MASTER THESIS

Revising the TAM in hedonic information systems: The influence of the TAM, perceived enjoyment, innovativeness and extraversion on the use of location-based social networks.

Mariëlle E. Bouwman
s0220256

University of Twente
Faculty of Behavioural Sciences
Department of Media, Communication & Organisation

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Supervisors:
Dr. P.A.M. Kommers
Dr. A.J.A.M. van Deursen

ABSTRACT

As a hedonic information system, a location-based social network (LBSN) is often seen as a promising innovative mobile service in recent years. However, research on LBSNs is still limited. Little is known about the factors influencing the intention to use LBSNs and the actual use of LBSNs. Our study aims to explain the critical factors underlying the use of a LBSN, by developing a conceptual framework based on the Technology Acceptance Model, the theory of diffusion of innovations and the Five-Factor Model. To examine our proposed research model, we conducted an online survey among users of a Dutch LBSN (Feest.je). We applied structural equation modelling to test our research model. Our results demontrate that perceived usefulness, perceived ease of use, perceived enjoyment and innovativeness seems to be significantly predicting the intention to use and the actual use of LBSNs, and hedonic information systems in general. We found no effect of the influence of extraversion. In practical, our results suggest that developers of LBSNs should especially make their service pleasant and fun to use. Whether a service is seen as enjoyable, will in fact have a significant impact on the intention to use a service, and on the usefulness and ease of use of a service.

Keywords: hedonic, location-based, social network, extraversion, innovativeness, usefulness, ease of use, enjoyment, technology acceptance model.

INTRODUCTION

A significant shift in social media the last few years, is the transition from PC's to mobile devices, such as smartphones and tablet computers. Increasing technological possibilities of mobile phones facilitated a rapid growth of innovative mobile applications and services. Together with the increasing need of users for information to be available "all the time, everywhere, from all devices" (Zheng & Li, 2006, p. 23), this led to a shift in social media. One of these growing innovative mobile services, are location-based social networks (LBSNs), such as Foursquare, Facebook Places and Feest.je (the Dutch equivalent). These location-based services (LBS) are seen as one of the most promising applications in the next years: "location-based services can present powerful opportunities for brands to connect with people, based on where they are and what they are doing, offering a high degree of tailored messaging" (TNS, 2011).

In the literature, a LBSN is defined in various wording: such as commercial location-based online social network (Li & Chen, 2010), mobile social networks (Humphreys, 2010), mobile-device-based social networking service (Counts & Fisher, 2010) and SpotAFriendNow application (van den Berg & Pekarek, 2010). It is essential therefore, to first establish a clear definition of a LBSN. Here, a LBSN is defined as a hedonic (pleasure-oriented) information system, that: enables users to search for locations (geo-tagged information) with their mobile device (e.g., smartphone, tablet PC), allows users to check-in on that location, share their location (with users within the service, or with their entire social network) and offer the possibility to meet other users near that location (Fusco, Michael, & Michael, 2010a; Li & Chen, 2009). First started in 2000 as a simple mobile text-service with few users (Dodgeball), LBSNs grew the last decade into advanced location-based services, for example Foursquare (10 million users worldwide) and Facebook Places (approximately 40/50 million users worldwide).

Research on the field of LBSNs is still limited, partially due to the novelty in the field of information- and communication technologies. Some research focuses on the user characteristics (both demographic and geographic characteristics) by analysing user-data available from the website of a LBSN (Li & Chen, 2010), while others discuss the social implications when using a LBSN (Counts & Fisher, 2010; Fusco, Michael, Michael, & Abbas, 2010b; Humphreys, 2010) or go deeper into the technological aspects when using a LBSN (He, Liu, & Ren, 2011; Shirani-Mehr, Banaei-Kashani, & Shahabi, 2010). However, to our knowledge, no research has been conducted among the users of a LBSN to give more insight

in why they use LBSNs. In their research on the future face of social media, Universal McCann stated: "A deeper knowledge of consumer needs and motivations is the key to unlocking our understanding of social media" (p. 49). The contribution of this study is that it will give scientific insights into the critical factors affecting the use of hedonic information systems, and LBSNs in particular. Furthermore, results from this study can help developers of LBSNs (e.g., Foursquare or Feest.je) to understand the underlying mechanisms of the use of their services and can potentially help them to approach their current and potential users more effectively.

This study aims to explain the factors underlying the use of a LBSN, by developing a conceptual framework based on the Technology Acceptance Model (TAM), the theory of diffusion of innovations and the Five-Factor Model (FFM). Specifically, this paper will study the influence of perceived usefulness, perceived ease of use and perceived enjoyment (adapted from the TAM), innovativeness (adapted from the theory of diffusion of innovations) and extraversion (adapted from the FFM), on the intention to use and the actual use of LBSNs. The triangulation of these three theories will give a more thorough insight into explaining the use of LBSNs. In the study of Kim (2010) on mobile data services, the Theory of Planned Behaviour was combined with the Expectation-Confirmation Model. According to Kim (2010), an integrated model provides a more better understanding of their results than either theory considered alone.

Therefore, the research question central to this study is as follows: *"To what extent does the TAM, with the additional constructs perceived enjoyment, extraversion and innovativeness, contribute to explaining the intention to use and the actual use of LBSNs?"*

In an attempt to answer this question, we will first discuss relevant literature in theoretical background section. Subsequently, we will describe the used methods for this study, we will present the results and we will discuss the results, limitations and conclusions of this study.

2. THEORETICAL BACKGROUND

In the literature, several models can be found that try to explain the adoption and use of hedonic information systems. In their study on use patterns of location-based services, Lehrer, Constantiou & Hess (2010) use a model of perceptual and intuitive cognitive systems. Within the background context (experience, knowledge and expertise of the individual) and the context of use, the actual use of a location-based service is determined by the referencing processes (perceptual) and reason-based processes (intuitive). Furthermore, in another study, the model of Triandis is being used to explain the motives and barriers affecting the use of mobile data services (Bina, Karaiskos, & Giaglis, 2007). The model of Triandis presumes that use behaviour consists of three elements: intention, habit and facilitating conditions. Also, the motivation theory and network externalities are used by Lin & Lu (2011), to explain why people use social networking. According to Lin & Lu (2011), the intention to use is determined by internal (perceived benefit) and external motivations (number of members, number of peers and perceived complementarity). However, most models that examine the adoption and use of hedonic information systems, are based on the Technology Acceptance Model (TAM).

