

Understanding the Adoption of Smart Community Services: Perceived Usefulness, Enjoyment, and Affective Community Commitment

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Abstract

Smart community is an emerging form of community that provides various convenient services (smart community services (SCS)) through smart community platform to community residents. However, in practice, residents have limited SCS acceptance, which deserves to be further investigated in the literature. This study investigates the SCS adoption of residents by integrating technological belief factors (perceived usefulness and enjoyment), and social influence factor (affective community commitment). A survey of 191 residents identifies perceived usefulness, perceived enjoyment, and affective community commitment as important determinants of SCS adoption. Affective community commitment weakens the effect of perceived enjoyment yet strengthen the effect of perceived usefulness on SCS adoption. Our study fills the research gap on smart community as well as enriches the IT acceptance literature. This study also offers practical recommendations that can aid practitioners in conducting smart community programs.

1. Introduction

Urban residents who demand for comfortable, convenient, and modern living environment are increasingly interested in smart community. By using various advanced information and telecommunication technologies, smart community aims to deliver various services, such as government, business, entertainment, interpersonal communication services, etc., to the residents within the community in a more efficient,

convenient, precise and proactive way, to better the life of community residents [1-3]. Typically, the integrated smart community service platforms, such as various portal websites, applications, and online-to-offline (O2O) platforms, etc., are used to provide various smart community services (SCS) described above to residents [1, 4, 5]. For example, through the SCS platform, residents can obtain accurate information push services such as surrounding road condition. Also, they can open the elevator door remotely for visitors through the SCS platform. Especially, in the current study, we focus on neighborhood-level smart community. Based on residents' dwellings, neighborhood is the most basic unit of a city and such smart community construction is viewed as a basic component of smart city which aims to build and integrate critical infrastructures and services of a city to better citizens' life by using information and communication technologies [6]. Nowadays, smart city is emerging as a strategy to mitigate the problems generated by the urban population growth and rapid urbanization all over the world [7]. It is also indicated that as a concrete embodiment of the structure of smart city, smart community has inherited the experience of smart city construction [6]. Therefore, the focus on smart community is of great practical significance for both the constructions of smart community itself and the constructions of the smart city.

Previous studies show that the success of community innovative initiatives primarily depends on the acceptance and participation of residents [8, 9], which holds true for community initiatives in general and smart community initiative in particular. Smart community initiatives can survive and realize their benefits and goals only when residents accept and use the smart community services (SCS). However, a

recent report from iiMedia Research shows that in the first half of 2015, 37.90%, 16.02%, and 46.08% of people in China have never, often, and occasionally used O2O services (an example of SCS), respectively. Therefore, identifying the factors that motivate residents to adopt SCS is necessary. However, limited empirical evidence supports the acceptance and use of SCS of community residents in the literature. To fill this gap, this study aims to understand the voluntary SCS adoption of community residents. SCS adoption is information technology (IT) adoption firstly because SCS usually comes in the form of various applications (apps). Thus, based on previous research perspectives and the deficiencies in IT adoption domain, we subsequently propose our research objectives on SCS adoption.

IT adoption studies emphasize the social influence of surroundings on the individual technology adoption decision [10, 11]. However, these studies have mostly focused on organizational [12, 13] or individual social contexts, such as mobile payment services adoption [14], and tend to overlook the SCS context. Moreover, these studies have mainly investigated social influence from the normative perspective, such as subjective norms [14, 15]. Nevertheless, recent studies have called for future researchers to focus more on relational social influence, such as affective commitment, particularly in group and collective contexts [15, 16]. When an individual has affective organizational commitment, he/she tends to adopt the technology that the group spreads [17]. Accordingly, the first objective of the current study is to analyze SCS adoption from the relational social influence perspective. In particular, this study highlights the affective commitment of residents to their residential communities (i.e., affective community commitment).

