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Location disclosure on LB-SNAs: The role of incentives on sharing behavior

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ABSTRACT

Location based social network applications (LB-SNAs) allow business access to real-time customer location information. Despite concerns about individual privacy, the popularity of LB-SNAs is rising. This research considers how marketers can motivate people to disclose their location even when they are aware of the risks involved. The data from these applications encourages customers to try new businesses and allows those businesses to provide services that increase loyalty among current customers. The proposed LB-SNA model was tested using survey research with active online LB-SNA users. Findings show that privacy concerns do not moderate the correlation between attitude and location disclosure and that the decision to disclose location information is correlated with incentives. We also show that opinion leadership is a new antecedent for understanding attitudes about location disclosure. This study fills a research gap by positing and testing how an external factor such as incentives can alter a person's attitude about sharing private information. We also refine correlated factors to attitudes, discovering that if a person perceives that they are an opinion leader, they will also be more inclined to have a positive attitude about LB-SNA. In conjunction to testing these new motives this research is the first to modify Internet privacy concerns to fit LB-SNAs specifically, test a model that is contextualized to LB-SNAs, and include incentives and opinion leadership as dimensions within a privacy model. These findings are relevant to practitioners interested in motivating user participation, as well as academics searching for better understanding of privacy behaviors.

1. Introduction

Online social networks, such as Facebook have over one hundred million users all around the world [28]. One of the most common questions people ask each other via text messages is "Where are u?" and location-based social networking applications (LB-SNAs) have been developed to answer that question specifically. LB-SNAs allow users to see where other people are, search location tagged content within their social graph, and meet other people in a specific area [28]. There are numerous social networking applications available on mobile devices that allow people to use LB-SNA technology [9]. There has been limited research on location sharing behavior, specifically in the context of LB-SNAs.

There are several studies concerned with information sharing and knowledge sharing that try to elaborate the antecedents of why people share information in different contexts [10,12], but in the case of location sharing there is limited research. Social networking sites (SNSs) are similar to LB-SNAs, because they involve an element of security and privacy [46]. Chen [10] added to this area of research by outlining factors that impact attitude about social networking, and how that attitude results in self-disclosure behaviors. In our model, we seek to expand on Chen's [10] findings by changing the context to LB-SNAs.

We offer a different look at the factors that affect attitudes and how incentives might impact location disclosure, and evaluate the moderating effect that opinion leadership has on location disclosure. This research addresses gaps in the current information systems (IS) research literature because there has been little research into LB-SNA behavior. This unique platform is particularly interesting because a LB-SNA is designed to disclose a traceable location of an individual at a specific moment in time, not just share thoughts or ideas. This should be considered particularly private information because it allows ill-intending people to know exactly where a person is located. This kind of network is designed with location information as the primary purpose. Despite presumed privacy concerns, people are still checking-in on these LB-SNAs [59]. To address this paradox, we propose two questions:

- What are the key factors that affect individuals' attitudes toward LB-SNAs?
- What are the factors that affect users to disclose their locations on LB-SNAs?

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To answer these questions, we consider three objectives in this study: (1) to propose a research model explaining which factors affect LB-SNA users to disclose their location, (2) to empirically test the proposed model using data collected from LB-SNA users, and (3) to give academia and practitioners deep insight about LB-SNA location disclosure and its implications.

In order to test our research model we conducted a survey and collected data from undergraduate students at a public university in the US. We used PLS to test our model and the results show that social norm, perceived benefit and perceived risk are important indicators for attitude toward LB-SNAs. In addition, our results show that the attitude toward LB-SNAs and incentives affect users location disclosure behavior. Our results provide several implications for both academia and practitioners. This research is a starting point to consideration of location sharing behavior in IS research based on its importance to marketing, social networking, and business intelligence.

The rest of this paper is laid out as follows. First we present a background of the study. Then we propose and justify our hypotheses and later we discuss our research methodology and results. In the final section we explain our research implications and limitations.

2. Literature review

Information sharing is a popular topic in academic research as well as in the media. With the growth of information availability via the Internet, it makes sense that researchers are trying to grasp why people share personal information online. Researchers have suggested that social media is one way that customers are sharing valuable information about products that can have an effect on a business [58]. Better understanding about how to get customer participation online is a valuable insight for practitioners and academics.

To try to understand Internet privacy, several IS researchers have looked to other disciplines for help and proposed multiple models for understanding privacy [29], specifically drawing on psychology theories like social contract theory [36], or the elaboration likelihood model [2]. Researchers have studied what motivates attitude about electronic privacy [36] and why people share information online [14,22,57]. Little research has focused on LB-SNAs, which are applications that specifically emphasize location disclosure as a primary purpose. The public is aware that disclosing location information online can be dangerous, but are still mentally justifying this behavior. In this paper we attempt to provide more explanatory power to which factors might impact online disclosure in the LB-SNA context, as well as offer our own ideas on what impacts attitudes about LB-SNAs.

Malhotra et al. [36] proposed a comprehensive model to explain privacy concerns in the electronic context. Through social contract theory the authors try to define Internet users' information privacy concerns (IUIPC) and then show how this proposed model impacts behavior intent. Put simply, social contract theory suggests that a person is only bounded by rules if he or she buys into the deal [16]. Conversely, if there is no respect for the contract, then there is no real obligation to comply [16]. In the IUIPC model, trusting beliefs and risk beliefs effect behavior intention [36]. Similarly, Angst and Agarwal [2] draw upon the elaboration likelihood model to suggest that attitudes about privacy concerns can be changed. Both of these papers take well-established ideas and apply them in other areas to show that they are also effective in explaining privacy behavior. This is important groundwork about privacy in attitudes and intentions, as these models provide a foundation for understanding privacy concerns online.

Social networks are similar to LB-SNAs; the main differences are the purpose and access. Firstly, social networks are designed to provide social connections between users, while LB-SNAs are more focused on location sharing. Secondly, social networks may be accessed on a computer, tablet, or smartphone, while LB-SNAs allow a user to check-in on a mobile device and use geographic position to discover proximal businesses. Similarities of the two are also important. Both are social networks, allowing users to interact with friends through technology. Also, social networks have a similar element of privacy concern [46]. There is clear overlap between the two categories, but the user interaction is unique.

