Decision Support Systems 115 (2018) 1–12

Contents lists available at ScienceDirect

Decision Support Systems

journal homepage: www.elsevier.com/locate/dss

Why do we share where we are? The influence of situational factors on the conditional value of check-in services

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ARTICLE INFO

Keywords:
Location-based services
Check-in services
System adoption
Conditional value

ABSTRACT

Location-based services (LBS) are among the major advancements in mobile internet applications since they take into account the geographic location of an entity and the ubiquitous nature of mobile services, using spatial decision support to provide customer value that exceeds that of traditional channels. However, the growth trajectory and associated adoption and diffusion of LBS have slowed, as challenges related to consumer perceptions persist. This study focuses on check-in services (CIS), a kind of LBS, like Facebook Locations and Foursquare, which use shared user experiences linked to geographical information to recommend places and venues. User adoption of CIS is particularly challenging, as the potential of location tracking is often regarded as a "double-edged sword" that benefits decision-making but risks the loss of privacy. To gain insights into users' voluntary CIS information disclosure, we combine the privacy calculus model (PCM) with the concept of conditional value and explore the effects of various situational stimuli in a true experiment and in data analyses that combine group comparisons with structural equation modelling (N = 296). The study confirms the relevance of conditional value to PCM and outlines direct and indirect effects of the situational factors of place relevance and frequency of location visit. The study makes several theoretical and practical contributions to the field of LBS adoption.

1. Introduction

Location-based services (LBS) are among the major advancements and most influential categories in mobile internet applications [1,2] as they take the geographic location of an entity into account [3]. Estimates suggest that LBS will generate up to $700 billion in value to consumer and business users [4] and that the global LBS market will grow from $15.04 billion in 2016 to $77.84 billion in 2021 [5]. While traditional technology-adoption research has examined LBS with regard to consumer perceptions [6–8], it has not addressed the specific attributes of applications and services, including situational factors [9,10]. Aspects of functionality, such as perceived ease of use and perceived usefulness, are weak adoption predictors in the case of "native" users of digital applications [11]. Users' adoption of interactive applications like LBS is predominantly determined by users' perceptions of the services' value [2]. The ability to measure the benefits that increase the value of location disclosure will contribute to the quality of LBS and the effectiveness of the respective business models [12]. Among the perceived risks of LBS, the risk to privacy has been one of the major challenges of LBS adoption since its introduction [13,14]. Users often refuse to reveal their locations because they are concerned about the possibility of abuse of location-based information [14].

The relationship between the perceived benefits and risks and their influence on user acceptance have been explained with the privacy calculus model (PCM) [15,16]. However, research has focused on an unspecific and static concept of perceived benefits that does not address the dynamic nature of location in a mobile setting (e.g., [16,17]). This study focuses on one category of LBS, check-in services (CIS). These services provide particularly valuable LBS, as they automatically combine location, time, and identity information to support decision-making. Services like Foursquare collect and analyze location-based user data and recommendations from a community to suggest "places to eat, drink, shop, or visit in any city in the world."[1] Such services require an active community to provide decision support, but the individuals who provide the data may not directly benefit from the service, instead sharing their experiences with others to support them. Despite the

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https://doi.org/10.1016/j.dss.2018.08.012
Received 2 March 2018; Received in revised form 30 August 2018; Accepted 31 August 2018
Available online 07 September 2018
0167-9236/

popularity of these services, how users' perceptions of CIS' benefits, risk, and value is established remains unclear [18]. In particular, research has not yet addressed the situational contexts in which CIS are used. Since the value of LBS arises from specific situations, the situational context is highly relevant to that value, so we address this research gap with an experimental study and build on PCM [15,16] to explore the situational influence factors that determine the conditional value of CIS and the related intention to disclose personal information. The related research questions are:

RQ1: How can the concept of conditional value be used with the PCM to explain CIS information disclosure?

RQ2: How do situational factors contribute to the generation of conditional value and CIS information disclosure?

We proceed as follows: First, we discuss LBS and CIS and the theoretical foundation of the study. Then, based on this discussion, we develop the research model. Next, we describe the methods applied in the paper and the related results, followed by a discussion of the theoretical and practical implications. We conclude with a summary of our contributions.

2. Related literature

This section defines the specifics of LBS and CIS and outlines the theoretical foundation of our study.

2.1. Location-based services and check-in services

We focus on users' geographic location information, which can be "any type of data that places an individual at a particular location at any given point in time, or at a series of locations over time" [19]. We define LBS as any kind of network-based, mobile information services that account for and result from the positional information taken from a mobile device to provide value-added services to users, depending on their geographic context and individual preferences [13,20,21].