Previous studies also show that technological belief factors, such as perceived usefulness and enjoyment, which are the extrinsic and intrinsic motivations in the motivational model, are also important drivers of IT adoption in addition to social influence factors [4, 13, 18, 19]. Nevertheless, previous studies have mainly focused on the direct effects of technological belief and social influence factors on IT adoption [12, 20, 21]. By contrast, only a few studies have considered the interaction effects of these factors on technology adoption despite the suggestion that using an interactionist perspective in predicting IT adoption is important because the adoption behavior is often a consequence of the interaction between IT belief and social influence factors [22]. Therefore, our second objective is to investigate the interaction effects of technological belief (perceived usefulness and enjoyment) and social influence (affective community commitment) factors on SCS adoption. We consider

perceived usefulness, perceived enjoyment, and affective community commitment as direct determinants of the SCS adoption intention of residents. Moreover, we argue that affective community commitment moderates the effects of perceived usefulness and enjoyment on SCS adoption.

2. Literature Review and Hypothesis Development

2.1. Smart community services

The concept of smart community was introduced in 1993 in Silicon Valley, California, and has been broadly spread and used around the world [23]. Smart community refers to “a community in which government, business, and residents understand the potential of information technology, and make a conscious decision to use that technology to transform life and work in their region in significant and positive ways” [23 p.2]. Typically, a smart community aims to provide its residents with a variety of convenient and beneficial SCS based on the requirements of the residents to improve their quality of life by applying the necessary technologies. The increasing population in cities provides immense opportunities for developing smart community and attracts many enterprises to invest on SCS. For example, many Japanese companies, such as Toshiba, Mitsubishi Electric, and Panasonic, are committed to developing smart community infrastructures because they expect that the value of this market can reach 180 trillion Yen by 2020.

Despite the popularity of smart community concept, the constructions of smart community all over the world remain in its exploration and pilot phases and lack a unified model [24]. In general, an integrated smart community service platform is regarded as an effective way to achieve smart community both in academia and practice [4, 6]. For example, builders can build a local government, enterprise, and resident tripartite shared services platform based on the geographical location of the community by using various information technologies (e.g., Internet of things, cloud computing, and mobile Internet). Therefore, local governments, real estate managers, and merchants can efficiently and conveniently provide community residents with various SCS, including government affairs, property management, and business services, through the service platform.

2.2. Existing research on smart community

The existing literature has mostly investigated the technological development of smart communities. For

example, Huang, Wan and Zhou [25] proposed an intelligent community system based on LonWorks Technology. Li and Liu [6] proposed an intelligent community system structure based on the multi-living agent. A few studies have also deepened the conceptual understanding of the smart community concept. For example, Lindskog [23] introduced several definitions of smart community and compared different smart communities from various countries and regions. Chourabi, Nam, Walker, Gil-Garcia, Mellouli, Nahon, Pardo and Scholl [7] identified smart community as a component of smart city.

However, relatively few empirical studies have focused on smart community. Researchers argue that as the end users, the participation of community residents (i.e., SCS adoption) is crucial for smart community [8, 9]. Therefore, the current study aims to understand the SCS adoption of residents by integrating perceived usefulness, perceived enjoyment, and affective community commitment. Fig. 1 illustrates our research model.

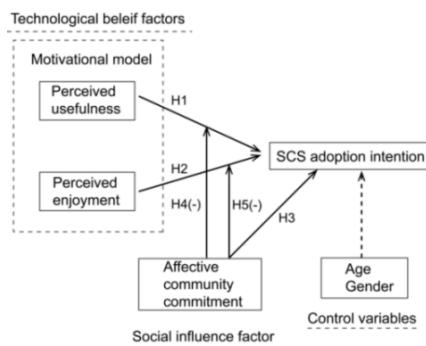


Fig. 1 Research model

2.3. Perceived usefulness and enjoyment

Motivational theory or motivational model has been extensively used in the IT/IS domain to explain individual technology acceptance and use because of its simplicity but high explanatory power [13, 26]. Most importantly, it captures the main reasons for individual adoption in a general and broader way, thus making it quite suitable in the early investigation of new IT acceptance [26]. Thus, we consider motivational model as a quite suitable framework when investigating residents' initial SCS adoption. Generally, motivation theorists classify the reasons that an individual performs an activity into extrinsic and intrinsic motivations. Extrinsic motivation refers to "the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself" [27 p.1112], such as improved task performance and efficiency. Intrinsic motivation refers to "the performance of an activity for

no apparent reinforcement other than the process of performing the activity per se" [27 p.1112]. Previous studies on technology acceptance generally view perceived usefulness as an example of extrinsic motivation, and view perceived enjoyment as an example of intrinsic motivation [13, 28-30].