It is also relevant to point out the mobile aspect of LB-SNAs. The assumption of a LB-SNA is that it is accessed via a mobile network. Mobile networks have unique privacy concerns. A primary concern with mobile technology is that location information is disclosed [57]. Because this is the function of using LB-SNAs, the assumption is that if a user shares location on a social networking application, they are not concerned about the privacy risk of location information that is common to mobile networking.

Because of the similarities, social network literature is relevant and related. Social networks specifically lend themselves to privacy concerns because they are designed to have users share private information through pictures, thoughts, and ideas. Several researchers have studied social networks and intent to disclose information and made significant contributions. Tow et al. [49] looked at Facebook users located in Australia and, ultimately, the authors propose a model of information disclosure behavior. This model suggests that both background context and perceived value will impact information disclosure behavior. In this study, the authors do not refer to context and perceived value as affecting attitude, but ultimately it is interpreted that they are looking to define what impacts attitude.

Attitude to carry out a task is very complicated because it involves human thoughts. The theory of planned behavior linked attitude and social norm as antecedents to actual behavior [1]. Given the framework of the information disclosure behavior model [49], several researchers have expanded on the idea of attitude. A logical choice for understanding antecedents to attitude is looking at the 'Big Five' personality traits. Interestingly, agreeableness, conscientiousness, and openness to experience have been found to effect privacy concerns, while extraversion and emotional stability were not found to have an effect [22]. This suggests that some personality traits are valuable in understanding LB-SNA attitudes, while others are not.

Social norms can be a motivating factor of attitude [1,15]. Dinev and Hart [15] propose that companionship has enough value to motivate information disclosure. Looking at this factor as a direct motivator of action is questionable. If motivations of society were enough to encourage action, more people would be acting similarly all the time. It is more common to see social norms impact attitude, not necessarily ultimate behavior, such as in UTAUT2 [52].

Other authors have tried to understand what external factors might motivate information disclosure. Research has shown that incentives will make respondents more likely to provide private information online [5,56]. This idea can be particularly valuable because it suggests that there is an override mechanism that might convince users to share even when they are not inclined to. While not in an online sharing context, external rewards have been found to motivate knowledge sharing [5]. Xu et al. [57] has also found that users of location-based services have less context-specific privacy concerns when they perceive that they have control over the information. In the model, control is from three sources: individual self-protection, industry self-regulation, and government legislation. Generally, using LB-SNAs should give users full control over shared information, and thus control might provide insights into why users are willing to share.

Recently, a model of member self-disclosure was proposed by Chen [10]. This model looks at social networks to answer the question of what the key factors in predicting self-disclosure are. This model is an excellent start at understanding self-disclosure on social networks, but neglects to explain some things specific to the LB-SNA context. Chen [10] further expands Tow et al. [49] by offering that attitude has an impact on information disclosure, similar to others [15,22]. Chen's model suggests that attitude is impacted by personality traits, perceived critical mass, and perceived risk. This study also shows that privacy value moderates attitude about information disclosure. This moderation

is logical because it can explain why positive attitudes might not result in information disclosure [10].

One of the biggest concerns of the tested model of member self-disclosure [10] is the inclusion of extroversion as it has specifically been found not to be a good predictor for online privacy behavior [22]. Also of note, there are explicit calls for a proposal of more antecedents for attitude in information sharing behavior research [10]. Further, Chen [10] goes on to suggest that he "identifies the major predictors of attitude" (p. 665); however there is no firm evidence that these predictors are the most significant predictors.

The importance of the external environment, specifically incentives being offered to participate in information disclosure, is also relevant to this area of study. It is well accepted that humans can be motivated by external incentives. This leaves a gap in the literature of what other factors could be impacting attitude that are not contradictory to current findings, and also what other factors directly impact disclosure of private information online. For this reason we look at other factors that might be important in understanding information disclosure in the context of LB-SNAs, which allow sharing a specific type of private information, online.

3. Research model

Given the potential for new insights in this area, we propose a model to better explain attitudes and ultimately information disclosure on LB-SNAs. Due to similarities, we mimicked Chen's [10] model closely, but felt that there are some missing variables for explanation, which we include here. Additions to our model are heavily based on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2); however, there are important constructs that can affect attitude and use that are left out of the original model [52].

Most importantly, we seek to test what could motivate respondents to check-in on LB-SNAs despite knowing the privacy concerns. From similar studies conducted on location based services, we propose that attitude toward a LB-SNA is an individual's positive evaluative effect about using a LB-SNA [4,10]. Location disclosure on LB-SNAs is defined as how much people are willing to disclose locations with others on LB-SNAs [44]. It has been established that attitude will effect behavior [10,52]. It has been consistently shown that if someone has a positive attitude about an action; they are more likely to engage in that behavior. Considering findings of previous research, as well as the intuitive logic discussed, we propose:

H1. Location disclosure on a LB-SNA is positively correlated with attitude.

While this is an important key driver of our research, it is also relevant to look at what will motivate the attitude of users before getting to the disclosure point. Similar to the UTAUT2 model, we propose that there will be several key factors that affect users' attitudes about LB-SNAs. The first of the suggested effects on attitude is social norm. Other researchers have found that those with more friends share locations more often on social networks [28]. Chen [10], proposed perceived critical mass, which is similar but different. Perceived critical mass asserts that there is a point where the internal network gains utility by the size of the network [10]. If a user perceives that the network has reached a certain tipping point, the network is more valuable.

In our model, social norm is taken directly from the UTAUT2 model. It is defined as the degree to which an individual perceives that important others believe he or she should use the new system [52]. This is a subtle but important distinction. Many LB-SNA applications are thoroughly accepted, however by different segments of the population. The social norm construct focuses on the user perception more than the quantity of other users.

The idea that humans are a part of a community, and thus are influenced by those around them, is not a new idea. Recently, similar constructs in this area have been distinguished in relation to herding [60]. Perceived critical mass, referred to as network externality by Sun [60], is about increasing the value to the network and often comes from current users. Social norm comes from an individual's reference group, and often implies judgment from the reference group if the technology is not accepted [60].

In our model, we prefer to resort back to the tested UTAUT2 model to better understand the idea of societal norm. This keeps the relationship with using LB-SNAs related to how the immediate reference group of a user interacts with applications that have achieved critical mass. Research has shown that users are motivated by social value, not just financial incentives [15]. For us, this motivation affects attitude because attitude can affect other factors before actual use. Others have found that influential people can have an effect on the use of a social network [49]. All of this research leads us to suggest that:

H2. Social norms positively correlate with attitude toward a LB-SNA.

