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 # Service Innovation by Design Thinking Methods: A Case of Seoul Children's Grand Park (SCGP)

Information communications technology (ICT)-based service innovations for tourism experiences have become an essential foundation in establishing a smart tourism city that an organization should consider. Thus it is required to understand service design process and method theoretically and technically. This research aims to introduce a case study demonstrating a structure and procedure for the service innovation based on design thinking methods in an urban park context for revitalizing Seoul children's grand park (SCGP). Our study provides a guideline of service design structure: explorative stage, generative stage, evaluating stage, and applying stage of designing to tourism context. By analyzing the current visitor's experience in old facilities and places, we suggest a service design model to manage visitor behavior patterns with ICT-based experience and also provide valid scenarios based on the results of big data analysis. Technically, we developed two application program concepts, visitor journey map and App Touchpoints, for visitor-centered experience design. This study contributes to articulate a conceptual framework of service design and its applications of ICT-based experience in the SCGP.

Key words: Seoul, Urban Park, Service design, Information Communications Technology,

Innovation, Value co-creation, Smart Tourism City.

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Introduction

Information Communications Technology (ICT) in tourism and event contexts has played a critical role in establishing service innovations that would enhance human-centered service systems (Lusch & Nambisan, 2015; Yoo, Boland, Lyytinen & Majchrzak, 2012). Human-centered service, concentrating on human experience, interaction, and personalized service, is a great deal of importance to better understand what human nature characteristics drive and navigate people in terms of travel and leisure contexts (Breidbach & Maglio, 2015). Importantly, this human-centered service innovation is considerably related to the concept of value creation in improving its process. Companies associated with tourism have paid attention to improve visitors' experience by utilizing ICT in order to better facilitate visitors in innovative ways of service experience and to support creating value out of experience. The Walt Disney Company, one of a successful instances, implemented ICT systems to make the theme park experience more entertaining and enjoyable which in turn bring an increasing number of visitors and higher spending. The company launched new mobile one system that linked to the My Disney Experience App (2017) in order to interface experience-centric services that require systematic technical skills and management delivery system (Forbes, 2017). Some academic research on service design also has addressed the importance of experience-centric service design (Tussyadiah, 2014; Zomerdijk & Voss, 2010). From the beginning of experience-centric services development, service design rationale ought to consider integrating physical environment, people, and process at each service encounter. That is, a customer who is in a physical environment needs to manage a certain service task to interact with a concrete service interface, and to integrate with the contextual elements of front stage and back stage (Patrício, Fisk, Falcão e Cunha & Constantine, 2011).

Although ICT has been widely used to develop experience-centric services, we found some undiscovered areas that are rarely implemented a properly designed ICT-based experience

system. Since individual experience is quite delicate and problematic in communication monitoring or tracking, we argue that service design is required to be analysed from a preliminary source of visitor's experience resulting from a longitudinal and accumulated data through the service delivery system.

In this study, we developed a service design of ICT-based experience for Seoul Children Grand Park (SCGP) opened in Seoul, Korea, in 1973 based on a decent amount of d literature review as a framework. The park regeneration project was attended by a variety of stakeholders including Seoul Metropolitan Government, private companies related to tourism and IT industry, university research institutes (Kyung Hee University), and public institutions. The project development took about six months and the input budget is estimated around one billion in US dollar.

We adopted Tussyadiah (2014)' framework of tourism experience design that closely involves human-centeredness, iterative process, holistic experience concept, multi-disciplinary perspective and human nature characteristics. In the end, we provide a comprehensive review of theories for experience design in tourism and the application of a technical method to a tarnished grand park for the purpose of regeneration which transforms into ICT-embedded visitors' experience park. Accordingly, we designed a prototype mobile App based on Tussyadiah (2014)' service design framework, then developed and deployed the App for SCGP.

Therefore, the purpose of this study is to:

a. develop a service design model system that provides visitor's route recommendations for park contents and activities.

b. suggest a service design system (i.e., mobile app of the SCGP) collecting visitor personas data (e.g., personal profiles) and analyzing visitors' behavioral patterns that lead to a greater experience quality and an increasing number of visitors.

c. retain a series of visitors' experience scenarios that determine human nature characteristics and enable those characteristic segmentations.

