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# THE MODERATE ROLE OF PERCEIVED SURVEILLANCE FOR VALUE PERCEPTION IN SOLOMO SERVICES CONTINUANCE

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## Abstract

*The full-fledged Social-Local-Mobile (SoLoMo) services appear recently as the form of app for Android or iOS system which include Facebook, Instagram, LINE, Google maps, etc. However, no study has attempted to understand the continuance intention among SoLoMo services. Besides, SoLoMo services have provided more powerful means of surveillance to track and profile their users, which might arouse negative feeling. In this study, we apply the consumption value theory to explore the value drivers and investigate the moderating effect of users' perceived surveillance. The results indicate that social value, emotional value, and functional value are significant drivers for continuance intention. Perceived surveillance moderates the relationship of social value and functional value on continuance intention.*

*Keywords: SoLoMo services, consumption values, perceived surveillance, continuance intention.*

# 1 INTRODUCTION

The advancement of mobile internet and mobile devices has made communication possible anywhere and anytime. Various innovation services have appeared, for example, mobile social network services such as Facebook, LINE, Instagram and location-based services such as Google map, Uber. Increasingly, mobile social network services have been provided in combination with localization and location-based services. For example, Facebook allows their users to share their information about whereabouts and local offers. The same combination phenomenon also appears on location-based services. For instance, Google map allows users to share their footprints to their friends on social network services. Such combination of social, local and mobile forms the innovative Social-Local-Mobile (SoLoMo) service type and gives rise to new opportunities for business. Recent research has put increasing attention on SoLoMo services (Xu et al. 2012; Yen 2012; Rosman et al. 2013; Cao et al. 2014). However, these research projects mainly focused on the technique side for better recommendation and users' intention for acceptance. There is no research to discuss the continuance intention of SoLoMo services. The continuance usage of service is a very important issue for service providers to keep their users. The more users there are, the more revenue opportunities there would be. It is essential to understand what drives users to continue using SoLoMo services.

Meanwhile, we need to consider the issues that are usually accompanied with the technique advantages. Since SoLoMo services combine social network services and location-based services, users are usually requested to provide more their own data such as friend list, immediate location, conversation history and so on. In this sense, users have to sacrifice more privacy to earn more convenient services. Thus, mobile devices as monitors continually collect users' activity logs. For example, if users intend to reserve hotel rooms at specific location, they might open a hotel-related SoLoMo service to search. Once they made such searches, while they later open other SoLoMo services, they might receive hotel-related advertisements about the specific location. Users may be concerned about why these SoLoMo services know about their schedules clearly, where these SoLoMo services get their information, and how much their secret information has already been collected stealthily. Users may consider that they are being surveilled and thereby feel uncomfortable. Accordingly, it would be critical to study how the feeling of be watched would influence the users' perception for SoLoMo services.

In the following, we first review prior literature in Section 2. In Section 3, we develop our research model and hypotheses. Then the research methodology is described in Section 4. The results are provided in Section 5. Finally, the conclusions are given in Section 6.

## 2 LITERATURE REVIEW

### 2.1 SoLoMo services-related research

The interaction of social network, location information, and mobile networking at right time and right place creates a new service form that called SoLoMo (Social-Local-Mobile). Such services are expected to satisfy users' social, local and immediate needs by services localization, and socialization through mobile devices. There are many SoLoMo services in practice including Facebook, Instagram, LINE, WeChat, Foursquare, Groupon, Google Map and so on. For example, a user may connect to the Facebook and uses the function "Check in" to share his/her immediate location information to friends on Facebook through iPhone. In this example, Facebook applies mobile network to deliver the user's location information to his/her friends on Facebook for facilitating social interactions. In this research, we define SoLoMo services as the integration services which combine social network services and location-based services through mobile devices to delivery their services for satisfying users' immediate needs.

SoLoMo services have been getting increasing academia attention. However, most research focuses on the technique aspects. For instance, Zhou et al. (2014) proposed an algorithm to provide better friend recommendations. Cao et al. (2014) described algorithms for discovering actionable telco customer insights using the combined power of social network, location pattern mining, and mobile usage analysis. At the management side, few research has been conducted. For example, Rosman et al. (2013) attempted to identify key factors what is driving consumers to purchase for formulating SoLoMo marketing campaign in hospitality industry. Gatautis and Medziausiene (2014) applied unified theory of acceptance to discover key factors affecting consumers' attitude toward the acceptance of social commerce.