Given the nature of information shared on LB-SNAs, there should certainly be concerns by the user about location disclosure. Revealing location information can be dangerous for the user, as it could lead people directly to them, or it could suggest that the user is not at home to protect personal property. Both of these significant concerns could have an effect on attitude about LB-SNA. Specifically, perceived risk can be summarized as the users' beliefs about potential negative outcomes from the use of LB-SNAs [20,24]. If a person is more concerned about risk, they will likely be less willing to be risky, and thus not share location information online. Given the nature of concern about privacy on a LB-SNA, we hypothesize that:

H3. Perceived risks of LB-SNAs negatively affect attitude toward LB-SNAs.

Along with risks, come benefits. Both have been shown to precede attitudes about privacy sharing [25,41]. Sharing information about locations that one visit can have a positive impact on society. If locations are below standards in some way, and that information is shared, all of society can benefit from the knowledge of a few users. People become informed about the poor quality of the location. Conversely, if a location has a lot to offer patrons, sharing positive information can help others find useful locations. Thus, the perceived benefit is the amount a user expects using LB-SNAs which will be useful to others [11]. Similar to this idea, others have found that background context and perceived value will impact disclosure behavior [49]. The idea that there is a societal gain for the use of the tool can have an impact on attitudes. People, generally, will look to benefit society if it is easy. We suggest that:

H4. Perceived benefits of LB-SNAs positively correlate with attitude toward LB-SNAs.

A major addition to our model is the idea of opinion leadership. This is defined as the amount an individual's opinion influences others to make decisions [26]. Opinion leadership is usually studied in consumer behavior literature to express its importance on decision processes [38]. Opinion leadership is a concept of explaining the influence of an individual's opinion on others' decisions [26]. Opinion leaders influence others' attitudes, beliefs, motivations, and behaviors [51]. They are valuable sources that should be considered by decision makers to positively influence the behavior of others [51]. Opinion leadership is said to be associated with advice-giving [45]. Building upon the two step flow theory, opinion leaders are more exposed to mass media and they intend to influence the less active sections of the population [23]. On LB-SNAs, same as other mass media, opinion leaders might have higher intentions to influence ideas of other people within their network.

Our hypothesis is that those that see themselves as opinion leaders will be more encouraged to share information. Because opinion leaders believe that the information they share are valuable recourses for others

they may contribute to a positive intention in sharing information on LB-SNAs so others can benefit from it. In the model on social networking, Chen [10] offered extroversion to capture a similar idea. However extroversion is a personality trait where a person prefers to be with others. Opinion leadership is a belief that your opinion matters to others, and is an internal interpretation of the user. It is similar to a civic duty to share information to others, because the opinion leader sees his or her knowledge as valuable to others. Extroversion is less relevant because LB-SNAs are not just a social meeting application, but a place to influence others' activities. Opinion leadership will contribute to a positive attitude toward LB-SNAs because users might have more of a positive feeling for a tool that they perceive as a complement for their own strengths. Generally, perceiving that one has a valuable opinion will make a person more likely to want to offer that opinion to others. We propose the following hypothesis:

H5. Opinion leadership positively affects attitude toward LB-SNAs.

Similar to the idea of perceived benefits is the idea of incentives; however, these ideas differ in practice. Incentives are offers provided by locations to a user to encourage a specific behavior. An example of this would be offering discounts or coupons for using a LB-SNA. For our model, incentives are a benefit directly received by the user that opts to check-in and disclose location. Xu et al. [56] show that participants are willing to share private information in return for something of value. Similarly, we propose that incentives will alter location disclosure behavior. In the prior applications, the incentives suggested were significantly higher than the suggestion of discounts at a dining location, but the logical idea is similar. If people are given an external benefit for performing a behavior, they will likely perform that behavior as long as the benefit has value. This idea is particularly important, as this suggests that an external factor could change behaviors after attitude is substantiated. This leads us to hypothesize that:

H6. Incentives positively correlate with location disclosure on LB-SNAs.

Incentives are a direct effect on disclosure because one might have a positive attitude about LB-SNAs but still choose not to disclose location or vice versa. This is the biggest difference in perceived benefits versus incentives. It is possible that a person will have a negative attitude about the use of LB-SNAs, but be motivated to change use behaviors given a valuable external incentive by the business.

Given attitudes about a LB-SNA, and external incentives, it is important to remember that the user must also have a way to participate in location disclosure [52]. While many people have mobile devices with numerous applications, some people still do not have this technology. Even if the mobile device is available, some might not have a wireless network that can connect them to the required location disclosing functions of the application. We factor in facilitating conditions because LB-SNAs imply technology that possibly not everyone has easy access to. Of the typical survey population, college students, all should have access to a computer to connect to a social network through the institution they attend, but not all respondents have access to mobile devices to easily share location at any given moment. This makes facilitating conditions more relevant, considering our survey frame, than previous similar studies outside of the LB-SNA context.

H7. Facilitating conditions positively correlate with location disclosure on LB-SNAs.

Finally, on a LB-SNA, users should perceive having complete individual self-protection over information sharing, namely, whether to check-in or not [10,53]. According to Chen's [10] model if people are concerned about privacy on the LB-SNA they may not disclose their location even though they have an attitude to use it [10]. Given control over privacy, previous research would suggest that LB-SNA users would have less privacy concerns, and thus be more willing to disclose location [57]. While respondents might enjoy social networks, and see participation as a social norm with a perception of low risk and high benefit, they still might choose not to disclose their location. Researchers have found that some may create an alias or disclose false information on a social network [22]. This would ultimately help keep information more private. This suggests that people have a desire to be a part of a network, even if they do have a concern about privacy [6]. As a result, Chen [10], proposes privacy concern as a moderator of attitudes. We follow this logic because attitude about a LB-SNA might be positive, but many people are still choosing not to disclose location. It makes logical sense that an ultimate inhibiting factor is a concern for privacy. Therefore we propose that:

H8. Privacy concern negatively moderates the effect of attitude toward location disclosure on a LB-SNA.

Following the hypotheses discussed above, we propose a model that better identifies factors that cause users to disclose locations on LB-SNAs. The model builds on previous models [10] but also brings in important ideas about technology use and adoption that have been overlooked previously [52]. Fig. 1 outlines the proposed model and hypotheses that we will test using empirical data.