Literature Review

Service Design

Service design has been defined as an activity of planning, and organizing people, infrastructure, communication and material components of a service (Zomerdijk & Voss, 2010). That is, the service design project can improve by enriching its service quality while some interactions between service providers and customers may generate personal experiences (Patrício et al., 2011). Services are the systems that involve many different influential factors; thus service design takes a holistic approach in order to acquire an understanding of the different actors within the system (Mager & Sung, 2011; Zehrer, 2009). Service design has emerged as a cross-disciplinary research interest situated in management, operations, design, engineering, and the social sciences (Tussyadiah, 2014). Some researchers also suggest touchpoints, -moment of truth (Normann, 1991)- or service clues (Berry, Wall & Carbone, 2006), and the point of interactions between customers and service evidence (Biner, Boons & Tetreault, 1990) as vital elements in terms of service design.

In the context of tourism, service design has become important because tourism is one of the experience-driven industries focusing on tourists' service experiences. Travelling is all exploration of places that enable tourists or visitors to interact with attractions, residents, or other resources in touristic destinations. Because of these features of tourism context, tourism industry seems service industry, but not exactly cannot be categorized as services (Tussyadiah, 2014). Because it is difficult to apply the elements of service design directly to tourism, the key characteristic of service design in tourism context is argued to be the experience-centric service, which is designed to enable the consumer to connect with the

service in a personal and memorable way (Pine, Pine & Gilmore, 1999; Pullman & Gross, 2004).

Tussyadiah (2014) emphasized three fundamental approaches which proposed for the tourism experience design (see Figure 1): the human-centered approach to design, the designing as iterative processes, and the holistic experience concept as an outcome of designing. First, human-centered design (HCD) as an appearing approach is associated with understanding the experiences of end user (i.e., visitors in this study). HCD is often utilized at every stage of designing for emphasis at an extensive attention to needs, wants, expectations, and limitations of the end user. The idea of HCD focuses on the senses, cognition, emotions, affect, and other values in a site and gains intimate insights and understanding into their experiences (Suri, 2003; McDonagh, Thomas, Khuri & Peña-Mora, 2013). Second, the iterative designing process is defined as designing follows a cyclical process of several iterations within the results of recent iteration, and then, can implement to change and revise the current design (Tussyadiah, 2014). Designing process in services must be subjected to continuous improvement and that the designing of a service involves iterations of different stages from service design specifications according to market requirements. Third, the conceptual framework for holistic experience design include the position of design research in designing process. Experience should be understood as a complex interaction between design attributes and contextual details where meanings and values will emerge in given complexed sociocultural context (Moustakas, 1994).

Figure 1. The fundamentals for tourism experience design (Tussyadiah, 2014)

The three approaches described above form the basis for the design and design research process as well as the tools and methods for the tourism experience design. And the following three concepts are explained through their interactions. HCD and iterative designing process demand a participatory design (i.e., co-designing), where every stage of designing includes an active engagement of end users together with designers and other stakeholders (e.g., management, employees and residents, etc.). Participatory design engages users in creative opportunities to express their feelings, needs, dreams and desires, resulting in rich information for concept development (Hanington & Martin, 2012).

Based on the framework of Tussyadiah (2014)'s work, our study has carried out in order to investigate the problem and to make applicable suggestions to the current issues appeared on an old urban park in Seoul. As the primary issue of the old urban park, for instance, has lack of ICT systems embedded in the park, there has been limited and insufficient data access about why people visit the park, what facilities people are attracted to, what kind of activities people do during their visit, and how the park attract new and more visitors. Since the current study suggests that this issue can be improved by managing the overall visitor experience of the park, Tussyadiah (2014) 's research framework, explaining human-centered design, naturalistic inquiry and integrative research, is well suited. A detailed description of the park can be found in the next session.

Seoul Children's Grand Park

The Seoul Children's Grand Park (SCGP) is a family recreation space located in the capital of Seoul, South Korea. The SCGP, opened on May 5, 1973, has provided various facilities such as a zoo, botanical garden, amusement park, and promenade in the area of 536,883 square meters (e.g., London Hyde park size). The SCGP is a place to accommodate leisure activities in the family unit in Seoul. However, a few large-scale theme parks were developed in Seoul and in the suburbs after the 2000s, and the SCGP went a free entrance fee to the public in 2006, which causes the following problems.