Accordingly, we define perceived usefulness of SCS as the perception or expectation of residents that using SCS will bring them extrinsic outcomes, such as additional time, substantial money, and improved efficiency of various services [13]. When a user perceives SCS as useful, he/she will think positively about this service, thereby increasing his/her tendency to adopt. Perceived enjoyment refers to the perception or anticipation that using SCS is enjoyable in its own right [26]. If an individual perceives that using SCS is pleasurable, then he/she is more likely to adopt this service naturally. Empirical studies have demonstrated perceived usefulness is a strong and important predictor of technology adoption [12, 31-33]. Previous studies also identify perceived enjoyment as a significant predictor of technology adoption [28, 30]. Accordingly, we propose that::

Hypothesis 1. Perceived usefulness is positively related to the SCS adoption intention.

Hypothesis 2. Perceived enjoyment is positively related to the SCS adoption intention.

2.4. Affective community commitment

The concept of community commitment is derived from organizational commitment in organizations context. McCunn and Gifford [34] pointed out that community (neighborhood) residents would experience commitment toward their communities especially when they identify with the values and goals of the communities. Particularly, residents may be aware that a community may order itself like an organization (such as community residents committee, owner committees, social events or dedicated positions liaising with a larger municipal body) [34 p.22], thus leading the residents to experience a form of organizational commitment to the community. Specifically, following organizations context, there are three types of community commitment, namely, continuance, normative and affective community commitment based on perceived high costs of leaving the community, the moral obligation towards the community and psychological attachment to the community, respectively [34]. It is worthy noticed that in organizations context, among the three types of commitment, affective commitment is most popular among scholars because such commitment has the strongest and most favorable correlations with

individuals behaviors particularly voluntary behaviors within the organizations [35]. In the current study, the SCS adoption of residents is voluntary, thus following previous tradition, we focus only on affective commitment because it may be most relevant to SCS adoption of community residents.

Researchers have demonstrated that affective organizational commitment can predict various voluntary behaviors of individuals within the organizations, including their citizenship behavior, voice behavior, knowledge sharing, and new technology adoption, because of their emotion and affection to the organization [15, 35-39]. Such affective organizational commitment refers to “the employee’s emotional attachment to, identification with, and involvement in the organization” [40 p.67] and reflects an emotion-based relationship between an individual and his/her organization [41 p.842]. Researchers view such affective organizational commitment as a source and manifestation of social influence from the relational perspective [15, 17], which is different from normative social influence, such as subjective norms and group norms.

In an organization context, affective commitment may be derived from the individuals’ experiences within their organizations that leads them to trust their organizations, perceive to be valued by the organizations, and feel satisfied with their organizations [35, 41]. In community context, the community provides various services to their residents, such as property management, business services, and government services, etc., to establish a favorable living environment. Under this condition, residents may develop affective commitment to the community similar to how individuals develop commitment to the organization, particularly when they are satisfied with the provided services and when they trust and feel satisfied with the community [34].

Affective community commitment refers to a residents’ emotional attachment to, identification with, and involvement in his community as a whole [34]. It represents an emotion-based relationship between the resident and the community, his belongingness to the community, and acceptance of the values and goals of the community [34]. Previous studies usually examine the effect of social influence on IT acceptance from a normative perspective, such as subjective norm. Although researchers have highlighted the importance of investigating the role of relational social influence, such as social identification and affective commitment, in technology acceptance, only a few studies have investigated on this. Meanwhile, scholars have recently called for future research to focus on member-group relationship factors when investigating technology acceptance [15, 17]. Accordingly, the current study

considers the direct and moderating influence of affective community commitment on SCS adoption.

