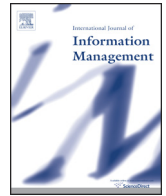




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A near field communication adoption and its impact on Expo visitors' behavior

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ABSTRACT

Utilization of advanced smart technologies and online-to-offline/offline-to-online marketing has resulted in the adoption of near field communication (NFC) in many expositions (Expos). The objective of NFC is to enhance and revitalize the Expo experience of visitors. Thus, this study focused on the motivation-opportunity-ability framework and satisfaction transfer of visitors who process information using NFC to understand NFC reuse intention and Expo loyalty. We hypothesized that information quality (motivation), organizational support for using NFC at an Expo (opportunity), and self-efficacy (ability) influence NFC value and NFC satisfaction. NFC value would influence satisfaction with NFC and with the Expo, which then influences NFC reuse intention and Expo loyalty, respectively. A survey of 309 visitors at the Expo showed that information quality and organizational support influenced perceived value and satisfaction of NFC. Self-efficacy influenced the perceived value of but not the satisfaction with NFC. Further, the perceived NFC affected NFC reuse intention and Expo loyalty through satisfaction with NFC and satisfaction with the Expo, respectively. This study thus expands the scope of study on NFC by demonstrating the need for utilization of NFC and by empirically demonstrating the importance of NFC.

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1. Introduction

Online-to-offline or offline-to-online (O2O) services, by utilizing Internet of Things (IoT) technologies, have emerged in business environment. These services, link offline and online shops to maximize customers' offline shopping experience (Deloitte, 2014; Griffiths & Howard, 2008; Lee, Choi, Kwon, & Jun, 2013; Müller-Lankenau et al., 2006; Regalado, 2013; Verhoef, Kannan, & Inman, 2015). In recent years, offline companies have implemented O2O service to identify and satisfy the needs of consumers in their purchase route (Peltola, Vainio, & Nieminen, 2015).

For this reason, O2O service based on technologies such as near field communication (NFC), Beacons, and Wi-Fi has been applied to share offline experiences through online media. Since 2011, the NFC service, "a short range and wireless technology for data transfer without physical touch" (Pesonen & Horster, 2012; p. 11), has been applied in tourism destinations and expositions (Expos), such as

the Museum of London in the UK, the Centre Pompidou's Teen Gallery in Paris (Swedberg, 2009), and STRP Festival as a form of smart tourism (RFID switchboard, 2015). NFC technology is more suitable for expos. NFC technology works by simply attaching tags, instead of additional terminals. No additional power source is required and installation and take-down are easy. It the number of users increases, so does the number of tags. In addition, NFC technology is intuitive and user-friendly; by touching a tag the NFC feature of a mobile phone is activated. According to the corporations participating in the Expos, information about visitors can also be acquired conveniently from their own NFC tag system and the relationships with visitors can be built through social networking sites such as Facebook (Jun, Choi, & Lee, 2014). However, services based on NFC have failed despite these strengths because NFC adoption is at an early stage and critical factors that affect visitors' NFC adoption have not been studied.

According to Expo organizers, the purpose of NFC for tourism and exhibition sites is not only to act as an information tool but also to reinforce tourists' loyalty to the sites. NFC service providers look forward to people continuing to use NFC. For this reason, Expos or tourism destinations tend to invest in NFC. In terms of IT adoption, prior studies examined it based on in relation to the-

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oretical frameworks such as technology acceptance model (TAM), the information systems (IS) success model, and the unified theory of acceptance and use of technology (UTAUT) (e.g., Chen & Chang, 2013; Dutot, 2015; Shin & Lee, 2014). Much of the research on individual adoption of IT focuses exclusively on the underlying factors related to the NFC use in tourism. IT use and utilization in the tourism context are closely linked to individual factors under the influence of technology and tourism organizations. Thus, it is crucial to identify the factors that affect IT reuse intention and loyalty to a tourism destination.

This study examines the determinants of NFC reuse intention and Expo loyalty in relation to the utilization of NFC. This study applies the motivation-opportunity-ability (MOA) framework to explain how Expo visitors process given information using NFC. The MOA framework also posits that motivation, opportunity, and ability factors are determinants of IS users' perception as a parsimonious framework (e.g., Chou & Wang, 2000; Kim & Kankanhalli, 2009; Koo, Chung, & Nam, 2015; Tzeng, 2011). In terms of Expo loyalty related to NFC usage, this study focuses on satisfaction transfer from NFC to an Expo, which can affect the formation of loyalty to an Expo. Satisfaction with one object can be transferred to another (Martín, Camarero, & José, 2011; Ren et al., 2012) and therefore if satisfaction with NFC can be transferred to satisfaction to an Expo, the purpose of an Expo organization – to increase visitors' satisfaction with an Expo – can be promoted. The objective of this research is to ascertain how NFC usage intention and Expo loyalty are formed by the utilization of NFC in the Expo. The MOA framework and satisfaction transfer are therefore appropriate theoretical perspectives.