Aging facilities and low-budget operation due to free opening. The SCGP has been renewed with the title Rebirth in 36 years in 2009 through a two-year reconstruction project. The SCGP reconstruction was completed after the expansion of the playground equipment, but it did not make an increase in visitors and became no longer an interesting place. In addition, the Seoul Public Corporation targeted for its purpose of business promotes citizen welfare rather than business for making a profit. Since it is operated only within the government's budget since 2006, it became very hard to expand and invest on building new facilities.

Various undefined stakeholders and management issues. The SCGP consists of various types of theme park including amusement park, playgrounds, exhibition space, and national park features (e.g., green spaces, zoo, and botanical garden). Therefore, there have been involved various stakeholders and visitors for multi purposes so that it has been in a difficult position to aim certain target for children's parks offering playgrounds, cultural space, and rest area. In addition, the fundamental problem is that there has not been embedded information management systems for sustainable park management yet, which could not account for a number of visitors, visitor motivation, visitor traits, and visitor behaviors and patterns.

To better understand the current situation of the SCGP, we have coordinated a reinvigoration project, entitled 'Seoul Children's Grand Park Renewal New Deal' that

establishes a new meaning for renewed facilities in the park and offers stories and contents to visitors for quality experience. We adopted that ICT-based service design methodology, which was applied to maximize experience of park visitors and to improve the efficiency of park management organizing various service providers (Tussyadiah, 2014). Specifically, we aimed to establish the entire processing system for holistic human-centered park reinvigoration through a service design model applying big data design-based scenario that can be collected from the visitor's recommendation in the SCGP (Tussyadiah, 2014).

Research Methods

We implemented ICT-based service experience design to reach research goals in regards to the issues of the SCGP. As explained, this study is to increase visitor experience quality through an experience-driven app in the front stage and to establish big data service design scenarios for the operational management side in the back stage.

We illustrated the purpose of the study as follows in Figure 2. This study will be divided into two main stages as a form of design research for tourism experience by a service design methodology. The first stage is an explorative stage, which discovers problems and defines a tourist behavior and experience. The second stage is a generative research, which develops the idea based on previous stage's qualitative data. However, the last stage of service design thinking methods, which is an evaluative stage (e.g., testing, validating the concept for launch) was excluded in this study because there is not enough time to evaluate due to short period since launch.