The TAM is a commonly used model to study the factors that determine the acceptance and use of several new information technologies, such as internet-related technologies (e.g., social network services, instant messaging, web 2.0 services, blogging) and mobile-related technologies (e.g., mobile services, smartphone applications, mobile knowledge management, mobile internet). The TAM aims to: "provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified (Davis, Bagozzi, & Warshaw, 1989, p. 985). Over the years, several modifications have been made to the original TAM, for example TAM2 (Venkatesh, 2000) and the Unified Theory of Technology Acceptance and Use (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). Based on various studies on the TAM, it becomes evident that the original model is still predictive when studying the acceptance and use of technologies. However, as stated by Davis (1989): "future research is needed to address how other variables relate to usefulness, ease of use, and acceptance". This study, therefore, will use the original TAM as a starting point and we will add external variables (perceived enjoyment, extraversion and innovativeness) that are relevant in the context of LBSNs.

According to the TAM, the actual use of a system is directly determined by the behavioural intention to use and indirectly by the perceived usefulness, perceived ease of use and external variables. These variables will be explained in the following sections.

2.1 Behavioural intention

The behavioural intention can be defined as the likelihood an individual intents to use a LBSN. However, the use of a LBSN is a rather general understanding. To date, no categorization has yet been made; therefore, we will try to distinguish between the various types of uses of a LBSN.

There are several kinds of LBSNs with different functionalities, some emphasize location-sharing and location-recommending (e.g., Brightkite, Where, Facebook Places), while others focus on the game-element (e.g., Foursquare, SCVNGR, Feest.je). For this study, Feest.je will be used to examine the use of a LBSN. Subsequently, the functionalities of Feest.je will be used to define the "actual use" of a LBSN. When looking at Feest.je, three functionalities can be distinguished, namely spots, parties and friends. Spots are the so-called locations, whereby the users of Feest.je are able to: search for spots, check-in on spots, create spots and give awards to spots. Furthermore, parties are a central element on Feest.je (feestje is Dutch for "party"), users of Feest.je can: search for parties, add parties and check-in on parties. Finally, friends play an important role on Feest.je; users of Feest.je are able to: search for friends, add friends, respond to check-in of friends and share their activity on Feest.je with friends. In sum, the actual use of a LBSN consists of three elements: spots, parties and friends.

According to the TAM, the behavioural intention will have a positive influence the actual use of a system. This assumption is supported by various studies on the intention to use services that are related to LBSN (e.g., Chang, 2007; Devaraj, Easley, & Crant, 2008; Kim, Shin, & Kim, 2010). However, it is noteworthy that the relationship between behavioural intention and the actual use of a technology, is often not included. Many studies lack the inclusion of this fundamental TAM relation into their research model (e.g., Agarwal & Karahanna, 2000; Chesney, 2006; Teo & Noyes, 2011; Wang, Lin, & Liao, 2010). Some researchers use non-users (e.g., students) to examine the use of a service (and thereby limiting themselves by examining the intention to use), while others simply don't include the actual use in their research model. However, when examining non-users, one is unable to examine the actual use of a particular service. These studies rely on the original TAM, where Davis (1989) argued that the behavioural intention to use a technology is a significant predictor of

the actual use of a technology. However, in our opinion, it is also important to actual examine the relation between the intention to use a service and the actual use. Based on our assumptions, we argue that the behavioural intention to use a LBSN will have a positive influence on the actual use of a LBSN. We propose the following hypotheses:

H1a: Behavioural intention has a positive influence on the actual use of spots.
H1b: Behavioural intention has a positive influence on the actual use of parties.
H1c: Behavioural intention has a positive influence on the actual use of friends.

2.2. Perceived usefulness

Perceived usefulness can be defined as the degree to which an individual believes that using a LBSN will enhance their performance (adapted from Davis (1989)). According to the TAM, perceived usefulness will have a positive influence on the behavioural intention. This assumption is supported by various studies on services related to LBSNs (e.g., Agarwal & Karahanna, 2000; Bina, et al., 2007; Chang, 2007; van der Heijden, 2004; Lin & Lu, 2011; Lu, Yao, & Yu, 2005; Qi, Li, Li, & Shu, 2009). For example, in his study on hedonic information systems Chesney (2006) shows that perceived usefulness has a significant influence on the intention to use. Furthermore, in their comparison of mobile services (text-messaging, contact, payment and gaming), Nysveen, Pedersen & Thorbjørnsen (2005) found out that perceived usefulness, as a antecedent, had a significant influence on the intention to use a mobile service. Also, Parveen & Sulaiman (2008) showed that perceived usefulness plays a significant positive influence on the intention to use wireless internet applications on a mobile device. Lastly, a study by Verkasalo, López-Nicolás, Molina-Castillo & Bouwman (2010), showed a strong significant influence of perceived usefulness on the intention to use smartphone applications. Based on these findings, we argue that the perceived usefulness of a LBSN will have a positive influence on the behavioural intention to use a LBSN. Therefore, we propose the following hypothesis:

H2: Perceived usefulness has a positive influence on the behavioural intention.

2.3 Perceived ease of use

Perceived ease of use is the extent to which an individual beliefs that using a LBSN will be effortless (adapted from Davis (1989)). According to the TAM, perceived ease of use will have positive influence on the behavioural intention. Furthermore, perceived ease of use will

have a positive influence on the perceived usefulness. These assumptions are supported by various studies on services related to LBSNs (e.g., Agarwal & Karahanna, 2000; Bina, et al., 2007; Chang, 2007; Chen & Chen, 2011; Nysveen, et al., 2005; Qi, et al., 2009). For example, in their study on the adoption of wireless internet applications on a mobile device, Lu et al. (2005), found out that perceived ease of use played a significant positive influence in the intention to adopt the applications. Furthermore, in the studies of Lu et al. (2005) and Venkatesh (2000), a strong positive influence of perceived ease of use on the perceived usefulness was found. Moreover, van der Heijden (2004) showed in his study on hedonic information systems, that perceived ease of use had a significant positive influence on the behavioural intention as well as on the perceived usefulness. Based on these findings, we argue that the perceived ease of use of a LBSN will have a positive influence on the behavioural intention to use a LBSN. Furthermore, we argue that the perceived ease of use of a LBSN will have a positive influence on the perceived usefulness of a LBSN. Therefore, we propose the following hypotheses:

H3a: Perceived ease of use has a positive influence on the perceived usefulness.
H3b: Perceived ease of use has a positive influence on the behavioural intention.