4. Methodology

4.1. Instrument development

We reviewed the literature to develop relevant measures from prior studies. Most items were measured on a 7-point Likert scale from strongly disagree to strongly agree. We modified the context of previous items to assure reliability of our measures. Appendix A contains all measurement items and their references.

4.2. Data collection

We conducted a survey using undergraduate students in a public university in the US. We collected a total of 319 responses and removed incomplete responses to have 303 usable responses. As shown in Table 1, the age group for our sample is heavily weighted toward 18–25 year olds (81.4%). This age group fits within the largest group of location services users [59]. College students are educated and young, which makes them likely users of this type of technology. They are also a part of a unique community, which suggests that they might feel the need to participate in online social networks that others do not. Additionally, Table 1 shows that most respondents have used a LB-SNA, accounting for 63% of the total samples.

5. Results

We used Smart PLS 2.0 to perform structural equation modeling to test our model. PLS uses metric properties of the scales to measure variables strength and direction of relationships among them [3]. A three-step analysis procedure was conducted which consisted of (1) an assessment of the measurement model to assess item reliability and validity,(2) a check for the presence of common method bias, and (3) a structural model assessment to assess the model's predictive power.

5.1. Measurement model assessment

The adequacy of the measurement model is an important concern which is examined by analyzing reliability and validity [21]. The reliability of each construct is determined by analyzing Cronbach's alpha and composite reliability, in which values above the benchmark of 0.70 are typically deemed as adequate [40]. Convergent Validity is assessed by Average Variance Extracted (AVE). Values of 0.5 or above indicate sufficient convergent validity and demonstrate that the latent variable

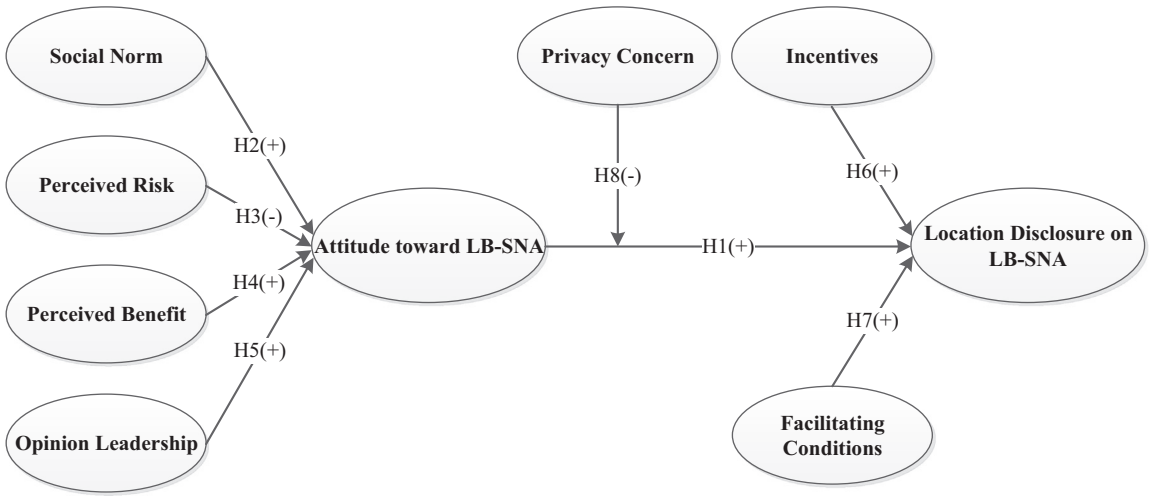

Fig. 1. Proposed location based-social network application (LB-SNA) model and hypotheses.

explains more than half of the variation of its indicators [17]. In Table 2, the diagonal values represent the square root of AVE, which is a measure for variance shared between a construct and its indicators, or convergent validity. Also in Table 2, Cronbach's alpha, composite reliability, and AVE values demonstrate the internal consistency and convergent validity of constructs based on the above constraints.

Two methods were used to examine discriminant validity. First, AVE values should be greater than off-diagonal correlations. This is true in our case as shown in Table 2. Second, related items of a construct must load highly on the factor it will measure and cross-loadings should be lower than the within-construct item loadings [27]. Table 3 reflects loading values of all the items used in the measurement instrument. The two criteria for examination of discriminant validity are acceptable.

5.1.1. Common method bias

Common method bias is a significant source of measurement errors [43] that indicate the possibility for erroneous conclusions [7]. To evaluate the presence of common method bias we used Harman's single factor test. According to Podsakoff et al. [43], common method bias is present if one of two conditions is observed: presence of a single factor from the factor analysis or presence of a single factor which accounts for the majority of the covariance among the variables. Conducting unrotated factor analysis based on all 46 items we had in our study, nine factors emerged which accounted for 74% of the variance in the data with the first factor accounting for less than 50% of the total variance. The percentage of the variance of the extracted factors and the corresponding eigenvalues for the factors are: 26% (eigenvalue = 12.31), 14% (eigenvalue = 6.54), 9% (eigenvalue = 3.81), 6% (eigenvalue = 2.81), 5% (eigenvalue = 2.44), 5% (eigenvalue = 1.86), 4% (eigenvalue = 1.6), 3% (eigenvalue = 1.46), and 2% (eigenvalue = 1.12). Thus, using Harman's single factor test we conclude that common method bias is unlikely to be present.

We also ran a PLS test for common method bias using the single method factor analysis approach suggested by Podsakoff [43] following the procedure of Liang et al. [30] (Appendix B). The results showed that the theoretical constructs were loaded as both high and highly significant while the common method constructs were loaded as low and in mostly all cases non-significant. Therefore, common method bias does not seem to be a serious problem in our research.

Table 1
Demographic information of survey respondents.

Gender	Male (62%)	Female (38%)
Age	81% of respondents are within age group18–25 years.	
Dispensable Income per year	72% of respondents have less than $15,000 dispensable income.	
LB-SNA users	Users (63%)	Non-users (36%)

5.1.2. Assessing the structural model

In order to assess the structural model we examined path coefficients and the R-square values. Path coefficients test the strength of the relationships between independent and dependent variables in the model and R-square values indicate the predictive power of the model for dependent variables.