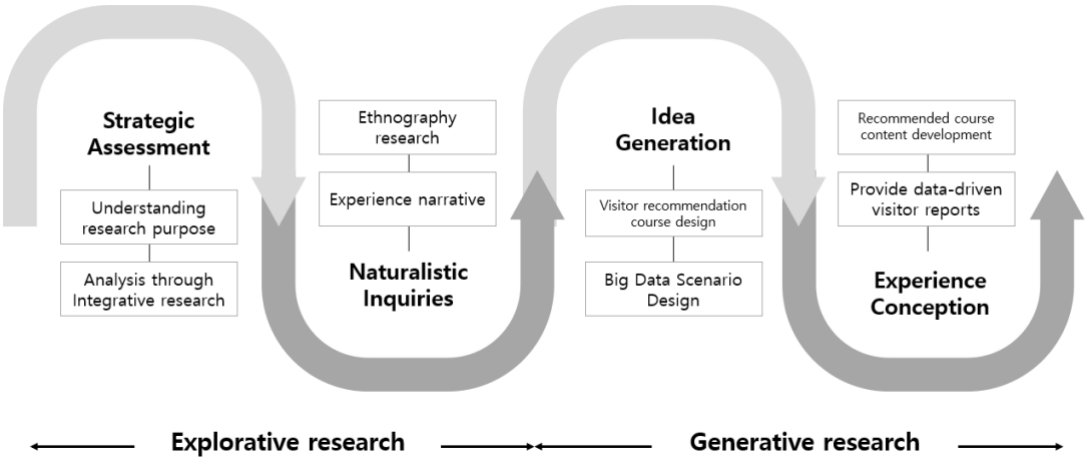

Figure 2. Designing research for park visitors' experience

Step 1: Explorative research

An explorative research stage begins defining problem statement and understanding research purposes through a comparative analysis. Research design of an exploratory work generally relies on the direct observation of what needs to be examined. An integrated strategy was designed to understand the purpose of research and investigate on visitors' experiences while considering the current issues and circumstances of the SCGP. In this step, we conducted three specific research schemes; (1) context analysis, (2) ethnography research, and (3) interview observation. Context analysis stage examines App trends, motivation to visit the park, and visitors' preferences for qualitative data. In an ethnography research, we observed about 50 visitors in activity behavior and movement in SCGP. Specifically, we observed who comes with whom, what activities visitors do, how long people stayed, where people moved from one place to the next place, etc. The total of 13 in-depth interviews was applied through the personal experience narrative approach, which allows exploring what human natures drive people to participate in such park activities and contents by monitoring feelings and opinions during the interview. Consequently, we found the hidden needs of park

visitors through the interview. The following section entails our ethnography method and in-depth interview research.

Ethnography research was conducted with approximately 50 visitors using ethnography methods in being a visitor, town-watching, visitor shadowing and diary approach. Being a visitor helped to identify the characteristics and problems of the SCGP and finally understood the potential solutions of the park. We applied town watching which is a marketing method that grasps people's behavioral patterns and lifestyles during their park activities by observing the usage patterns of visitors. Moreover, a shadowing method was conducted to conceptualize how, when and why individual actions are expected to create visitor's needs. These processes are essentially required to identify different types of visitors who visited the SCGP and captured their behaviors and desires that were used as the core values in the development of visitor recommendation list.

Figure. 3 Ethnography research

Interview research (i.e., personal experience narrative) is for understanding visitor-centered experience and visitors' holistic experience. We organized co-design activities of the direct participation visitors and park stakeholders by conducting 13 in-depth interviews in order to categorize visitors by a demographic perspective and major stakeholders. We identified the value and behavior of each visitor prototype in Table 1. Guest, Bunce and Johnson (2006) note that, for relatively homogeneous populations, between 6 and 12 participants should be adequate to reach saturation. Similar numbers are reported by Francis, Johnston, Robertson, Glidewell, Entwistle, Eccles and Grimshaw (2010) and Marshall (1996)

in the studies using medical leaders, practitioners and patients' relatives, these ranging from 13 to 15. Based on the above literatures, we concluded that 13 interviews had obtained sufficient qualitative information on visitor's needs and interests.

Table 1. Visitor type and behavior

Visitor type (person)	Behavior
Family with kids (3)	*Visitor frequent:* The purpose of the visit is relatively clear and shows activities such as enjoying physical activities or picnicking in idle spaces (i.e., green spaces). *Rarely visited visitors:* They recognize SCGP as a complex space, usually through maps, and worry about losing their children.
Couple (2)	There are two types of couple visitors who act to find a quiet space and couple visitors who act to find a lively space.
Friends (2)	*A Small group of friends (2 to 4)* shows various behaviors such as picnics, walks, and spectator types. *Visits as a group (e.g. A club)* enjoys games mainly in idle spaces
Single (alone) (2)	A single activity usually finds a place for contemplation or taking a walk.
Local residents (2)	Many of the visitors are residents who live nearby, usually a walking distance taking a walk or doing simple exercises.
Other visitors (2)	Observing visits by kindergarten group visitors or photo clubs, etc.

Through these steps, research foundation was carried out for the next phase that promotes characteristics of the park and defines stakeholders. In addition, we defined visitor behaviors and purpose of a visit through the holistic visitor journey map and identified the needs for service platform (i.e., app) development to increase visitor convenience and quality experience.

Step 2: Generative research

Idea generation. We came up with the idea for designing visitor's routes recommendation and big data scenarios for collecting data in a consideration of finding points defined in the previous step. First, the core targets were set using visitor segments

based on the App and the SCGP involvements in the classified types and demographic characteristics of visitors. The derived core target segments developed 25 customized routes through the iterative process of continuous modification and transformation. Then, two theme routes and four seasonal routes were added. A total of 31 recommended routes was designed and confirmed (see Fig. 4). Customized routes were designed considering visitor's companionship and their visit purpose of SCGP. Visitors can select companion and the purpose of a visit from the App features.