2.4 Perceived enjoyment

As mentioned before, Davis (1989) stated that future research on the TAM needs to examine other antecedents that influence the behavioural intention, besides perceived usefulness and perceived ease of use. In a follow-up study, Davis, Bagozzi & Warshaw (1992) made a distinction between extrinsic (perceived usefulness, perceived ease of use) and intrinsic motivations (perceived enjoyment). Perceived enjoyment can be defined as the extent to which using a LBSN is enjoyable and pleasant (adapted from Davis et al. (1992)). Subsequently, they added perceived enjoyment to their model. According to their study, the most significant determinants of behavioural intention are perceived usefulness, perceived ease of use and perceived enjoyment (Davis, et al., 1992). This assumption is supported by various studies on services related to LBSNs (e.g., Bina, et al., 2007; Chang, 2007; Chen & Chen, 2011; Chesney, 2006; Kim, 2010; Nysveen, et al., 2005; Verkasalo, et al., 2010). For example, Lin & Lu (2011) found a significant positive influence of perceived enjoyment on the intention to use social networking. Van der Heijden (2004) showed in his study on hedonic information systems, that perceived enjoyment has a significant positive influence on the intention to use. Furthermore, in their study on technology use among pre-service

teachers, Teo & Noyes (2011) showed a significant positive influence of perceived enjoyment on the intention to use technology. Moreover, they found a significant positive influence of perceived enjoyment on perceived usefulness and perceived ease of use (Teo & Noyes, 2011). Also, in their study on mobile hedonic applications, Liu & Li (2011) found a significant positive influence of perceived enjoyment on perceived usefulness. Venkatesh (2000) shows, in his study into the determinants of perceived ease of use, that perceived enjoyment has a significant positive influence on perceived ease of use. Based on these findings, we believe that perceived enjoyment will play an important role in the use of a pleasure-oriented information system, like a LBSN. Therefore, perceived enjoyment will be added as an antecedent in the TAM. We argue that the perceived enjoyment of a LBSN will have a positive influence on the behavioural intention to use a LBSN. Furthermore, we argue that the perceived of a LBSN will have a positive influence on the perceived usefulness and the perceived ease of use of a LBSN. Therefore, we propose the following hypotheses:

H4a: Perceived enjoyment has a positive influence on perceived usefulness
H4b: Perceived enjoyment has a positive influence on perceived ease of use
H4c: Perceived enjoyment has a positive influence on the behavioural intention

As stated before, an integrated model of theories will provide a better understanding and explanation, than one theory alone (Kim, 2010). Also, when Davis et al. (1992) included perceived enjoyment in their model, they claimed that further research is needed to examine the role of additional constructs within the TAM. These additional constructs can be found in other theories, for example the Five Factor Model (FFM) of personality. When looking at various studies on the TAM and hedonic information systems, it is remarkable that personality as a construct is often not included. For example, in the UTAUT (latest version of the TAM) only individual differences in the form of age and gender are incorporated in the model (Venkatesh, et al., 2003). This is confirmed by Thorbjørnsen, Pedersen & Nysveen (2007), they argue that social and identity-related influences often are neglected in research on technology and service adoption. The study of Rosen & Kluemper (2008) confirms that personality traits are important predictors of perceived ease of use and perceived usefulness in the context of social networking technologies. Furthermore, Devaraj et al. (2008) related the personality traits of the FFM to the TAM. They found that the dimensions of the FFM are useful predictors of perceived usefulness and intention to use (Devaraj, et al., 2008). Also, studies of Wang, Lin & Liao (2010) and Wang (2010) on information systems, confirm a

positive relation between personality and the perceived enjoyment when using an information system. Based on these findings, we argue that the personality traits of the FFM will have a significant influence on the constructs of the TAM. In the next section, we will explain the FFM and we will relate this theory to the constructs of the TAM.

2.5 Extraversion

As a commonly used approach in research on personality, the FFM divides personality into five different dimensions, namely: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience (McCrae & John, 1992). The first trait, extraversion, reflects a person's tendency to exhibit social behaviour and to experience positive emotions (Ross et al., 2009). Secondly, agreeableness reflects the tendency of a person to be trustworthy, compliant, sympathetic and cooperative (Ross, et al., 2009). The third dimension, conscientiousness, reflects the extent to which a person is organized, dedicated and conscientious (Ross, et al., 2009). As four trait, neuroticism, reflects the tendency of a person to experience psychological distress and to be extremely sensitive to threats (Ross, et al., 2009). Lastly, openness to experience, represents a person's willingness to consider alternatives, be curious and to enjoy artistic activities (Ross, et al., 2009).

In the case of LBSNs, the trait of extraversion seems to be of particular interest. After all, a LBSN facilitates social behaviour, in the form of searching for other users, sharing activity with other users and if desired, meet with other users. Social behaviour is central to the trait of extraversion. A highly extraverted individual will be sociable, will seek activity and excitement, will be assertive and will seek the company of others. We believe that these needs of an extraverted individual can be gratified when using a LBSN.

The importance of extraversion as an antecedent when studying technology and service adoption, has only been studied by a few researchers. First of all, extraversion has a positive influence on the use of Internet (Kiesler et al., 2002) and the use of social networking websites (Ross, et al., 2009). Furthermore, according to research of Butt & Philips (2008) and Inyang et al. (2010), extraversion has a positive influence on the degree of mobile phone use. Moreover, in their study on relating personality to the TAM, Devaraj et al. (2008) found out that extraversion had a significant indirect influence on the intention to use. Extraversion is also positive related to perceived usefulness (Rosen & Kluemper, 2008), perceived ease of use (Rosen & Kluemper, 2008) and perceived enjoyment (Wang, 2010; Wang, et al., 2010). Based on these findings, extraversion will be added as an antecedent in the TAM. We argue that extraversion will have a positive influence on the behavioural intention to use a LBSN.

Furthermore, we argue that extraversion will have a positive influence on the perceived usefulness, perceived enjoyment and the perceived ease of use of a LBSN. Therefore, we propose the following hypotheses:

H5a: Extraversion has a positive influence on perceived usefulness
H5b: Extraversion has a positive influence on perceived enjoyment
H5c: Extraversion has a positive influence on perceived ease of use
H5d: Extraversion has a positive influence on the behavioural intention

Besides extraversion, another antecedent could potentially affect the degree of acceptance and use of LBSNs, namely the degree of innovativeness of a person. Especially when studying new technologies such as LBSNs, we believe that this variable could be an influential construct. This assumption is supported by several studies on the influence of innovativeness on the intention to use services that are related to LBSNS. Also, Agarwal & Prasad (1998) claim that the degree of innovativeness will give valuable insights in the reasons why some individuals adopt the new technologies, while others reject them. Therefore, the inclusion of innovativeness as a construct to the model seems appropriate. A theory that is often used, when assessing the degree of innovativeness, is the theory of diffusion of innovations. This theory can help explain the adoption and acceptance of new technologies (Rogers, 1995). However, in our opinion, using this theory alone would be insufficient to explain the use of LBSNs. Therefore, we argue that when integrating this theory with the TAM, a better explanation can be given of the intention to use LBSNs and the actual use. In the next section, we will explain the theory of diffusion of innovations and we will relate this theory to the constructs of the TAM.