The overall results of the analysis are shown in Fig. 2. As hypothesized, social norm (path coefficient = 0.138, $p < 0.01$), perceived risk (path coefficient = 0.371, $p < 0.001$), perceived benefit (path coefficient = 0.495, $p < 0.001$), and opinion leadership (path coefficient = 0.082, $p < 0.05$) are significantly associated with attitude toward LB-SNA and explain the 58% of variance in users' attitude toward LB-SNA. Although, the relationship between attitude toward LB-SNA and location disclosure on LB-SNA was significant (path coefficient = 0.43, $p < 0.001$), the moderating effect of privacy concern on the relationship among attitude and location disclosure was not significant.

Also, incentives significantly influence location disclosure on LB-SNAs (path coefficient = 0.112, $p < 0.05$) while the effect of facilitating conditions on location disclosure in LB-SNA is not significant. Incentives, facilitating conditions and attitude toward LB-SNA account for 25% of dependent variable variance. Summary of the hypotheses results are shown in Table 4.

6. Discussion

The findings of our study are practically and theoretically relevant and insightful. In the realm of social networking theories, there is no specific theoretical model to describe users' attitudes toward location disclosure on LB-SNAs. This study develops a new model to reveal why users intend to share their location information when they use LB-SNAs. Building upon the model of self-disclosure by Chen [10], a model of location disclosure was proposed. Our research model includes two major parts; the first part explores the attitude toward using the LB-SNAs and the second part addresses the users' behavior of location disclosure on LB-SNAs.

Opinion leadership, perceived risk, perceived benefit, and social norm are the antecedents of attitude toward using LB-SNAs, which explain the 58% of the variance. All of the hypotheses regarding attitude are supported. This is relevant information to practitioners because, if using a check-in function at a place seems to follow the norms of the society, then a person is more likely to have a positive attitude toward

Table 2
Correlation matrix.

	Principal Construct	AVE	CR	CA	1	2	3	4	5	6	7	8	9
1	Attitude toward LB-SNA (ATT)	0.78	0.95	0.94	**0.88**								
2	Perceived benefit (PB)	0.74	0.94	0.93	0.66	**0.86**							
3	Location disclosure (LD)	0.59	0.81	0.66	0.48	0.43	**0.76**						
4	Facilitating condition (FC)	0.63	0.83	0.78	0.39	0.25	0.20	**0.79**					
5	Incentives (INC)	0.70	0.92	0.89	0.31	0.35	0.26	0.10	**0.83**				
6	Social norm (SN)	0.79	0.92	0.87	0.45	0.49	0.30	0.19	0.27	**0.88**			
7	Opinion leadership (OL)	0.70	0.93	0.92	0.17	0.19	0.08	0.06	0.09	0.08	**0.83**		
8	Privacy concern (PC)	0.69	0.95	0.94	−0.36	−0.19	−0.13	−0.13	−0.03	−0.15	0.07	**0.83**	
9	Perceived risk (PR)	0.73	0.94	0.93	−0.50	−0.22	−0.15	−0.23	−0.14	−0.17	0.05	0.62	**0.85**

CR: composite reliability, CA: Cronbach's alpha.
The diagonal elements (in bold) represent the square root of AVE.

using location disclosure functions. Businesses should try to encourage people to check-in by focusing on the large number of people that participates in the same type of behavior.

One of the most important additions of this study is the role opinion leadership can play in IS adoption. People who perceive that they have more influence on others are more likely to have a positive attitude toward LB-SNAs. The application of this construct in other contexts might provide more insights into what motivates people to use technologies that have a strong opinion component at the core.

If there is a perceived risk associated with location disclosure, people are less likely to have a positive attitude. Similarly, if there is a perceived benefit for sharing location on LB-SNAs people will have a more positive attitude about location disclosure. Minimizing risks and featuring

Table 3
Factor loading.