In view of the human-centered service design perspective, we focused on increasing visitors' experience in the SCGP by switching from the hard, dull, uninteresting wordings of the supplier's position to the soft, friendly, value-oriented, and trending hashtags of the visitors' position. We produced the process and procedures of visitors-oriented and customized routes in Figure 4.

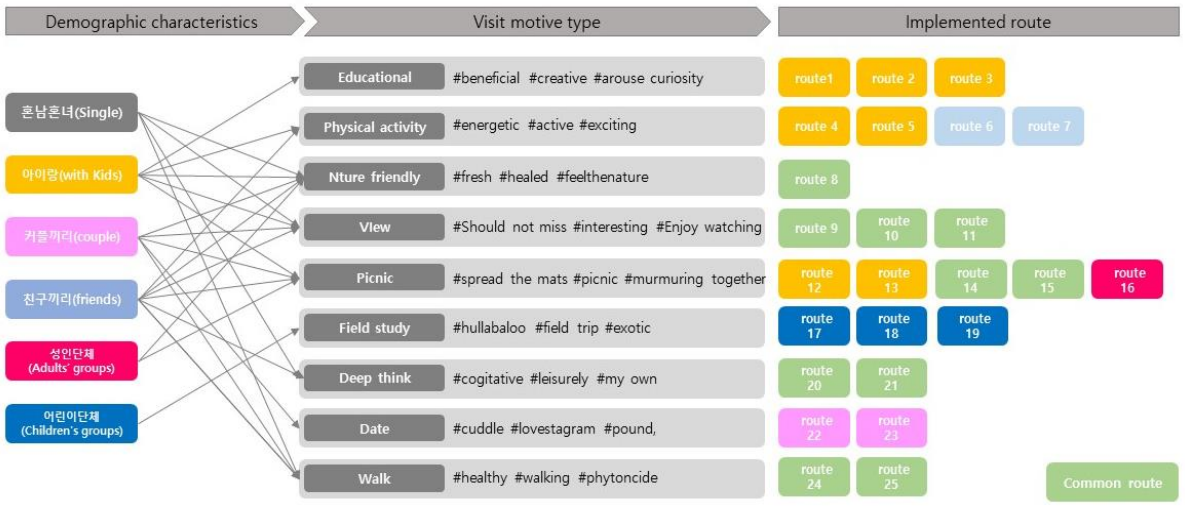

Figure. 4 Implemented visitors-oriented, customized routes

Experience conception. The tourism experience concept should be comprehensive, but at the same time, can be dissected into components that allow for designers and practitioners to operationalize the concept (Tussyadiah, 2014). As a recommended route component, the contents (i.e., App Touchpoints, the SCGP quiz, visitor behavior report) were developed to maximize visiting experience so that visitors could experience the value of the

SCGP. We also conceptualized three contents and generated them through a virtual visitor journey map.

We designed four attributes of App touchpoints to enhance the visitor's experience via the App's various features. An App touchpoint can be defined, in this study, as any way a visitor can interact with SCGP in person-to-person or through the SCGP's App. In the case of touchpoints, it was conceptualized for different value of each visitor with unique motivation and categorized into four categories considering the characteristics of SCGP. The purpose of each App Touchpoint is as follows:

a. Gamification: the game element causes interest of visitors to the SCGP (e.g., Augmented Reality (AR)-based game content, quiz, etc.)

b. Co-creation: an increase in visitors' attachment to the SCGP by creating and sharing new values with the SCGP (e.g., posting reviews and Instagram feed that visitor can share and connect with the people and things, etc.)

c. Physical evidence & social: an increase in usage of SCGP app while social activities and leaving physical evidence like photos (e.g., AR photo, route recommendation for selfie, etc.)

d. Information & service: providing visitors with useful and interesting information (e.g., information clip, video clip, audio clip, etc.)