2.6 Innovativeness

Developed by Rogers (1995), the theory of diffusion of innovations tries to explain how innovations are adopted and are being spread over time. The degree of adoption is determined by the characteristics of the innovation (e.g., the relative advantage to the user and the complexity of the technology) (Rogers, 1995) and the degree of innovativeness of the individual adopting the innovation (Agarwal & Prasad, 1998). Innovativeness can be defined as: “the willingness of an individual to try out any new information technology” (Agarwal & Prasad, 1998, p. 206). Agarwal & Prasad (1998) claim that innovativeness is a rather stable trait, and will therefore not change significantly when applied to different types of

information technology. Furthermore, individuals with a high score on innovativeness are expected to develop more positive attitudes towards new technologies (in this study LBSNs).

When looking at the literature, several studies show a strong significant influence of the degree of innovativeness on the use of services that are related to LBSNs (e.g., Agarwal & Karahanna, 2000; Kuo & Yen, 2009; Parveen & Sulaiman, 2008). For example, in his study on the adoption of mobile commerce, Yang (2005) shows that innovativeness has a significant influence on the TAM constructs of perceived usefulness and perceived ease of use. This is also confirmed by a study of Lu et al. (2005) on the adoption of wireless internet services via mobile technology. They found out that innovativeness had a significant positive relation on the perceived usefulness and perceived ease of use (Lu, et al., 2005). Furthermore, studies of Kwon, Choi & Kim (2006) and Tang & Chiang (2009) on mobile services, show that innovativeness is a significant predictor of perceived usefulness. Finally, Qi et al. (2009) claim that innovativeness has a positive influence on the behavioural intention to use mobile data services. Based on these findings, innovativeness will be added as an antecedent in the TAM. We argue that innovativeness will have a positive influence on the behavioural intention to use a LBSN. Furthermore, we argue that innovativeness will have a positive influence on the perceived usefulness, perceived enjoyment and the perceived ease of use of a LBSN. Therefore, we propose the following hypotheses:

H6a: Innovativeness has a positive influence on perceived usefulness
H6b: Innovativeness has a positive influence on perceived enjoyment
H6c: Innovativeness has a positive influence on perceived ease of use
H6d: Innovativeness has a positive influence on the behavioural intention

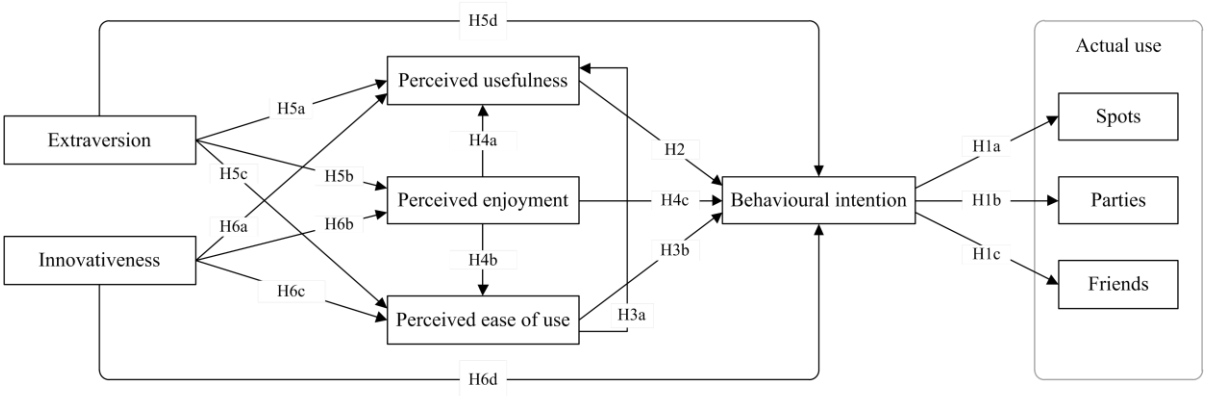

Figure 1. Research model.

Based on the previous assumptions on the hypothesized influences between the actual use, behavioural intention, perceived usefulness, perceived ease of use, perceived enjoyment, extraversion and innovativeness, we propose our research model (see Figure 1).

To test the research model, two studies are conducted among users of Feest.je. First, a preliminary study was conducted to shed light on the hypothesized constructs and other not-hypothesized constructs that could influence the use of Feest.je. By first examining the use of Feest.je with a qualitative study, evidence could be found supporting other variables than the hypothesized constructs. Subsequently, the main study was conducted to examine the proposed research model. The next section will discuss the methods used in these studies.

3. METHOD

3.1 Preliminary study

3.1.1 Sample and procedure

To examine whether the proposed constructs were relevant to the use of Feest.je, a short preliminary study was conducted. In July 2011, a total of 67 Feest.je users were asked to participate in a short online survey. The sample comprised seven males, one female and three unknown (M = 31.50, SD = 8.16). Participants were recruited through searching on Twitter for tweets relating to the usage of Feest.je. We assume that Feest.je users, who share their activity on Twitter, are able to give valuable input for a preliminary qualitative study. The degree of Feest.je usage varied across the participants – 72.7% of the Feest.je users reported to be occasional users, followed by 18.2% regular users and 9.1% rare users.

3.1.2 Measures

The online survey consisted of a series of questions measuring the degree of usage (by asking questions, on a five-point Likert scale (1 = “often”, 5 = “never”), about the usage of spots, parties and friends, see paragraph 3.2.2 and Appendix A), alongside with some demographic questions (gender, age, education and geographic location). Furthermore, on a five-point Likert scale (1 = “strongly disagree, 5 = “strongly agree), questions were asked about the social behaviour (creating and maintaining social relationships, social influence, sharing experiences), innovativeness and enjoyment of the participants when using Feest.je. Finally, to examine the possibility of other not-hypothesized constructs influencing the use, open-ended questions were asked concerning the reason participants use Feest.je (why do you use Feest.je, what do you use Feest.je for, when do you use Feest.je, what is the first thing that

comes to mind when you use Feest.je and describe in what kind of situations you use Feest.je).

3.2 Study

3.2.1 Sample and procedure

To examine the relationship between the proposed constructs, an online survey was conducted among Feest.je members in September 2011. A total of 13858 Feest.je users randomly received an e-mail invitation from Feest.je. In this e-mail, they were asked to participate in the online survey. Furthermore, this invitation provided a short introduction to the survey, a time estimate to complete the survey and information about the incentive the Feest.je users would receive when they completed the survey (a Feest.je badge). A first invitation was sent between September 8, 2011 and September 19, 2011. Subsequently, the reminder was sent on September 26, 2011.