## **2.2 Consumption values theory**

Zeithaml (1988) defined perceived value is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given. Value represents a trade-off of the salient give and get components. Sheth et al. (1991) developed a more comprehensive theoretical framework of value that is called consumption values theory to explain why consumers make the choices they do. There are three fundamental propositions: consumer choice is a function of multiple consumption values, which are independent, and make differential contributions in different contexts. They identified functional value, social value, emotional value, epistemic value and conditional value as key values for influencing consumer choice behavior.

Functional value is defined as the perceived utility acquired from an alternative's capacity for functional, utilitarian, or physical performance. Social value is defined as the perceived utility acquired from an alternative's association with one or more specific social groups. Emotional value is defined as the perceived utility acquired from an alternative's capacity to arouse feelings or affective states. Epistemic value is defined as the perceived utility acquired from an alternative's capacity to arouse curiosity, provide novelty, and/or satisfy a desire for knowledge. Conditional value is defined as the perceived utility acquired by an alternative as the result of the specific situation or set of circumstances facing the choice maker.

Deng et al. (2010) modified theory of consumption values into functional value, emotional value, social value and monetary value to understand customer satisfaction and loyalty in mobile instant message services. Yen (2012) recognized the importance of utilitarian value, social value, and hedonic value for customer loyalty in mobile phone services. Wang et al. (2013) made a little modification for theory of consumption values and suggested that functional value, social value, emotional value, and epistemic value have significant effects on behavioral intention to use mobile applications and conditional value is an antecedent of these consumption values. Prior research shows a satisfactory generalization ability of consumption values theory in different research contexts. Therefore, we adopted consumption values theory as our main theoretical foundation to explore the important values influencing SoLoMo services continuance.

## **2.3 Perceived surveillance**

The popularity of mobile devices and evolution of mobile network have provided a special attraction for users to engage in SoLoMo services. On the positive side, SoLoMo services are valuable for satisfying their own needs; users could access any information they want, chat to their friends and receive discount messages at any time and any place. On the negative side, SoLoMo services have provided more powerful means of surveillance to track and get full profiles of their users. Personal private data such as location footprint, browsing history, purchasing information, and conversation record might be stealthily collected by SoLoMo services without any permission of users. By aggregating these personal data of users, SoLoMo services would get more understanding about users and provide more precise information or suitable advertisement activities. While the content offered by SoLoMo services becomes more precise, users might notice that they are being surveilled. Solove

(2006) indicated the awareness of surveillance make a person feel extremely uncomfortable and also cause that person to alter his/her behavior.

Xu et al. (2012) proposed the concept of perceived surveillance and considered it as a sub-dimension of mobile users' information privacy concerns. Sharma and Crossler (2014) adapted the perceived surveillance as an antecedent of perceived privacy risk for disclosing information underlying the context of social commerce environment. Nevertheless, past research mainly focused on the antecedent role of perceived surveillance, no research tried to discuss the moderate role of perceived surveillance for users' perception changing. Accordingly, this research is interested in the moderating effect of perceived surveillance and how the value perception would be affected while using SoLoMo services.

### 3 RESEARCH MODEL AND HYPOTHESES DEVELOPEMENT

This research utilizes consumption values theory as our guiding theoretical framework for exploring what drive users' continuance intention of SoLoMo services. According to prior literature, functional value, social value, and emotional value are most relevant to this study. Considering the specific context of SoLoMo services, we argue that three variables, locatability, friendship maintenance, and perceived relaxation, have positive impacts on users' continuance intention of SoLoMo services. We also consider that the positive value perception may be moderated by perceived surveillance. The research model is depicted in Figure 1.