The role of NFC on reuse intention and Expo loyalty is investigated based on MOA theory and satisfaction transfer. The first objective of this research is to identify Expo visitors' motivation, opportunity, and ability factors affecting NFC value and NFC satisfaction using NFC. This research also investigates the effects of NFC value on NFC satisfaction and on Expo satisfaction in addition to the effects of NFC satisfaction on Expo satisfaction. Finally, this research identifies the effects of NFC on the reuse intention of NFC and the effects of Expo satisfactions on Expo loyalty.

The major contribution of this study will be to understand the role of NFC-based O2O services in an Expo. We expect the results of our study to reveal critical factors that should be considered in the planning and application of NFC in a smart tourism context such as Expos. The rest of the paper is organized as follows. This paper introduces NFC based service cases and studies in tourism and MOA, satisfaction transfer, value in theoretical background. Then, we present the research model and describe the research methodology, followed by our results. The paper concludes with a discussion of the limitations of the research and the implications of its findings.

2. NFC based service cases and studies in tourism

The NFC has been widely applied in tourism. In the UK, the cities of London and Manchester have used NFC technology in smart statues (Boden, 2014). The smart statue revitalizes landmarks, increasing the number of visitors to surrounding museums. NFC has also been applied by Project Ingeborg in Klagenfurt, Austria (Pinge.org., 2015). Project Ingeborg provides cultural contents through NFC tags around the city. For example, the contents of classical literature whose copyrights have expired can be downloaded at places or spaces that describe them through NFC (Davis, 2012). Since August 2012, the city has also provided novels, short stories and poems written by local artists to create a smart city space, thereby enriching experiences and satisfaction of both residents and tourists. Several cities in France and Spain use NFC

tags to offer information services for public transportation, city-specific news, cultural and tourist attractions (Connectthings, 2015). In Korea, museums and Expos have used NFC to increase revenue from ticket sales. For example, starting with the ubiquitous exhibition service system introduced in 2007 (Kim, Chan, & Gupta, 2007), NFC technology has been used at the 2012 Yeosu World Expo to accept mobile payment, as an exhibition guide, and to locate lost children. At the Korea Travel Expo 2013, NFC booths at the Seoul Motor Show offered game and promotional services (Benple, 2015; Choi, Jun, Kang, & Lee, 2013; Jun et al., 2014; Lee et al., 2013). In short, the NFC has been used at Expos for tourist information service to increase tourist satisfaction through smart tourism.

NFC utilization is an example of O2O services. The NFC-based O2O Expo examples in this study installed 1000 NFC tags in exhibition spaces to give visitors with language assistance, business card exchange, corporate information sharing, and automatic Wi-Fi. A visitor could obtain rich information about products or corporations by touching an NFC tag with a smart phones. Conclusively, NFC-based O2O services in Expos can help visitors to find online activities organically, thereby facilitating information, advertisements and sales of Expos as well as corporate participation in Expos and providing new experiences and convenient services for visitors, resulting in increases in satisfaction of Expo participation.

Most studies of NFC-based services focused either on case studies of NFC technology application, development and payment (e.g., Cheong, Ling, & Teh, 2014; Egger, 2013; Pesonen & Horster, 2012; Shin & Lee, 2014), or on how the services have been applied spatially. There have also been some comparisons of other technologies to NFC applications (Choi et al., 2013; Jun et al., 2014; Lee et al., 2013). Among the most recent is an empirical study of user acceptance of NFC using empirical data (e.g., Dutot, 2015). Because the vitality of NFC technology can be maintained and advanced only if NFC technology is used continuously, several studies have examined the acceptance of the technology. NFC-based O2O services can create a virtuous cycle by organically connecting offline with online activities. In this way, Expo visitors experience NFC services online and Expo experiences offline which they then share in their SNS online activities. Therefore, NFC plays an important role in linking Expo information provided online with offline. The adoption of NFC by Expo organizations generates loyalty to the Expo by ensuring Expo visitors' satisfaction. In this way the study contributes to the identification successful links between online and offline activities by determining factors that affect loyalty to the Expo and NFC reuse intention.

3. Theoretical background

3.1. Motivation-opportunity-ability

Previous studies of information technology (IT) adoption have been based on the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the theory of planned behavior (TPB) (Ajzen, 1991), TAM (Davis, 1989), the technology readiness and acceptance model (TRAM) (Lin, Shih, & Sher, 2007), the IS success model (DeLone & McLean, 1992), innovation diffusion theory (IDT) (Rogers, 1995), social cognitive theory (SCT) (Bandura, 1986), UTAUT (Venkatesh, Morris, Davis, & Davis, 2003), the elaboration likelihood model (ELM) (Bhattacharjee & Sanford, 2006) in IS and tourism studies. These perspectives represent that IT acceptance is affected by a user's cognitions and propensity (e.g., SIT, TRA, TPB, TAM, TRAM, UTAUT), communication process (e.g., ELM), product and system quality (e.g., IS success model), and social influence (e.g., IDT) (Bhattacharjee & Sanford, 2006). However, the prior research failed to explore tourists' IT acceptance because there are complex

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