And we coded the visitor's behavior and the facilities of the SCGP based on the MBTI indicators, and the analysis shows individual personality preferences in four dimensions and provides fun type visitor reports (Myers, McCaulley & Most, 1985). The developed visitor report is presented to App users (i.e., visitors), along with personality types, features and representative figures produced by their activities in the SCGP.

In the end, all activity is transformed to data, collected and continuously accumulated through the App (see Figure. 5). Information increased in big data platform enables

administrators to operate the park efficiently and visitors to receive a fun report presenting movement pattern, health data and activity records. The visitor's route recommendation system is the solution to solve the problems of the SCGP as promoting holistic visitors' experience in the park. Further, an integrated visitor experience has designed from every front stage interaction that visitors have with the SCGP and the back stage activities that the park's employees work on to deliver value to visitors (see Figure. 6).

Figure 5. Screens of the prototype App (up) & A visitor journey map of the SCGP (down)

The design of the front and back stage of big data processing. In terms of big data scenarios, the idea could be used for visitor reports to generate to enhance efficiency of the

operation management. Input data were collected using GPS-based visitor's mobile information (e.g., park entry, distance, visiting facilities, etc.), staying time at each facility and profile information that visitors fill out directly in the App. In addition, all information such as visitors' co-creation process (e.g. the review frequency, the physical evidence) and weather information were also designed to be accumulated through the App. This input process allows the administrator to manage the point of behavior (POB) of the SCGP and to derive an output that helps them operate in consideration of intuitive insight from visitor data. This system will provide visitors with an MBTI (Myers-Briggs Type Indicator)-based visitor behavior report that takes into account persona (Myers et al., 1985).

To be more specific, we coded MBTI property, i.e., Extraversion (E) or Introversion (I), Sensing (S) or Intuition (N), Thinking or Feeling (F), Judgment (J) or Perception (P), for all facilities and the app touchpoints in the SCGP. People's visitation facilities and App Touchpoints experiences are accumulated into visitor's personal data, taking into account time weights. Based on the accumulated data, the personal report of the visitor is generated and displayed a certain type of persona among the 16 types personality according to MBTI attributes (see Figure 6).

