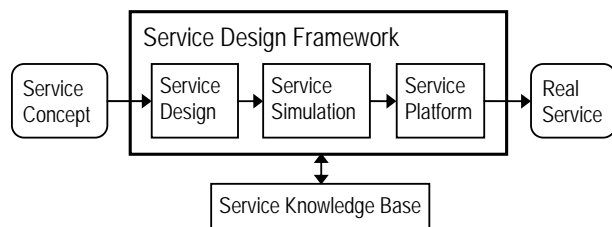


Fig. 1 The IT-Convergence Service Design Framework (ISDF)

#### A. Service Design

Most services are designed by a closed group of planning members. Usually there is little chance for clients to take part in designing of a service. With the ISDF, clients may participate in the design phase of a service. The service provider and clients can collaborate through the ISDF from the beginning of a service provision. The service design can be divided into the following steps:

- Service scenario design
- Service process design
- Service information design
- Interaction design

#### B. Service Simulation

Clients can simulate a service before they come to the real service platform. They can estimate the time, money, or efforts to finish a specific route of a service. The service platform may include museum, event, skiing or any leisure activities. The clients may preview pictures they would see along with the service route.

Service providers also use the service simulation tool to estimate the traffic and bottleneck point. They can get feedback from the service participants through the ISDF. We expect that clients may be more satisfied with the real service when they participate in the service design or simulation activities.

#### C. Service Platform

Web is the typical service platform. Service platform deals with the place where real service is provided. The ISDF suggests how to apply RFID or USN technology for advanced service if needed. A prototype of a service platform may be constructed before a real service is launched.

### IV. CONCLUSION

In the paper, we proposed a service design framework to improve quality of services. The ISDF is based on the service engineering technique and composed of three parts: service design, service simulation, and the service platform. The ISDF can provide a good communication environment for the service provider, content provider, and clients to share their service know-how and co-develop the service knowledge base for further use.

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#### REFERENCES

- [1] <http://www.w2i.com> (Digital Cities)
- [2] Shiu-Kai Chin, James S. Royer and Alex Wilkinson, "SSME: How to Solve It," Service Science, Management and Engineering, Springer, 2008, pp. 269-277.

- [3] Suvi Nenonen and Jukka Puhto, "Towards Customer Centric Physical and Virtual Environment – Platform for Services," *Service Science, Management and Engineering*, Springer, 2008, pp. 303–308.
- [4] Stefan Holmlid and Shelley Evenson, "Bringing Service Design to Service Sciences, Management and Engineering," *Service Science, Management and Engineering*, Springer, 2008, pp. 341–345.
- [5] Paul P. Maglio, Savitha Srinivasan, Jeffrey T. Kreulen and Jim Spohrer, "Service Systems, Service Scientists, SSME, and Innovation," *Communications of the ACM*, July 2006, Vol.49, No.7, pp. 81-85.
- [6] Michael Bell, *Service Oriented Modeling*, Wiley, 2008.
- [7] Ravi Kalakota and Marcia Robinson, *Services Blueprints*, Addison Wesley, 2003.
- [8] Dan Saffer, *Designing for Interaction*, New Riders, 2007.

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