A total of 236 e-mail addresses turned out to be invalid, which leaves 13622 valid email addresses. A subset of 210 Feestje.je users (158 male, 46 female and 6 unknown) participated in the study, whereby 200 participants completed the entire survey and 10 participants did not filled in the demographic questions. Participants ranged in age from 15 to 69 (M = 33.65, SD = 10.63). The degree of Feest.je usage varied across the participants – 36.2% of the Feest.je users reported to be rare users, followed by 31.4% occasional users, 27.1% non-users and 5.2% regular users (M = 2.15, SD = .88).

3.2.2 Measures

Usage. As is evident from the theoretical background section, the actual use of Feest.je consists of three basic functionalities, namely spots, parties and friends. Using these functionalities, we developed a scale to measure the degree of actual use of Feest.je. On a five-point Likert scale (1 = “often”, 5 = “never”), participants filled in the extent to which they used spots (such as checking-in at locations and searching for locations), parties (e.g., checking-in at parties and add parties to Feest.je) and friends (for example, searching for friends on Feest.je and sharing activity with other social networks) (see Appendix A). The scale was proven to be reliable (α = .94), when tested in the preliminary study and the pre-test (N = 48). The obtained Cronbach’s alpha reliability estimate was .93.

Extraversion. To determine the degree of extraversion, the Extraversion subscale of the Dutch NEO Five-Factor Inventory (NEO-FFI; Hoekstra, Ormel, & De Fruyt, 2003) was

used. On a five-point Likert scale (1 = "strongly disagree, 5 = "strongly agree), participants were asked to rate their agreement on the 12-items of the Extraversion subscale (see Appendix A). A higher score on this scale, indicates a higher level of extraversion as a personality trait. The obtained Cronbach's alpha reliability estimate was .73 (see Table 1).

Innovativeness. To measure the degree of innovativeness of the participants, a four-item scale was adapted from Agarwal & Prasad (1998) (see Appendix A). This scale is proven to be reliable when assessing the degree of personal innovativeness in the context of IT (Agarwal & Karahanna, 2000; Agarwal & Prasad, 1998), context-aware services (Kwon, et al., 2006) and mobile data services (Lu, et al., 2005). On a five-point Likert scale (1 = "strongly disagree, 5 = "strongly agree), participants were asked to rate their agreement with the items. Slight modifications were made to the items when translating them into Dutch. A higher score on this scale, indicates a higher degree of innovativeness as a personality trait. The obtained Cronbach's alpha reliability estimate was .77 (see Table 1).

Perceived usefulness, perceived ease of use, behavioural intention and perceived enjoyment. To measure the constructs of perceived usefulness, perceived ease of use and behavioural intention, items from the TAM (Davis, 1989) were used. These items are well-validated and are a commonly used method to assess the mentioned constructs. To determine the degree of enjoyment, adapted items from Venkatesh (2000) and Verkasalo et al. (2010) were used. Participants were asked to rate their agreement with the items on a five-point Likert scale (1 = "strongly disagree, 5 = "strongly agree). The items were translated into Dutch and adapted to this study (see Appendix A). The obtained Cronbach's alpha reliability estimate for the four constructs was .79 (also see Table 1).

4. RESULTS

4.1 Preliminary study

Participants had a positive attitude towards using Feest.je to facilitate social behaviour (M = 3.39, SD = .56). Moreover, participants had a significant positive attitude towards using new mobile and internet-related technologies (M = 4.8, SD = .37, p < .001). Finally, when asked about enjoyment when using Feest.je, participants had a significantly positive attitude towards using Feest.je (M = 4.13, SD = .64, p < .01).

Open-ended questions about the reasons participants used Feest.je, indicated that there are several reasons why Feest.je is being used. Most important is the reason that the participants "liked" to use Feest.je (16.1%). Also, participants were asked to indicate in what kind of situation they used Feest.je the most. Feest.je was particularly used when checking-in to pleasure-oriented occasions, for example going to a restaurant, a club or a party (28.6%).

Results of the preliminary study indicate that, besides the commonly-used constructs of the TAM (perceived ease of use and perceived usefulness), other constructs also play a role in the use of Feest.je. It was proposed that the degree of innovativeness, extraversion (social behaviour) and enjoyment would play a significant role in the use of Feest.je. The preliminary study confirms this assumption. Furthermore, we found no evidence for supporting other variables than the hypothesized constructs.

4.2 Study

The means, standard deviations and Cronbach's alpha reliability estimates were calculated for the two predictor variables and four criterion variables (see Table 1). Also, the mean and the standard deviation of extraversion were compared to norm scores of the NEO-FFI (Hoekstra, et al., 2003). This comparison indicates that the average score on extraversion was significantly higher than the published norm in the NEO-FFI *(M* = 40.1, $p < .001$).

4.2.1 Structural equation modelling

To test the proposed research model (see Figure 1), structural equation modelling using Amos 18.0 (Arbuckle, 2009) was applied. Structural equation modelling is a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon (Byrne, 2001). Typically, this theory represents causal processes that generate observations on multiple variables (Bentler, 1989).

Table 1.
Descriptive statistics and reliability.

Variables	#Items	Mean	SD	Cronbachs alpha
Extraversion	12	43.43	5.75	.73
Innovativeness	4	4.31	.70	.77
Perceived usefulness	3	2.47	.95	.87
Perceived enjoyment	3	3.10	.84	.70
Perceived ease of use	2	4.08	.79	.65
Behavioural intention	2	3.26	1.08	.89

N = 210.

Synonyms for structural equation modelling are covariance structure analysis, covariance structure modelling, and analysis of covariance structures. According to Byrne (2001), the term structural equation modelling conveys two important aspects of the procedure: (1) that the causal processes under study are represented by a series of structural (i.e., regression) equations, and (2) that these structural relations can be modelled pictorially to enable a clearer conceptualization of the theory under study. The hypothesized model can then be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data. Byrne (2001) poses that if the goodness of fit is adequate, the model argues for the plausibility of postulated relations among variables; if it is inadequate, the tenability of such relations is rejected.

To assess if the sample size was adequate for structural equation modelling, Hoelter's critical N was computed. At the .05 level of significance, the model in Figure 1 resulted in a Hoelter's N of 415. Furthermore, at the .01 level of significance, the model of Figure 1 resulted in a Hoelter's N of 732. Because the sample size is sufficient (Hoelter's N > 200), we can apply structural equation modelling.

4.2.2 Path analyses

Before examining the paths of our research model, the correlation matrix of the variables is computed (see Table 2). First of all, as hypothesized, there seems to be a strong significant positive relation between the perceived ease of use and perceived usefulness.