2.4.1. Affective community commitment to the SCS adoption intention

Residents’ affective community commitment often derive from their experiences within the communities, which lead them to perceive been valuable by their communities, feel satisfied with their communities, thus, evaluate their communities favorably, and develop positive attitudes toward their communities [34, 42, 43]. The social exchange principle states that individuals in such condition are likely to reciprocate by engaging in supportive behaviors, such as SCS adoption, just as organizational research indicates that an individual with high affective commitment tends to reciprocate by showing various support and cooperation behaviors in organizations [35]. With affective community commitment, residents identify with the objectives and goals of their communities and be willing to exert effort as members of their communities [37]. Therefore, they tend to respond positively to the call of their communities, support new community programs, and enhance their SCS adoption intention. Previous studies also identify affective commitment as one of the most important factors that positively influence individuals’ support for the change initiatives of their organization, including the introduction of the IT innovation [15]. In community context, the introduction of SCS represents an important IT change for the community. Following organizational research, we argue that affective community commitment will positively influence the SCS adoption of residents. Therefore, we propose that:

Hypothesis 3. Affective community commitment is positively related to the SCS adoption intention.

2.4.2. Interaction effect between motivations and affective commitment on the SCS adoption intention

Previous motivation studies on IT acceptance generally assume that motivations, such as perceived usefulness and enjoyment, influence individual adoption intention in a similar manner regardless of the social surroundings [44]. Nevertheless, in the context of SCS adoption, not all community residents are the same and each resident usually exhibits different affective commitment to their community. Such difference may influence the effects of perceived usefulness and enjoyment on their SCS adoption. Characterized by identification with the goals of the community, affective community commitment may inspire residents to support the action or movement of their communities. Therefore, when residents have

high affective community commitment, they may place considerable emphasis on the requirements of their communities, thereby limiting the importance of perceived usefulness and enjoyment in explaining their SCS adoption behavior.

Researchers indicate that affective organizational commitment can encourage an individual's behavior that is conducive to the organization even in the absence of motivations or when such behavior is in conflict with the self-interests of the individual [45]. SCS adoption based on perceived usefulness and enjoyment is out of self-interest (i.e., obtaining utility and enjoyment from using SCS) [28, 46]. Following previous organizational research[45], we argue that residents with high affective community commitment will exhibit immense interest to SCS adoption because of their emotional attachment to their communities even in the absence of perceived usefulness and enjoyment. That is, individual self-interest motivations only slightly affect the SCS adoption decision of community residents with high affective community commitment. By contrast, usefulness and enjoyment may assume added importance in motivating SCS adoption in the absence of affective community commitment because residents with low affective commitment lack interest in supporting the smart community initiatives of their communities. In such condition, motivations can compensate for the adverse effects of low commitment, and residents may adopt SCS only out of self-interest. Hence, perceived usefulness and enjoyment have greater effects on the SCS adoption decision of residents with low affective commitment than that of residents with high affective commitment. In summary, low affective commitment results in motivations exerting an immense effect on the SCS adoption of residents. Therefore, we propose that:

Hypothesis 4. Affective community commitment weaken the effect of perceived usefulness on SCS adoption intention.

Hypothesis 5. Affective community commitment weaken the effect of perceived enjoyment on SCS adoption intention.

3. Methodology

3.1. Sample and data collection

We used questionnaire survey collecting data to test our hypotheses. We conducted the survey in China. In China, the community (neighborhood) is the main living form of Chinese citizens and it provides residential, social and political functions for community residents [1]. To better the residents'

community living and promote the constructions of smart cities, the Chinese government is strongly advocating the constructions of smart communities and has issued relevant guidance to promote smart community constructions. In such background, smart community practices are becoming increasingly popular in China, and urban community residents in China are aware of SCS apps and SCS through either direct usage or various media exposure [4]. The respondents are residents from various residential communities in China, who are the main service objects of smart community and end users of SCS. We provided a brief introduction to SCS at the beginning of the questionnaire to ensure that the responders better understood the questionnaire items, for example, "By integrated smart community service platform, mostly being various apps, residents can obtain and use kinds of smart community services, such as information query and push, service order like property repair, pay for property management, ... ". We eventually received 191 usable responses. Following Armstrong and Overton (1977), we compared the responses between the early 25% and late 25% respondents on all variables using chi-squares to assess potential non-response bias. The results showed no significant differences between these respondents, thereby indicating that non-response bias was not a problem in our study.