This work follows the call for context-specific research in the area of LBS [16,22] by focusing on CIS as an application area of LBS. CIS allow users to "make their personal and location data publicly available through the (…) apps that allow users to 'check in' by publicly registering their current location for social purposes" [23]. Prominent examples in this category are Foursquare[2] (or its derivative, Swarm[3]) and Facebook Places.[4] Users use such services for such purposes as documenting places and telling stories about a location [1]. The location check-ins can also act as a decision aid for other users who are considering visiting a venue, as friends' visits are recorded and made available electronically. However, check-ins are not limited to venues and can be used at every location and at any point in time. Check-ins may be made during a visit to a club in another city, a sports stadium, or places visited daily, such as parking lots and grocery stores, so these check-ins allow a certain user to be "followed" without physically accompanying him or her [18].

Some LBS take only the user's location into account [26], such as when Google Maps is used on a desktop to explore a foreign country (see Desktop Google Maps in Fig. 1). However, Google maps can also take the time into account, as when it is used on a mobile device for GPS navigation, combining the current location with current traffic conditions. Therefore, we included mobile Google Maps in the location and time category in Fig. 1. LBS can also use the user's identity to "remember" where he or she has been before. Related applications like Foursquare provide a particularly high level of value for their users (see Fig. 1). However, also non-CIS applications like some locational social media, geographic and mobile customer relationship management (CRM), and some governmental intelligence applications can be assigned to the category that combines location, time, and identity (e.g., [25]). CIS are an ideal example, as they belong to this most sophisticated class of LBS. In addition, CIS are particularly suitable for the underlying research questions, as CIS rely on voluntary (and, therefore, conscious) disclosure of location. Such conscious decision-making is well suited to investigate the influence factors of these decisions, and using it follows the call for further examination of voluntary cases of information disclosure [22].

2.2. The theoretical lens of the privacy calculus model

Acceptance research in the domain of LBS has used several theoretical lenses. While many studies are based on the Technology Acceptance Model and related concepts like Venkatesh et al.'s [26] Unified Theory of Acceptance and Use of Technology (e.g., [27,28]), their applicability to the present research is questionable, as these models were developed in the context of the acceptance of mandatory technologies in an organizational context and do not take into account the intrinsic motivations for the everyday-life use of a technology [29,30]. These models also focus on a technology's capabilities, so contextual factors and their influence on the perceived risks and benefits are neglected [29,31].

Therefore, we build on the PCM as a theoretical foundation to explain the use of CIS [15,32]. At the individual level, privacy refers to an individual's ability to control how his or her personal information is used [33]. PCM is based on exchange theory, as it proposes that the individual decision is whether to disclose information, such that privacy is lost in exchange for the benefits of the service [34]. This benefit-risk exchange results in a privacy calculus that takes into account the perceived costs in the form of privacy risk and the benefits of the respective service [15,32]. In case that the benefits exceed the cost then this results in an intention to participate in the exchange by disclosing personal information. To that end, the intention to disclose is highly relevant for the acceptance of a service [16,35]. PCM was chosen as the theoretical foundation, as privacy is regarded as the major inhibiting factor in adopting LBS [14], but more research on the relevance of privacy risk to the decision to share real-time location data is required [23,36]. PCM is also particularly suitable, as services like CIS are usually free to use, but the user "pays" by providing personal data. PCM takes this trade-off into account and has been described as "the most useful framework for analyzing contemporary consumer privacy concerns" [15].

PCM also allows service-related benefits to be examined simultaneously [33] and has been successfully applied in various contexts (e.g., [34,37]). It is also highly flexible, as there is no established set of factors for benefits and costs [38]. For example, the benefits applied in the case of e-commerce range from personalization [39] to personal interest in internet content [34] to enjoyment [40]. In this context, the flexibility of the approach allows us to tailor the benefits and privacy risks to the special characteristics of CIS to enhance the results' relevance to our area of interest.

2.3. Integration of conditional value and situational factors

We use the concept of conditional value to determine the benefits of CIS. Pihlström and Brush [41] called for mobile service research to integrate the dimensions of time and location into the service-creation process. The related construct of conditional value is defined as the value experienced only in certain contexts or situations based on a particular time or the user's location, social environment, technological environment, or mental state [41]. The service is available independent of these conditional factors–ideally everywhere and at all times–but conditional value emerges only when the service is used based on the situation [41]. Time and place are the strongest predictors of conditional value [42], as "context is everything" for the interaction between

[2] https://foursquare.com/.
[3] https://de.swarmapp.com/.
[4] https://de-de.facebook.com/places/.