Table 2.
Correlation matrix.

Variables	2	a	b	c	3	4	5	6	7
2. Actual use	-	-	-	-	-	-	-	-	-
a. Spots	.85**	-	-	-	-	-	-	-	-
b. Parties	.76**	.63**	-	-	-	-	-	-	-
c. Friends	.87**	.75**	.57**	-	-	-	-	-	-
3. Extraversion	*.02*	*-.05*	*.02*	*.07*	-	-	-	-	-
4. Innovativeness	*-.01*	*-.01*	*-.09*	*.03*	.17*	-	-	-	-
5. Perceived usefulness	.22**	.22**	.28**	.15*	*-.05*	*-.09*	-	-	-
6. Perceived enjoyment	.24**	.24**	.20**	.23**	*-.08*	*.06*	.56**	-	-
7. Perceived ease of use	.20**	.21**	.17*	.18**	*.03*	.32**	.23**	.47**	-
8. Behavioural intention	.33**	.34**	.32**	.29**	*-.07*	*-.02*	.57**	.65**	.42**

$N = 210$.

*$p < .05$ (2-tailed).

**$p < .01$ (2-tailed).

Non-significant correlations are in italic.

However, when linking these two variables in the structural equation modelling, this connection would lead to a not-fitted model.

Secondly, it was hypothesized that innovativeness had a direct influence on the behavioural intention. However, examination of the structural model, shows that this connection would not lead to a fitted model (χ^2 (36) = 17.998, χ^2 /df = .986, SRMR = .027, TLI = 1.001, RMSEA = .000 (90% confidence interval [CI]: .000, .06), AIC = 93.800, ECVI = .449 (CI: .450, .511)).

Furthermore, there seems to be a strong positive relation between actual use and perceived usefulness, perceived enjoyment, perceived ease of use and behavioural intention. However, when including actual use as a variable in the research model, this does not lead to a fitted model (χ^2 (21) = 16.338, χ^2 /df = .819, SRMR = .016, TLI = 1.012, RMSEA = .000 (90% confidence interval [CI]: .000, .108), AIC = 66.456, ECVI = .318 (CI: .321, .356)). Actual use, therefore, will not be included in the path analysis.

As stated before, the actual use consists of three variables: spots, parties and friends. As evidenced in the correlation matrix, there are significant positive relations between these three variables of actual use (2a, 2b and 2c) and the perceived usefulness, perceived enjoyment, perceived ease of use and behavioural intention. When adding the variables of actual use separately to the research model, this leads to a fitted model. However, the model only shows a good fit when these variables are only associated with the behavioural intention (χ^2 (36) = 17.998, χ^2 /df = 1.047, SRMR = .030, TLI = .997, RMSEA = .015 (90% confidence interval [CI]: .000, .068), AIC = 93.698, ECVI = .448 (CI: .445, .514)). This is in accordance with previous research, where behavioural intention directly determines the actual use (Chang, 2007; Kim, et al., 2010).

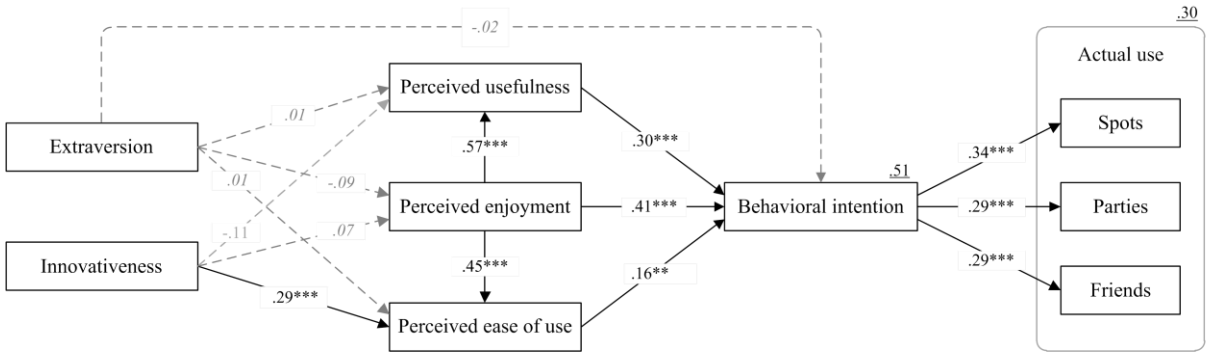

Figure 2. Standardized path coefficients of the research model.

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Non-significant paths are the dotted lines (and in italic). Squared multiple correlations are underlined.

4.2.3 Path model & hypotheses

Based on the path analyses, a fitted model is computed (see Figure 2) (χ^2 (36) = 17.998, χ^2 /df = 1.047, SRMR = .030, TLI = .997, RMSEA = .015 (90% confidence interval [CI]: .000, .068), AIC = 93.698, ECVI = .448 (CI: .445, .514)). This model shows the standardized path coefficients and variance accounted for by the complete set of variables (consisting of the factor loading (β) and the squared multiple correlations (R^2).

The variance accounted by for the complete set of variables is expressed in the squared multiple correlations. Perceived usefulness, perceived enjoyment, perceived ease of use and innovativeness explained 51% of the variance in the behavioural intention. Furthermore, the actual use was accounted by the research model for 30%.

Based on the preceding path model, an overview of the hypotheses has been made (see Table 3). The findings of this study indicate that the behavioural intention (H1a, H1b, H1c), has a significant positive influence on the actual use of a LBSN. Furthermore, the perceived usefulness (H2), perceived ease of use (H3b, H3c) and perceived enjoyment (H4a, H4b, H4c) have a significant direct positive influence on the behavioural intention to use a LBSN. Subsequently, these hypotheses are supported. Moreover, we can reject H3a, because the

Table 3.

Path coefficients

Hypothesis	Path	*β*-value	*p*-value	Result
H1a	BI → USE	.34	.001	Supported
H1b	BI → USE	.29	.001	Supported
H1c	BI → USE	.29	.001	Supported
H2	PU → BI	.30	.001	Supported
H3a	PEOU → PU	not-fitted	not-fitted	Not supported
H3b	PEOU → BI	.16	.01	Supported
H4a	PE → PU	.57	.001	Supported
H4b	PE → PEOU	.45	.001	Supported
H4c	PE → BI	.41	.001	Supported
H5a	EX → PU	.01	.87	Not supported
H5b	EX → PE	-.09	.20	Not supported
H5c	EX → PEOU	.01	.82	Not supported
H5d	EX → BI	-.02	.62	Not supported
H6a	IN → PU	-.11	.06	Not supported
H6b	IN → PE	.07	.29	Not supported
H6c	IN → PEOU	.29	.001	Supported
H6d	IN → BI	not-fitted	not-fitted	Not supported

influence of perceived ease of use on perceived usefulness was not evident in our fitted model. Also, the study showed that extraversion did not have a significant influence on the behavioural intention, perceived usefulness, perceived enjoyment and perceived ease of use. Therefore, H5a, H5b, H5c and H5d are rejected. Furthermore, the findings of this study indicate that innovativeness had a significant influence on perceived ease of use (supporting H6c), but not on perceived usefulness, perceived enjoyment and the behavioural intention (rejecting H6a, H6b and H6d).