Mean		Std	Location disclosure (LD)	Facilitating condition (FC)	Social norm (SN)	Perceived risk (PR)	Perceived benefit (PB)	Attitude (ATT)	Privacy concern (PC)	Incentives (INC)	Opinion leadership (OL)
LD1	2.26	1.17	0.56	0.21	0.20	0.12	0.14	0.30	−0.05	0.11	0.04
LD2	2.15	1.72	0.77	0.07	0.03	−0.01	0.25	0.19	−0.06	0.11	0.01
LD3	2.83	1.97	0.77	−0.20	−0.01	−0.19	0.14	0.07	−0.01	0.06	0.03
FC1	5.26	2.39	0.12	0.79	0.11	−0.08	0.11	0.21	−0.08	0.05	0.02
FC2	5.72	1.91	−0.01	0.88	−0.03	−0.02	0.14	0.13	−0.01	0.02	−0.02
FC3	6.00	1.61	−0.08	0.75	0.00	−0.13	−0.05	0.07	0.02	−0.05	0.12
SN1	2.90	1.73	−0.03	−0.01	0.85	−0.04	0.18	0.23	−0.04	0.09	0.09
SN2	2.70	1.69	0.05	0.01	0.88	−0.02	0.28	0.09	−0.04	0.12	−0.02
SN3	2.73	1.67	0.18	0.10	0.72	−0.06	0.30	0.14	−0.12	0.15	−0.01
PR1	5.10	1.63	−0.05	0.05	−0.08	0.80	−0.10	−0.05	0.29	0.06	0.07
PR2	4.39	1.61	−0.03	−0.06	0.04	0.80	0.02	−0.07	0.21	−0.01	−0.02
PR3	4.19	1.86	−0.08	−0.20	−0.04	0.75	−0.06	−0.28	0.35	−0.06	−0.03
PR4	4.25	1.84	0.00	−0.14	−0.07	0.74	−0.07	−0.30	0.39	−0.06	0.05
PR5	4.25	1.76	0.04	−0.10	−0.01	0.71	−0.06	−0.19	0.37	−0.12	0.07
PR6	4.87	1.78	−0.04	0.02	−0.02	0.76	−0.06	−0.08	0.38	−0.13	0.06
PB1	3.46	1.71	0.14	0.06	0.20	0.04	0.74	0.16	−0.09	0.19	0.06
PB2	4.19	1.74	0.11	0.17	0.11	−0.17	0.67	0.30	−0.04	0.06	0.05
PB3	3.76	1.68	0.09	0.03	0.12	0.04	0.87	0.16	−0.07	0.13	0.15
PB4	3.60	1.64	0.08	0.01	0.12	−0.05	0.82	0.21	−0.10	0.17	0.11
PB5	3.61	1.68	0.10	0.01	0.12	−0.14	0.81	0.25	−0.05	0.14	0.05
PB6	3.49	1.66	0.09	0.00	0.15	−0.01	0.84	0.20	−0.07	0.12	0.06
ATT1	3.65	1.53	0.10	0.10	0.11	−0.27	0.41	0.72	−0.13	0.05	0.07
ATT2	3.36	1.48	0.05	0.06	0.10	−0.27	0.42	0.72	−0.19	0.12	−0.01
ATT3	3.73	1.62	0.18	0.14	0.14	−0.25	0.34	0.73	−0.19	0.15	0.13
ATT4	3.76	1.55	0.09	0.10	0.11	−0.27	0.40	0.75	−0.18	0.09	0.04
ATT5	4.18	1.63	0.09	0.13	0.11	−0.02	0.21	0.72	−0.14	0.16	0.17
ATT6	3.87	1.85	0.29	0.22	0.16	−0.13	0.25	0.69	−0.15	0.17	0.07
PC1	6.08	1.27	0.03	0.04	−0.14	0.12	−0.03	−0.10	0.80	−0.02	0.09
PC2	5.83	1.39	−0.03	−0.06	−0.12	0.09	−0.03	−0.02	0.85	0.03	0.05
PC3	5.64	1.52	−0.05	−0.07	−0.03	0.16	−0.04	−0.09	0.84	0.12	0.04
PC4	5.64	1.62	−0.01	−0.03	−0.01	0.32	−0.06	−0.17	0.78	−0.02	0.00
PC5	5.89	1.44	0.06	0.02	−0.03	0.26	−0.10	−0.06	0.80	−0.05	0.06
PC6	5.59	1.60	−0.01	−0.05	0.07	0.34	−0.09	−0.09	0.76	−0.04	−0.01
PC7	5.39	1.64	−0.01	0.00	0.05	0.25	−0.07	−0.07	0.71	−0.07	0.01
PC8	5.98	1.33	−0.12	0.03	0.00	0.14	−0.06	−0.12	0.82	0.04	0.05
INC1	3.88	1.65	0.03	0.11	0.07	0.01	0.12	0.05	0.04	0.80	0.07
INC2	3.86	1.62	0.09	0.08	0.09	−0.08	0.13	0.07	0.03	0.84	−0.01
INC3	3.43	1.59	−0.05	−0.02	0.05	−0.05	0.15	0.07	−0.07	0.85	−0.01
INC4	3.79	1.56	0.07	−0.04	0.05	−0.05	0.09	0.14	0.02	0.77	0.10
INC5	3.42	1.64	0.13	−0.10	0.06	−0.04	0.15	0.10	−0.02	0.80	0.02
OL1	5.14	1.54	−0.01	0.12	0.06	0.01	−0.01	0.06	0.04	0.01	0.82
OL2	4.91	1.54	0.05	0.07	−0.06	0.00	0.10	0.00	0.02	0.08	0.82
OL3	4.77	1.55	0.01	0.04	0.02	0.05	0.12	−0.01	0.05	0.06	0.83
OL4	5.21	1.47	0.06	0.01	0.00	0.05	0.01	0.05	0.07	0.05	0.89
OL5	5.25	1.43	0.03	−0.08	0.01	−0.01	0.02	0.06	0.11	−0.02	0.85
OL6	5.05	1.47	−0.07	−0.02	0.04	0.04	0.15	0.13	−0.03	0.00	0.79

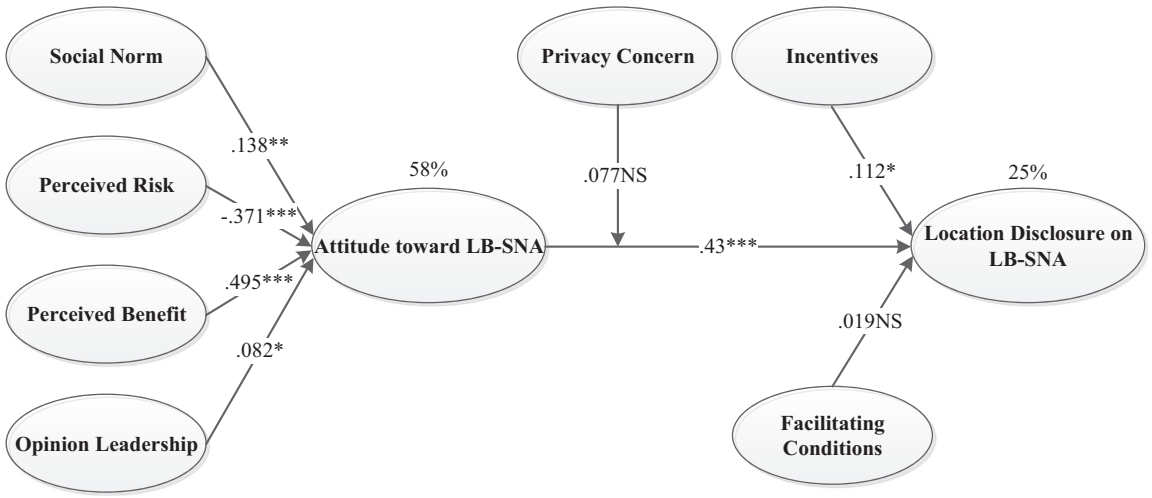

Fig. 2. Structural location based-social network application (LB-SNA) model results.

benefits more prominently can affect users' perceptions of these ideas, and thus encourage use of LB-SNAs.

The second part of the model focusing on antecedents of location disclosure has two insignificant proposed hypotheses. Hypothesis 6 which explains the positive effect of facilitating conditions on location disclosure is not supported. We believe that the lack of empirical support is due to the specific technology used. Smartphones have multiple functionalities such as web surfing, calling, texting, and navigating. Smartphones have several applications and uses, so just having a mobile phone and the capabilities to use LB-SNA might not actually mean that you choose to participate in this behavior. Previous studies have suggested that the technology might not lend itself to facilitating conditions as a concern [8].