3.2. Measurement

The measurement items of our constructs were adapted from previous studies and reworded to fit the SCS adoption context (see Appendix A). Each item was measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The original English questionnaire was translated into Chinese because our research was conducted in China. Three native Chinese who are proficient in English and unfamiliar with our research were invited to assist in the translation. To ensure equivalence of meaning, we back-translated the Chinese questionnaire into English, and determined no semantic discrepancies between the two versions.

4. Results

We examined possible common method bias using Harman's one-factor test. The results revealed three factors with eigenvalues above 1.0 and accounted for 74.47% of the variance. The largest factor did not account for the majority of the variance (30.54%), indicating that common method bias was not a substantial concern in this study. Moreover, we

compared the fit between the one-factor model and our measurement model using LISREL, and the fit of the former ($\chi^2 = 1705.12$, d.f. = 104, RMSEA = 0.285, CFI = 0.777, IFI = 0.778, NFI = 0.763, NNFI = 0.743) was considerably worse than that of the latter ($\chi^2 = 209.77$, d.f. = 96, RMSEA = 0.079, CFI = 0.977, IFI = 0.977, NFI = 0.960, and NNFI = 0.971), further indicating that the common method bias was not an issue in our study.

4.1. Measurement model

We performed confirmatory factor analysis to analyze the validity and reliability of our measurement model using SPSS19.0. Table 1 shows that the factor loading of all items are above the 0.6 criterion and AVEs of all constructs are over the recommended value

of 0.5, indicating the favorable convergent validity of the measurement model. The Cronbach's alpha values of all constructs were over the benchmark value of 0.6. The composite reliability scores of all the constructs were over the 0.7 criterion. These results demonstrated the favorable reliability of our measurement model.

Table 2 shows that the square roots of AVEs of all constructs are larger than the correlations among constructs, indicating the favorable discriminant validity of our measurement model. We further analyzed the variance inflation factors (VIFs) and tolerance values to assess multicollinearity. Multicollinearity only exists when a VIF score exceeds 10 or when a tolerance value is below 0.1. The highest VIF was 2.129, thereby indicating that multicollinearity was not a serious concern in this study.

Table 1. Results of the confirmatory factor analysis

Constructs	Items	Cronbach's Alpha	Composite Reliability	AVE	Loading Range
Perceived Usefulness	5	0.914	0.939	0.758	0.607-0.938
Perceived enjoyment	3	0.915	0.947	0.855	0.905-0.940
Affective Community Commitment	5	0.884	0.916	0.685	0.777-0.860
SCS Adoption Intention	3	0.954	0.971	0.917	0.956-0.959

Note: AVE = average variance extracted

Table 2. Means, standard deviations, and correlations

	Mean	S.D.	1	2	3	4
1. PU	3.883	0.860	0.871			
2. PEN	3.869	0.976	0.713	0.925		
3. ACC	3.259	1.012	0.396	0.359	0.828	
4. ADI	3.272	1.156	0.611	0.609	0.396	0.958

Note: The diagonal row shows the square root of AVE

4.2. Structural model

We used the hierarchical linear regression model to test our hypotheses. The results are showed in table 3. In Model 1, the path coefficients of age and gender are not significant, suggesting they are poor predictors of the SCS adoption intention of residents. Model 2 shows that perceived usefulness ($\beta = 0.315$, $p < 0.01$), perceived enjoyment ($\beta = 0.338$, $p < 0.01$), and affective community commitment ($\beta = 0.149$, $p < 0.05$) are significantly related to SCS adoption intention, thereby supporting H1 to H3. Model 3 shows the positive interaction effect between affective community commitment and perceived usefulness on SCS adoption

intention ($\beta = 0.297$, $p < 0.01$), thereby rejecting H4. Affective community commitment and perceived enjoyment has a significant negative interaction effect on SCS adoption ($\beta = -0.184$, $p < 0.1$), thereby supporting H5.