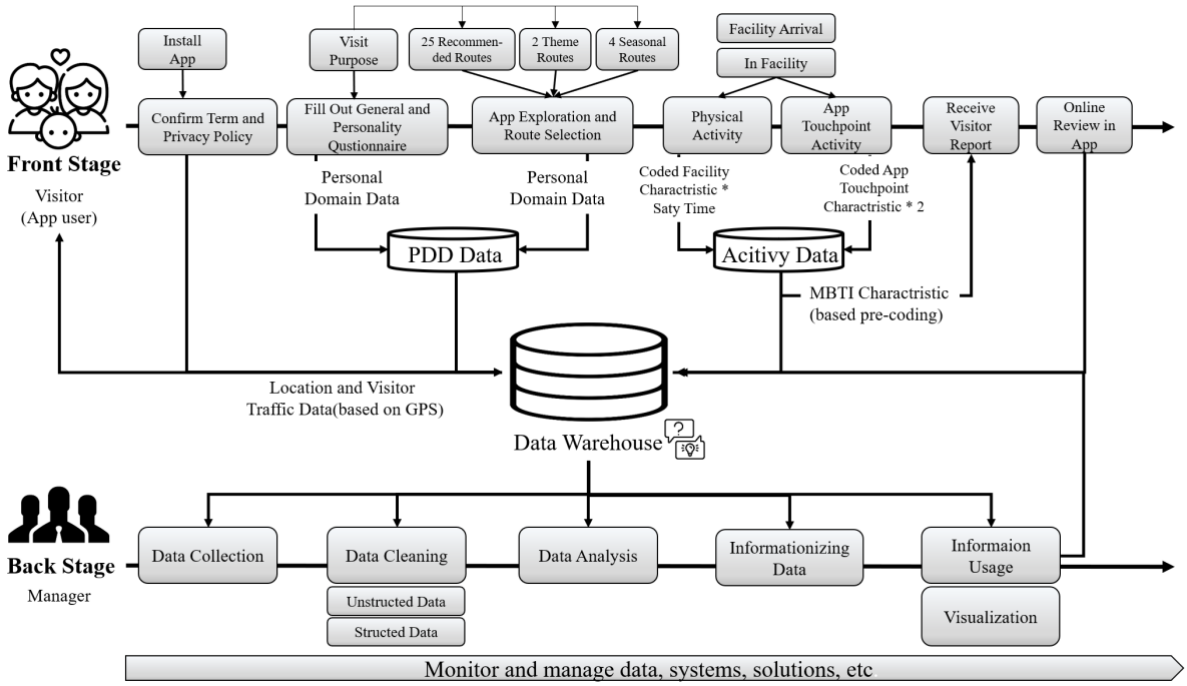

Figure. 6 The front stage and back stage of service design of big data processing

Conclusion

Today, service innovation is carried out, so-called 'experience economy', which is a human-centered thinking where various stakeholders participate together to define problems with an innovative perception and perspective. Service design has been a plenty of attention in the tourism industry because the nature of tourism products and services are experiential. From this point of view, this study explains the service design thinking methods to develop park visitors' holistic experience (as a representative of part of tourism). We tried to figure out the problems of the SCGP that mainly are out of date facilities, low-budget operation due to the free entrance fee, and some undefined stakeholders and management issues based on service design theory in tourism context.

Currently, the App (named Children's Grand Park Go 365: CGPGo365) that can enhance visitor experience quality of the SCGP has been launched and used by many visitors. There has not been enough review evaluation for the app because of the short duration of use in time, but users generally evaluated that the app was very useful and easy to use the recommended routes (see Figure 7). The old-fashioned park is creating new user visits and returns and their overall satisfaction by enriching information technologies. With visitors' big data, researchers are able to improve the visitor-centered service for app touchpoints and route recommendations by analysing visitor's behavior pattern. In the future, the accumulated and rich data collection enables providing more constructive and elaborated details in activity patterns that enhance visitors' experience satisfaction.

Figure 7. The screen of SCGP's app and online reviews from visitors

When applying an iterative process using human-centered approaches of design thinking on the SCGP, the emphasis lay on the following steps: (1) the use of explorative research discovers a problem and defines a visitors' behavior and experience and (2) the use of generative research explores the idea previous stage's qualitative data and creates the new conceptual experience. As a result, a total of 36 routes was developed according to visitors' type and visitor motivation from a visitor-centered perspective. In addition, the idea that was used for visitor reports could raise efficiency of the operation management. As for the way to create the experience conception, we developed the content of visitor experience (i.e., App touchpoints, visitor behavior report) to maximize the park experience of the SCGP. All of these activities are transmitted to data, collected and continuously accumulated through the App. Finally, we designed big data scenario for visitors to have personalized and positive service experience and park managers to efficiently maintain sustainability to the park operation.

Drawing on relevant literature in service and experience design, this research makes important academic contributions to experience design in tourism. Existing research of experience design and human-centered design in tourism context has stayed in most conceptual papers (e.g., Tussyadiah, 2014; Zehrer, 2009). This paper, inspired by Tussyadiah's work is to explore and adopt the pertinent issues in the relationship between service experience and service design for urban park revitalization in the tourism industry. This research can verify how the service design model can be applied for urban tourism and

how it can be useful for service experience for visitors and park management by conducting the three phases presented in Tussyadiah (2014)'s work.

Regarding practical contributions, tourism service organizations should manage visitor experiences by using experience design thinking method. This paper has applied in the service design process in the tourism and leisure context so that experience service design may be placed. This paper strongly supports the designing of visitors' journeys and app touchpoints by using ICT-usage, for the visitors' experience, and for the designing of a dynamic structure of park visit. In particular, we present how the behavioral patterns of visitors in the front stage and the back stage could be collected. This data will be an important resource for improving park management in the future. Tourism managers, particularly considering using ICT to enhance the tourism experience, should pay attention to how visitor behavior is collected into data and how it interprets. This study provides a theoretical framework explaining an experience design in a tourism context. More importantly, our study develops a case of service design by enabled-ICT for the SCGP reinvigoration emerging with visitors' holistic experience.

*__Acknowledgement__

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2016S1A3A2925146 and NRF2019S1A3A2098438)

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