Another reason for insignificance of facilitating condition effect on location disclosure could be due to similar usage knowledge of respondents. Investigating age differences within social network sites revealed that they are more popular with teenagers [42]. LB-SNAs are similar to social networking sites in many ways, unless they are installed as unique applications on smartphones. The young generation knowledge area about social network applications is more comprehensive than other generations [37,47]. Consequently, the variance in our measurement results for facilitating conditions decreases and the proposed relationship between facilitating conditions and location disclosure is not significant in our study.

The negative moderating effect of privacy concern on the relationship between attitude toward LB-SNAs and location disclosure is insignificant. There are multiple reasons why this may be the case. The first reason is that although it is believed that people may have concerns about their privacy, their actual behavior is different. Recently it has been found that social network users have less online privacy concern when it comes to information disclosure [50]. According to the privacy paradox notion, the actual behavior and intention of users in sharing personal information are different with regard to privacy concern [39]. It has been explained that people may trade off privacy for convenience and they may disclose personal information for obtaining immediate rewards [18]. This is in accordance with our finding about the positive effect of incentives on location disclosure. Privacy might also be insignificant because the prior negative experience over a lifetime may increase privacy concerns, and our sample is fairly young [13,48]. Young people have less prior bad experiences to hinder them from sharing information such as their location. According to the Pew Research Center, in 2013 youth behavior for sharing information on social media has changed in the past couple of years. They are more likely to share more information on social media sites as part of their socializing behavior. Also, 16% of teen social media users let a SNS post their location automatically [35]. Another reason is that people have higher knowledge of control for their privacy on SNSs. For example, in 2011, 58% of users restrict access to their profiles on SNSs [34]. It can be inferred that because a majority of samples in our study, almost 61%, use Facebook to share location they have higher knowledge for controlling their privacy. Facebook is a SNS; however the application that is used for location disclosure behavior on a smartphone carries over the privacy settings from the SNS. Accordingly, privacy concern does not prevent people from sharing information while they can control which network of people can see their shared information such as location [34]. Furthermore, people trust SNSs more because of privacy statements which make the privacy concern an insignificant moderator toward location disclosure [46].

Supported hypotheses of the second part of the model are attitude's and incentives' positive effect on location disclosure. First, attitude does predict the actual behavior of sharing location which has been well established in the literature. People with higher attitude toward LB-SNAs have actually shared their locations more often. In addition, incentives such as coupons and discounts together with attitude toward LB-SNAs are antecedents for location disclosure with 25% of the explained variance. This is a particularly important finding because it adds the external motives to disclose location, which is specifically important to businesses. It is easy for businesses to have a direct and immediate impact on external factors to influence users.

Theoretically this study addressed the location disclosure on LB-SNAs by proposing a new research model. It can have significant implications because there has been little work in the context of LB-SNAs. Location information is different from other types of user-generated information because location can be highly revealing on multiple levels. Traces of people's locations contain valuable information that can reveal users mobility over time and space according to different activities.

Table 4
Summary of data analysis results.

Hypotheses	Result
H1: Attitude toward LB-SNA → location disclosure on LB-SNA	Supported
H2: Social norm → attitude toward LB-SNA	Supported
H3: Perceived risk → attitude toward LB-SNA	Supported
H4: Perceived benefit → attitude toward LB-SNA	Supported
H5: Opinion leadership → attitude toward LB-SNA	Supported
H6: Incentives → location disclosure on LB-SNA	Supported
H7: Facilitating conditions → location disclosure on LB-SNA	Not supported
H8: Privacy concern's moderator effect on attitude toward LB-SNA → location disclosure on LB-SNA	Not supported

The proposed model shows how our new confirmations for location disclosure on LB-SNAs work and how the previous models of information disclosure should be modified. Specifically, privacy concern has always been an important construct to explain information disclosure while our findings show that managing privacy diminishes the importance of privacy concern. In addition, the idea that facilitating conditions have less of an impact on current technology and could be further developed in similar contexts.

To practitioners, the greatest value is specifically the role incentives has as an important influential factor on location disclosure within user networks or even publicly. This is an important finding indicating why some people might share their location at specific places. The concept of reward systems and the effect of incentives as an extrinsic motivation on knowledge sharing in organizations have been discussed in many studies [31,54]. Our finding supports the idea of the relationship between extrinsic motivations and sharing behavior in different contexts. Retail stores and service establishment owners can motivate their customers to share their location to get some discounts and at the same time attract more customers.

Survey research always comes with specific limitations, and ours is no exception. First, the survey was administered to college students in exchange for extra credit points. While the sample size is acceptable according to similar studies in this area [32,33], the respondents' range of demographics such as age, income, and education level are limited. We do believe typical demographics of college students are appropriate for our study because they tend to be active LB-SNA users. Nonetheless, it may decrease the generalizability of our findings. Also, some researchers believe that student data is artificial and it lacks external validity [19]; in the case of social network applications they can represent more realistic data. Despite the fit of the sample, there is a tendency for students to underestimate the importance of our studies, and thus, hastily complete the survey. We tried to mitigate this by stressing the value that could be derived, but there is some concern. Future studies should consider larger and more distributed samples to increase generalizability.

Finally, the behavior of disclosing location is a constant process in which users gradually decide whether or not they want to share their locations. Cross sectional studies are limited to a single moment in time. It could be more interesting in the future, if researchers conduct a longitudinal study to analyze the relationship between attitude toward location disclosure and the actual behavior of sharing the location across time. Future research could do analysis on the antecedents of location disclosure in LB-SNAs using longitudinal data.

7. Conclusion

Location-based social networking applications are continually increasing in popularity. It is expected that LB-SNA users exceeded 80 million in 2013 [28]. Unlike other social networks, LB-SNAs enable researchers to study spatial patterns at the same time with behavioral studies. Currently, there are more companies using location information of their customers to provide better services. Considering the success of these applications in IS, there is a need to study the antecedents of one of the unique features of LB-SNAs, which is location sharing. Location disclosure has special implications on privacy information because it can be dangerously revealing. In this study, we find influential factors that affect location disclosure.

Our findings show that influential factors of attitude toward LB-SNA are perceived risk, perceived benefit, social norms, and opinion leadership. In addition to attitude, an influencing factor on location disclosure is incentives. Incentives factor is an important motivation that can cause people to share their location regardless of their attitude. The findings of our study show that contrary to previous studies in this area privacy concern is not supported to be an effective factor toward information sharing.