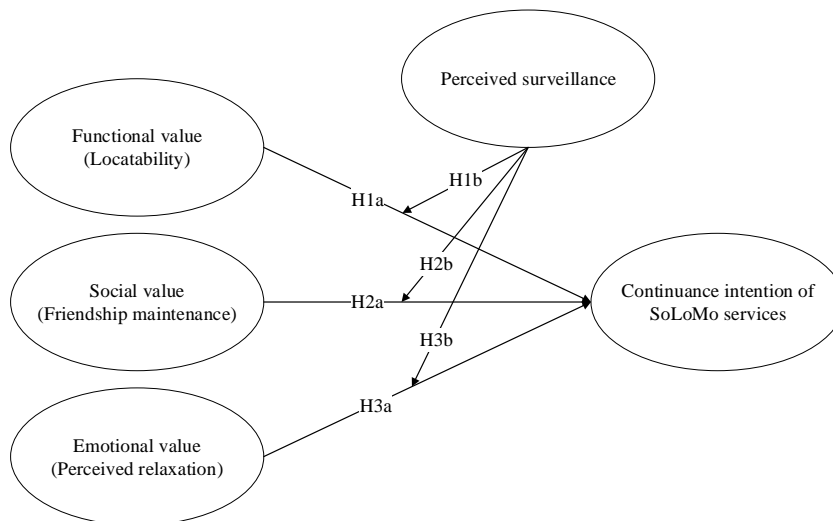


Figure 1. Research model

#### 3.1 Locatability as functional value

Functional value of SoLoMo services is derived from the satisfaction of users' functional needs. For example, SoLoMo services could provide location-related information to help users to get immediate localization information such as route plans, traffic reports, local store offers, local coupons, and so on. It is valuable for users because their immediate localization needs are satisfied at anytime and anyplace. Thus, we argue that locatability as functional value of SoLoMo services, which is defined as the perceived value of providing information/services to SoLoMo service users at the right place and at the right time to support their immediate needs. Xu et al. (2009) indicated that locatability is inherent in location-based services and motivates users' intention to engage in specific behavior. According to consumption value theory and prior research, we hypothesize that:

*H1a: Locatability has a positive effect on the intention to continue using SoLoMo services.*

### **3.2 Friendship maintenance as social value**

SoLoMo services enable users to interact with their friends without any constraints of time and space. It facilitates the density of social interaction through an increasing number of communications. Undoubtedly, it would be helpful for users to maintain their friendship by positive social interaction. For example, users can share local coupon information to their friends to help them get a special discount. Another example, if users see the posts of their friends, they can quickly respond to their friends and understand their status. Users may feel they are connected to the world and engaged in a social group. They may consider the SoLoMo services are valuable for fulfilling their social needs. Thus, we argue that friendship maintenance as social value of SoLoMo services, which is defined as users believe that SoLoMo services would maintain their existing interpersonal relationship. Kim et al. (2011) argued that users can find and provide emotion support, companionship and encouragement in social network communities. Drawing on the consumption value theory and past research findings, we therefore hypothesize that:

*H2a: Friendship maintenance has a positive effect on the intention to continue using SoLoMo services.*

### **3.3 Perceived relaxation as emotional value**

In addition to acquire functional and social utility, users may want to relax sometime. For example, on public transportation, users may check or play with smartphone whenever they feel bored. It is not for getting utilitarian information or engaging social interaction, but for emotion adaptation. They may watch social gossips, play casual games, or read jokes to pass waiting time. Thus, users might consider services as valuable for emotion adaptation and continue to use SoLoMo services. Therefore, we argue that perceived relaxation as emotional value of SoLoMo services, which is defined as the level of releasing tension from interactions with SoLoMo services. Sanz-Blas et al. (2013) indicated that relaxation positively reinforces adolescents' attitudes towards mobile social network services. Given the consumption value theory and empirical support, we hypothesize that:

*H3a: Perceived relaxation has a positive effect on the intention to continue using SoLoMo services.*

### **3.4 Perceived surveillance as the moderator**

Surveillance has become a crucial component of all environments informed or enabled by information and communication technologies (Lyon 2001). Although through SoLoMo services users can save searching time for localization information, lower communication cost for social interaction, and adapt emotion for releasing tension, the services also provide powerful means for tracking users. Solove (2006) indicated that awareness of surveillance would make a person uncomfortable and change behavior. Similarly, if users are aware of the possible monitoring of SoLoMo services, the original value perceptions may be altered. In this research, we define perceived surveillance as users perceive their life details might be surveilled ubiquitously and stealthily by SoLoMo services. Perceived surveillance may become the inhibition for continuing use SoLoMo services. We therefore hypothesize that:

*H1b: Perceived surveillance negatively moderates the relationship between locatability and intention to continue using SoLoMo services.*

*H2b: Perceived surveillance negatively moderates the relationship between friendship maintenance and intention to continue using SoLoMo services.*

*H3b: Perceived surveillance negatively moderates the relationship between perceived relaxation and intention to continue using SoLoMo services.*

## 4 RESEARCH METHODOLOGY

### 4.1 Measurement development

All the variables are measured by seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7). Most of measures used to operationalize the constructs in the research model were adapted from prior literature. Items of locatability were adapted from scales of Xu et al. (2009); items of friendship maintenance were new scale developed; items of perceived relaxation were adapted from scales of Lin (2014). The items of perceived surveillance were developed by this study. To ensure the content validity, modified items were reviewed by two information system experts. After revising the items based on the suggestions of experts, the refined questionnaire was pilot-tested on 30 experienced users of SoLoMo services. The reliability of survey was tested, the Cronbach's alpha of each variable is above 0.7.

### 4.2 Data collection

Empirical data were collected by conducting an online survey. The target population of this study was SoLoMo services experienced users. Our announcement described the purpose of this study and the participation qualifications. For guiding, we gave the definition of SoLoMo services and also listed several examples, such as Facebook app, LINE app, Instagram app, Foursquare app, Google maps app, GOMAJI app, Groupon app, etc. A total of 454 responses were collected in this study. After scrutinizing all collected responses and removing 4 invalid responses (without experiences for using SoLoMo services), the final valid sample consisted of 451 responses. 258 participants are male and 193 are female.

### 4.3 Data analysis

Following the two-step approach recommended by Anderson and Gerbing (1988). This study first assessed the measurement model to test the reliability and validity of the factors. Then, the structural model was analyzed to test the hypotheses. A structural equation modeling technique called Partial Least Square (PLS) was applied to test the research model by using SmartPLS 2.0 (Ringle et al. 2005).

## 5 SURVEY RESULTS

### 5.1 Measurement model

The measurement model results were described in Table 1. All of the item loadings (indicator reliability) were significantly larger than 0.7 and thus acceptable (Fornell & Larcker 1981; Barclay et al. 1995). All of the composite reliability (CR) also fulfilled the recommended level 0.7; all of the average variance extracted (AVE) exceeded the adequate value 0.5. Thus, convergent validity was assured. The correlation matrix listed in Table 2 indicates that the diagonal square root of AVE of each construct was higher than corresponding correlation values. Thus, the discriminant validity was assured (Fornell & Larcker 1981). Overall, the results assured the construct validity of the measurement model.

Construct	Items	Factor loading	t value	CR	AVE	Cronbach's alpha
Locatability	LO1	0.805	32.034	0.900	0.693	0.854
	LO2	0.821	33.439			
	LO3	0.866	59.882			
	LO4	0.838	48.018			
Friendship maintenance	FM1	0.849	45.143	0.900	0.751	0.834
	FM2	0.883	43.129			
	FM3	0.867	42.800			

Perceived relaxation	PR1	0.869	54.057	0.909	0.715	0.866
	PR2	0.851	47.923			
	PR3	0.892	73.203			
	PR4	0.764	27.865			
Perceived surveillance	PS1	0.840	7.773	0.935	0.783	0.913
	PS2	0.914	11.227			
	PS3	0.883	10.552			
	PS4	0.902	11.193			
Continuance intention	CI1	0.898	55.831	0.936	0.830	0.897
	CI2	0.920	80.008			
	CI3	0.920	86.617			

Table 1. Standardized factor loading, AVE, CR and Cronbach's alpha.

Construct	Locatability	Friendship maintenance	Perceived relaxation	Perceived surveillance	Continuance intention
Locatability	<b>0.833</b>				
Friendship maintenance	0.591	<b>0.866</b>			
Perceived relaxation	0.557	0.696	<b>0.845</b>		
Perceived surveillance	0.113	0.127	0.152	<b>0.885</b>	
Continuance intention	0.433	0.550	0.496	0.141	<b>0.911</b>

Table 2. Correlation of constructs and AVE.