5. DISCUSSION

5.1 Main findings

The present study contributes to the literature on the use of hedonic information services, by developing an integrated model to examine the use of a LBSN. We used a combination of three theories, the TAM, the FFM and the theory of diffusion of innovations, to examine the critical factors underlying the intention to use and the actual use of LBSNs. Specifically, by adding additional constructs to the TAM (i.e., perceived enjoyment, extraversion and innovativeness), we sought to explain the use of Feest.je.

The results of the present study indicate that the actual use of a LBSN can be significantly predicted by the intention to use a LBSN. Furthermore, the perceived usefulness, perceived enjoyment and perceived ease of use are significant predictors of the intention to use a LBSN. Also, perceived enjoyment is a significant predictor of perceived usefulness and perceived ease of use. Perceived enjoyment is regarded as the key influencer of the research model. Lastly, we found that innovativeness is a significant predictor of perceived ease of use.

Consistent with the literature, we found that the behavioural intention to use a LBSN has a direct positive influence on the actual use of a LBSN (e.g., Chang, 2007; Devaraj, et al., 2008; Kim, et al., 2010). Furthermore, the behavioural intention to use a LBSN is predicted by the perceived usefulness, perceived enjoyment and perceived ease of use. This indicates that the degree of which a LBSN is seen as useful, has a positive influence on the intention to use the LBSN. This is in accordance with previous studies, where a significant positive relation between the perceived usefulness and behavioural intention was found (e.g., Chang, 2007; Chesney, 2006; Nysveen, et al., 2005; Verkasalo, et al., 2010). Furthermore, our study shows that the degree to which a LBSN is seen as easy to use, has a positive influence on the intention to use the LBSN. Our finding is consistent with previous research, where a positive

relation between the perceived ease of use and behavioural intention is proven to be significant (e.g., Chen & Chen, 2011; van der Heijden, 2004; Lu, et al., 2005; Qi, et al., 2009).

In accordance with previous studies, we found that innovativeness has a positive influence on the perceived ease of use (e.g., Kuo & Yen, 2009; Kwon, et al., 2006; Lu, et al., 2005; Parveen & Sulaiman, 2008; Tang & Chiang, 2009). Our findings imply that a higher score on the degree of innovativeness, leads to an increasing perception of the ease of use of a LBSN. That is, a LBSN is seen as easier to use by individuals high on innovativeness, than individuals low on innovativeness. A possible explanation lies in the fact that individuals high on innovativeness are more experienced with new information technologies, than individuals low on innovativeness. Subsequently, this familiarity leads to an increasing ease of use of a LBSN.

Also, our study reveals that extraversion has no significant influence on the perceived usefulness, perceived enjoyment, perceived ease of use and behavioural intention. This finding is contrary to existing work which found extraversion to be significantly related to the TAM (e.g., Devaraj, et al., 2008; Rosen & Kluemper, 2008; Wang, 2010; Wang, et al., 2010). Although the participants in our study significantly scored higher than the average norm score of the NEO-FFI (Hoekstra, et al., 2003), we found no significant effect of extraversion on one of the constructs of our research model.

Lastly, our results show that perceived enjoyment is the key influencer in our research model. Corresponding to previous work, we found that perceived enjoyment is a significant predictor of perceived usefulness (Liu & Li, 2011; Teo & Noyes, 2011), perceived ease of use (Teo & Noyes, 2011; Venkatesh, 2000) and behavioural intention (Chen & Chen, 2011; van der Heijden, 2004; Verkasalo, et al., 2010). This means that the more pleasure and fun an individual experiences when using a LBSN, the more this LBSN is seen as useful and easy to use. Moreover, the intention to use a LBSN will be higher, when an individual experiences pleasure, enjoyment and fun during the use.

More importantly, our findings stress the importance of including perceived enjoyment into the TAM when studying hedonic information systems. Our study shows that perceived enjoyment is significant positively related to the core concepts of the TAM, therefore taking a prominent role in our research model. Most of the research on the TAM is focused on utilitarian contexts, where the perceived usefulness and perceived ease of use, as core concepts, seem to be fulfilling in predicting the behavioural intention to use an information system. When using the TAM to study a pleasure-oriented service however, we argue that perceived enjoyment should be taken into account. Previous work of Chesney (2006) and van

der Heijden (2004) support our assumption, by claiming that perceived enjoyment should be seen as a key determinant in the use of hedonic information systems. When looking at several studies that have incorporated perceived enjoyment into the TAM, it is remarkable though, that they only examine the influence of perceived enjoyment on one or two core concepts of the TAM (e.g., Chen & Chen, 2011; Lin & Lu, 2011; Liu & Li, 2011). To our knowledge, only van der Heijden (2004), Chesney (2006) and Lin & Lu (2011) examined the incorporation of perceived enjoyment as a key influencer into their research model. However, these three studies were limited to the field of hedonic websites, pleasure-oriented software and social networks. Our study contributes to the literature by examining the influence of perceived enjoyment on the core concepts of the TAM in the context of mobile hedonic information services, namely LBSNs.

5.2 Limitations and future research

This study has several limitations that should be taken into account. First of all, we measured the degree of usage of Feest.je among our sample. As evidenced in the method section, approximately 67,6% of the participants reported to be rare or occasional users. We believe that our research model could have been influenced by this low degree of usage. For example, we hypothesized that individuals who are sociable and extravert, would tend to use a LBSN more. It is possible that we found no effect, due to the fact that most of the participants indicated to be rare or occasional users. Future research should use more active and frequent users, to examine whether extraversion indeed has no influence on the perceived usefulness, perceived enjoyment, perceived ease of use and behavioural intention to use a LBSN.

Furthermore, our results show that the perceived usefulness of a LBSN is partially negatively influenced by the degree of innovativeness. Although this relation is not significant in our study, it is worth mentioning. This would suggest that an individual who poses a high degree of innovativeness, doesn't perceive a LBSN to be useful. As a new information technology, LBSNs are regarded as being appealing to innovative individuals. After all, LBSNs are seen as one of the most promising novel applications in the next years (TNS, 2011). It is remarkable therefore, that we find a negative influence of innovativeness on perceived usefulness. This would suggest that LBSNs may not be as promising as one has thought. However, from our results, we can only presume the negative influence of innovativeness on the perceived usefulness. Therefore, future research needs to examine the relation between the innovativeness and perceived usefulness of a LBSN.