The novelty of location disclosure model can be motivating for future practical and theoretical studies. Researchers can expand our model to find other antecedents of location disclosure behavior. We believe that this study begins to provide a conceptual model that elaborates location disclosure as a dependent variable that has not been developed in previous research and should be considered important since this feature of LB-SNA will likely grow in popularity.

Appendix A. Measurement items

Table A1
Measurement items.

Construct	Measurement items	References
Privacy concern	Personal privacy is very important for me.	[10]
	I am very sensitive about the privacy of my information.	
	I am concerned about my privacy.	[6]
	I am concerned about strangers knowing my location.	
	I am concerned about people I do not know obtaining my personal information from my online activities.	
	I am concerned about being tracked by the LB-SNA application I use.	
	I am concerned that service providers may use my location information for other purposes, e.g., analyzing my daily activities to derive information about me.	[55]
	It is important to me to keep my personal information private.	[10]
Perceived benefit	I benefit others when I use LB-SNA.	New item
	Using LB-SNA has many advantages for society.	
	When I use LB-SNA, others benefit from information that I share.	
	In general, when people use LB-SNA, they help others around them.	
	Using LB-SNA is a beneficial activity for society as a whole.	
	When I share information on LB-SNA, I benefit others.	
Opinion leadership	In general, I like to talk with friends about locations I visit.	[26]
	I give my friends a great deal of information about places I visit.	
	In my group of friends, I am usually asked to give my opinion about locations I visit.	
	I am very likely to tell friends about a location I visit.	
	My friends are likely to listen to my advice regarding locations I visit.	
	I am generally regarded by my friends as a good source of advice about locations to visit.	
Perceived risk	In general, it is risky to use LB-SNA.	[10]
	Using LB-SNA will involve many unexpected problems.	
	I feel unsafe using LB-SNA.	[20]
	I feel that using LB-SNA is risky for me.	
	I believe that there is potential for loss when I use LB-SNA.	
	I believe that the use of LB-SNA can be risky.	New item
Attitude toward LB-SNA	It is a good idea to use LB-SNA.	[4]
	I believe that using LB-SNA is wise.	
	I have a positive attitude toward using LB-SNA.	[10]
	Use of LB-SNA is a good idea.	
	Using LB-SNA is fun.	[52]
	I like using LB-SNA.	
Incentives	Most locations I go to offer instant discounts for “checking-in” on LB-SNA.	New item
	Locations I visit offer future coupons on LB-SNA.	

(continued on next page)

Table A1 (*continued*)

Construct	Measurement items	References
	I frequently go to locations that offer coupons on LB-SNA.	
	Based on my income, discounts offered on LB-SNA are usually valuable to me.	
	I often go to locations where discounts offered on LB-SNA help me save money.	
Social norms	People who influence my behavior think that I should use LB-SNA.	[52]
	People who are important to me think that I should use LB-SNA.	
	A large percentage of my friends use LB-SNA.	[61]
Facilitating conditions	I have a LB-SNA application installed on my mobile device.	[52]
	The LB-SNA application I usually use is available at no-cost to me.	New item
	I have the knowledge necessary to use LB-SNA applications.	[52]
Location disclosure	Frequency of check-in per each week.	New item
	I check-in every time I use LB-SNA.	
	I rarely "check-in" when I use LB-SNA.	

Appendix B. Common method bias analysis

Table B1
Common method bias analysis results.

Construct	Indicator	Substantive factor loading (R1)	$R1^2$	Method factor loading (R2)	$R2^2$
Location disclosure	LD1	0.682***	0.465	0.058	0.003
	LD2	0.848***	0.719	0.019	0.000
	LD3	0.778***	0.605	−0.078	0.006
Facilitating condition	FC1	0.795***	0.632	0.137**	0.019
	FC2	0.909***	0.826	−0.034	0.001
	FC3	0.805***	0.648	−0.11*	0.012
Social norms	SN1	0.909***	0.826	−0.034	0.001
	SN2	0.978***	0.956	−0.079*	0.006
	SN3	0.776***	0.602	0.124*	0.015
Perceived risk	PR1	0.897***	0.805	0.095	0.009
	PR2	0.941***	0.885	0.2**	0.040
	PR3	0.808***	0.653	−0.129	0.017
	PR4	0.823***	0.677	−0.128*	0.016
	PR5	0.805***	0.648	−0.05	0.003
	PR6	0.884***	0.781	0.04	0.002
Perceived benefit	PB1	0.833***	0.694	−0.024	0.001
	PB2	0.634***	0.402	0.181*	0.033
	PB3	1.012***	1.024	−0.133*	0.018
	PB4	0.880***	0.774	0.008	0.000
	PB5	0.828***	0.686	0.069	0.005
	PB6	0.946***	0.895	−0.074	0.005
Attitude toward LB-SNA	ATT1	0.907***	0.823	−0.006	0.000
	ATT2	0.838***	0.702	0.071	0.005
	ATT3	0.871***	0.759	0.065	0.004
	ATT4	0.907***	0.823	0.023	0.001
	ATT5	0.928***	0.861	−0.178*	0.032
	ATT6	0.846***	0.716	−0.004	0.000
Privacy concern	PC1	0.833***	0.694	0.037	0.001
	PC2	0.894***	0.799	0.091	0.008
	PC3	0.893***	0.797	0.063	0.004
	PC4	0.795***	0.632	0.103*	0.011
	PC5	0.850***	0.723	−0.005	0.000
	PC6	0.793***	0.629	−0.074	0.005
	PC7	0.747***	0.558	−0.027	0.001
	PC8	0.855***	0.731	0.017	0.000
Incentives	INC1	0.828***	0.686	−0.046	0.002
	INC2	0.857***	0.734	0.015	0.000
	INC3	0.864***	0.746	0.004	0.000
	INC4	0.802***	0.643	0.004	0.000
	INC5	0.828***	0.686	0.021	0.000
Opinion leadership	OL1	0.819***	0.671	−0.005	0.000
	OL2	0.828***	0.686	0.021	0.000
	OL3	0.844***	0.712	−0.003	0.000
	OL4	0.905***	0.819	−0.043	0.002
	OL5	0.862***	0.743	−0.054	0.003
	OL6	0.785***	0.616	0.093	0.009

* P < 0.05; ** P < 0.01; *** P < 0.001 (two-tailed significance).

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