Note: The values in bold type shown along the diagonal are respectively a square root of the AVE of a specific construct.

## 5.2 Structural model

Structural model was used to test the hypotheses through a recommended bootstrap procedure with 5,000 resamples (Hair et al. 2011). Figure 2 shows the PLS results of the research model, including the standardized path coefficients, and variance explained ( $R^2$ ). All three main path coefficients were significant at .001. The result model explained 33.68% of the variance in continuance intention of SoLoMo services by locatability, friendship maintenance, and perceived relaxation. Locatability had significant positive effect on continuance intention (H1a,  $\beta = 0.125$ ,  $t = 2.243$ ), friendship maintenance had significant positive effect on continuance intention (H2a,  $\beta = 0.348$ ,  $t = 5.430$ ), and perceived relaxation had significant positive effect on continuance intention (H3a,  $\beta = 0.184$ ,  $t = 3.206$ ). Perceived surveillance moderated two relationships between users' value perception and continuance. The higher degree of perceived surveillance was, the lower the effects of locatability (H1b,  $\beta = -0.178$ ,  $t = 4.395$ ) and friendship maintenance (H2b,  $\beta = -0.183$ ,  $t = 4.675$ ) on intention to continue using SoLoMo services would have. However, we did not detect the significant moderating effect between perceived relaxation and continuance intention (H3b,  $\beta = -0.093$ ,  $t = 1.914$ ).



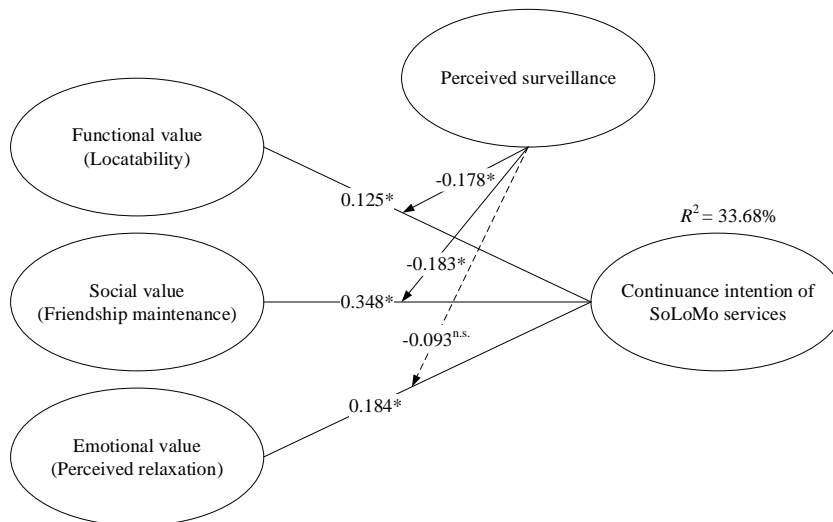


Figure 2. Results of the research model from PLS

Note: \* indicates  $p < 0.001$ ; *n.s.* indicates non-significant

## 6 CONCLUSIONS

The primary aim of this research is to explore what values drive users' continuance intention of SoLoMo services and perceived surveillance moderating effect on the value perception. The results indicated that continuance intention of SoLoMo services were driven by locatability, friendship maintenance, and perceived relaxation, which were functional value, social value, and emotional value, respectively. For SoLoMo services users, the most important value driver is friendship maintenance, the second important value driver is perceived relaxation and third important value driver is locatability. However, the perception values of locatability and friendship maintenance are moderated by perceived surveillance.

This research has contributed to academic as follows. First, we applied consumption values theory as our guiding framework and identified empirically that social value, emotional value, and functional value are important drivers for continuance intention of SoLoMo services. Second, this research is the very first study to investigate the moderating effect of perceived surveillance that negatively affects social value and functional value. It would help us to notice the possible moderating effect from privacy invasion.

Future research might consider the different behavior for groups of persons with different GPS usage habits. In addition, it might be also interesting to explore the influence of gamification which has a social flavor but is not completely under the social umbrella. It may help us to explore factors that entice users to keep using those new mixed natures of SoLoMo services.

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