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Location-based system: Comparative effects of personalization vs ease of use

Bongseok Choi [a], Ohbyung Kwon [b,*], Bongsik Shin [b,c]

[a] Korea Energy Economics Institute, 405-11 Jongaro, Jung-gu, Ulsan, Republic of Korea
[b] School of Management, Kyung Hee University, 26 Kyunghee daero, Dongdaemun-gu, Seoul, Republic of Korea
[c] College of Business Administration, San Diego State University, 5500 Campanile Dr, San Diego, CA 92182, United States

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ABSTRACT

Context-driven, personalized information services have become extremely popular for numerous mobile businesses to influence consumers' decision-making and improve subsequent benefits. In this research, we examine the effects of two explanatory variables (i.e., personalization and ease of use), arguably the two most critical factors, on the success of location-based system (LBS) in terms of economic gains, perceived benefits, and intention to continue service usage. Personalization enabled by contextualization (*personalization* for short) of LBS enhances the quality of information provided, and ease of use is a representative system quality variable. To examine the association, our research focuses on consumers' decision-making regarding where to buy gasoline and the effects of LBS-assisted searching for gas price information on user perceptions and actual behavior. We utilize two research methods for this empirical study: a field experiment and two complementary field surveys. The empirical findings confirm the strong association between the explanatory and consequence variables.

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1. Introduction

Personalization capability is essential to enhance the quality and acceptance of online systems (and system-enabled services), especially in mobile settings. Personalization capability helps users on the go cope quickly and efficiently with the abundance of available information (either situational or contextual), preventing information overload (Chiu et al., 2010). Many successful applications factor in user context, characterize situations, and provide information tailored to individual needs; this is especially true when these applications are designed for mobile users. Personalizing and optimizing the user interface to the context of the individual is an advanced view-design methodology whereby the presented information is automatically adapted to situational changes rather than remaining static regardless of the user or application context (Bolchini et al., 2013). In this study, we therefore use the two terms 'context-aware or contextualized' information and 'personalized' information interchangeably. Context-driven, personalized information services have become especially crucial for success of numerous online businesses, as they influence the process and outcome of consumers' decision-making (Chau et al., 2013; Lavie et al., 2010; Schiaffino et al., 2010; Zanker et al., 2010). The focus of this research is the location-based system (LBS), an extremely popular context-aware platform that uses the geospatial position of mobile devices to control service features and offer suggestions to users (e.g., store recommendations).

* Corresponding author.
E-mail addresses: bchoi4@keei.re.kr (B. Choi), obkwon@khu.ac.kr (O. Kwon), bshin@sdsu.edu (B. Shin).

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Despite its enormous potential and popularity, researchers and practitioners have found inconsistent evidence regarding the association between personalization capability and business outcomes. Some studies find that users are satisfied with personalization (Liang et al., 2007; Tam and Ho, 2005), while others find that they are not (Lavie et al., 2010). One reason for this inconsistency may have to do with the measurement of the effects of personalization on outcomes (Zanker et al., 2010). In most current studies, subjective measures based on perceptions, attitudes, and motivations are used (Ho and Bodoff, 2014), or indirect measures of user satisfaction are used such as click rates and time spent reading personalized content (Chiu et al., 2010; Zanker et al., 2010). In conducting this research on LBS, we depart from the traditional reliance on the self-report survey by adopting a research method that accommodates both a field experiment in a real-life setting and self-report field surveys to gather necessary data.

In embarking on this research, we presume that personalization and ease of use are the two most important conditions for success of mobile systems, according to the traditional theory of success in information systems and the popularity of *context-aware personalization* (*personalization* for short) of mobile applications. These two success conditions are crucial, as they augment user perceptions of information quality (through provision of tailored information) and system quality (characterized by ease of use), respectively. We examine their relative effects on three different success measures of LBS: financial gains, overall perceived benefits, and intention to continue system usage. We posit that financial gain as a result of changed user behavior in the process of decision-making is the most powerful evidence of the effects of LBS.

For this research, we conduct a field experiment in the domain of gas purchase decision-making by automobile drivers for whom an LBS provides gas price information reflecting the dynamic location of the decision-maker (i.e., driver). In the field experiment, participants in the control group completed the assigned task of searching for a gas station and purchasing gas without receiving assistance from context-aware technology, while participants in the treatment group used the LBS called Opinet (Oil Price Information Network; www.opinet.co.kr), which facilitates dynamic mobile comparison shopping. Then, additional data were gathered through self-report surveys. Our research therefore extends the findings of previous empirical studies that examined the impact of personalized mobile application systems primarily through the lens of self-reported benefits (Komiak and Benbasat, 2006; Kim and Son, 2009; Park, 2014).

2. Theory and literature

To understand the relationship between the variables included in this study, we relate the theoretical relevance of our research to the notions of consumer information searching and the conditions critical to information systems success. The former is intended to explicate the *financial effects of personalization services* and the latter to delineate the association between our two explanatory variables (i.e., personalization and ease of use) and two additional outcome variables: *perceptions of general benefit* and *intention to continue system usage*.

2.1. Consumer information searching

Consumer search theory has improved our understanding of how consumers form consideration sets in the process of searching for products or services and ultimately making choices. The original theory of consumer searching dates back to the seminal paper of Stigler (1961) in which the diversion of product/service prices was attributed to the cost of consumer search behaviors due to lack of perfect information. Stigler's model is based on the concept of non-sequential searching in which agents select from a fixed pool of items. In the model, consumers sample a fixed number of stores and choose to buy the lowest-priced alternative based on a simultaneous search strategy. However, the non-sequential search strategy has a limitation in modeling human behaviors, as it does not take into account newly obtained (e.g., context-aware) information that consumers might come across during the search process.

McCall (1970) and Mortensen (1970) developed *sequential consumer search theory* (SCST) to provide a better explanation of consumer search behaviors. An aspect of SCST particularly relevant to this study is the role of information complexity, in which obfuscation magnifies price dispersion as search costs increase. Obfuscation refers to the situation in which consumers experience cognitive limitations due to the complexity of price structures or presented information. According to this theory, consumers rationalize the tradeoff between the costs incurred and the benefits accrued from undertaking to arrive at a set of optimal options for which they have complete information. Consumers maximize their expected utility at a given product price by either accepting the lowest price available or searching further. When the provided information is uncontextualized, search costs increase. Under conditions of limited availability of personalized information, sub-optimal or even bad decisions are often made.

Several researchers have discussed the role of consumers' information gathering or information processing from the theoretical viewpoints of bounded rationality (Spiegler, 2006), information gatekeepers on the Internet (Baye and Morgan, 2001), information obfuscation (Ellison and Ellison, 2009; Ellison and Wolitzky, 2012) and consumers' beliefs about production costs (Janssen et al., 2011). Some experimental studies primarily focused on identifying the optimal search rules in terms of search duration or sequence (Kogut, 1990, 1992; De Los Santos et al., 2012); and decision time pressure in determining optimal choices (Reutskaja et al., 2011).

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