Concerning our sample, several limitations can be pointed out. First of all, our sample was not evenly distributed, with only 21,9% female (n = 46). When looking at the differences between men and women, it is remarkable to find out that, for women, innovativeness has a significant positive influence on perceived enjoyment as well as on perceived ease of use. This would indicate that women who are highly innovative, would perceive a LBSN as more enjoyable and easy to use, than women low on the degree of innovativeness. For men, innovativeness only has a significant influence on the perceived ease of use. For a better generalizability, we recommend on one hand, that future research should strive for an even distribution of the sample. On the other hand, future research should also look deeper into the differences between men and women. Also, we studied the users of Feest.je, a Dutch LBSN. With approximately 20.000 users, one might wonder to what degree the users of this Dutch LBSN will be representative for users of a worldwide LBSN such as Foursquare with 10 million users. To examine the feasibility of our results, future research should study other LBSNs.

Moreover, we claimed in our theoretical background section that we limited ourselves to investigating extraversion, because it is the one trait that reflects social behaviour the most and would therefore be most interesting to examine in the context of LBSNs. Our study, however, shows no influence of extraversion on the proposed constructs. Therefore, it is not inconceivable that other personality traits, such as neuroticism or openness to experience, could influence the intention to use a LBSN. Previous studies of Devaraj et al. (2008) and Rosen & Kluemper (2008) confirm this assumption by demonstrating a positive influence of agreeableness and a negative influence of neuroticism on the constructs of the TAM. Further research needs to be done to examine the role of the other personality traits on the intention to use and the actual use of LBSNs and hedonic information systems in general.

Lastly, although we found that perceived usefulness, perceived ease of use and perceived enjoyment are strong predictors of the intention to use and the actual use of LBSNs, we know little about their determinants. Our study merely shows a strong positive influence of innovativeness on perceived ease of use. We found no support for a significant influence of extraversion or innovativeness on the remaining constructs in our research model. The question then arises, what other determinants underlie the perceived usefulness, perceived ease of use and perceived enjoyment. When examining the literature, we found several antecedents that could potentially affect the perceived usefulness, perceived ease of use and perceived enjoyment. For future research, we will discuss some of these determinants that

could have an influence on our research model, namely perceived involvement, social influence and use context.

First of all, perceived involvement reflects the degree of involvement that people experience when using an information technology (Agarwal & Karahanna, 2000; Rosen & Kluemper, 2008). According to Agarwal & Karahanna (2000) and Rosen & Kluemper (2008), a deep state of involvement can be strongly positively associated with perceived usefulness and perceived ease of use when using an information technology in general, or a social network service in particular. It is plausible that perceived involvement will serve as a significant determinant in our research model. Furthermore, we also believe that the social influence could play an important role in our research model. Social influence can be defined as the degree to which an individual believes significant others put pressure on him/her to make a particular decision, such as using a LBSN (Lu, et al., 2005; Verkasalo, et al., 2010). According to Lu et al. (2005) and Verkasalo et al. (2010), there is a strong positive relation between social influence and the constructs of the TAM. Therefore, we believe that when an individual is positively influenced by an important other, he/she will be more inclined to use a LBSN, will perceive a LBSN to be more useful, will experience more enjoyment when using a LBSN and will perceive the LBSN to be easier to use. Lastly, we expect that the context in which a LBSN is used, will have a significant influence on the perceived usefulness, perceived ease of use, perceived enjoyment and behavioural intention. According to several studies on mobile hedonic services, it is important to have a fit between the context and the information technology used (Bina, et al., 2007; Liu & Li, 2011). We assume that when a LBSN is used in an appropriate context, this will lead to an increase in the perceived usefulness, perceived ease of use, perceived enjoyment and will eventually lead to an increase in the intention to use the LBSN. To better understand the intention to use and the actual use of hedonic information systems, we suggest that further research needs to be done to examine the above antecedents and other determinants of the behavioural intention, perceived usefulness, perceived ease of use and perceived enjoyment.

5.3 Conclusion

Overall, the results of this study show that the behavioural intention, perceived usefulness, perceived ease of use, perceived enjoyment and innovativeness are significant determinants of the actual use of a LBSN. Also, perceived enjoyment seems to be the most significant determinant of the intention to use a LBSN. We contribute to the literature by demonstrating that the original TAM with addition of perceived enjoyment seems to be

significantly predicting the intention to use and the actual use of LBSNs, and hedonic information systems in general. In practical, our results suggest that it is important for developers of LBSNs to make their services useful, profitable and easy to use. Our study shows that this will eventually lead to an increase in the intention to use and the actual use of LBSNs. Moreover, our study implicates that developers of LBSNs should especially make their service pleasant, enjoyable and fun to use. Whether a hedonic information service is seen as enjoyable, will in fact have a significant impact on the intention to use the service and on the usefulness and ease of use of the service.

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APPENDIX A. MEASURING THE VARIABLES

A.1. Actual use

- Spots:
  - Search for spots
  - Check-in at spots
  - Add spots
  - To give awards to spots
- Parties:
  - View parties
  - Check-in at parties
  - Add parties
- Friends:
  - Search for friends
  - Add friends
  - React on check-ins of friends
  - Share spots with social networks.

A.2. Behavioural intention

- I plan to use Feest.je in the future.
- I expect to use Feest.je in the future.

A.3. Perceived usefulness

- I think it is useful to use Feest.je
- Using Feest.je improves my efficiency.
- Using Feest.je saves time.

A.4. Perceived ease of use

- I find it easy to check-in with Feest.je
- Using Feest.je is easy for me to understand.

A.5. Perceived enjoyment

- I think it is fun to use Feest.je
- Using Feest.je brings me enjoyment and allows me to relax

- I use Feest.je to kill time.

A.6. Extraversion (adapted from Hoekstra et al. (2003), translated into English)

- I like to have a lot of people around me
- I laugh easily
- I don't see myself as a happy and cheerful person
- I really enjoy talking to people
- I like to be at places where something is going on
- I am not a cheerful optimist
- I am a very active person
- I would usually prefer to do thing alone
- I often feel like I am bursting of energy
- I would rather go my own way than I would give guidance to others
- I live a hectic life
- I am a cheerful and lively person

A.7. Innovativeness

- If I hear about a new information technology, I look for ways to experiment with it.
- In general, I am hesitant to try out new information technologies.
- Among my peers, I am usually the first to try out new information technologies.
- I like to experiment with new information technologies.