To further analyze the interaction effects, we draw Fig. 2 following the graphical procedure of Aiken, West and Reno [47]. It further shows that the positive relationship between perceived usefulness and SCS adoption intention is enhanced by affective community commitment, while the relationship between perceived enjoyment and SCS adoption intention is weakened by affective community commitment.

Table 3. Results of the hierarchical regression analysis

DV: BI	Model 1 Control Variables	Model 2 Main Variables	Model 3 Interaction Effects
AGE	0.018	0.024	0.039
GEN	-0.018	0.056	0.065
PU (H1)		0.315***	0.396***
PEN (H2)		0.338***	0.291***
ACC (H3)		0.149**	0.129**

PU × ACC (H4)			0.297***
PEN × ACC (H5)			-0.184*
Model F	0.07	31.188	24.669
R ²	0.001	0.457	0.485
Adjusted R ²	-0.01	0.443	0.466
Change of R ²		0.457	0.028
F Change		51.896***	5***

Note: ***P < 0.01; **p < 0.05; *p < 0.1.

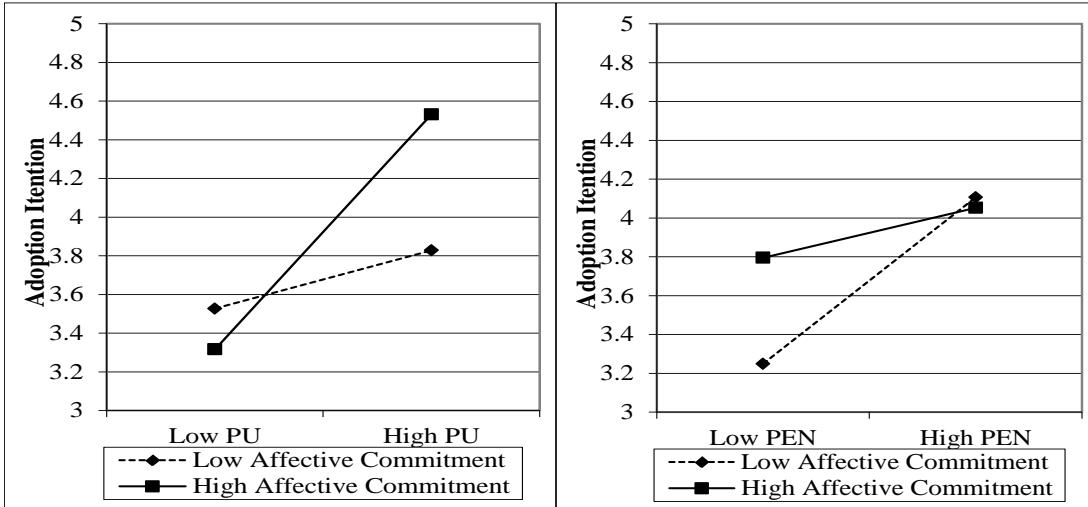


Fig. 2. Moderating effects of affective community commitment on motivations

5. Discussion

This study aims to investigate the SCS adoption of community residents by combining the motivational model of IT acceptance and affective community commitment. Most of our hypothesis are supported.

Consistent with previous motivation research in the technology acceptance domain [28], our findings reveal that perceived usefulness and perceived enjoyment are important determinants of the SCS adoption of residents, suggesting that the residents value both the utilitarian and hedonic value of using SCS. This finding suggests the applicability of the motivational model in explaining the SCS adoption of residents. We also identify affective community commitment as an important determinant of SCS adoption. This is consistent with previous research, which indicates that individuals with affective commitment may identify the goals and values of their organizations and increases their tendency to support the changes in their organizations, including IT change [15, 48].

In addition, we confirm the negative moderating effect of affective commitment on the relationship between intrinsic motivation (i.e., perceived enjoyment) and SCS adoption intention. This is in line with previous study , which shows that commitment to virtual communities weakens the effect of egoism knowledge sharing motivation on knowledge sharing

intention because people who make their knowledge sharing decisions out of commitment will pay limited attention on their self-interests [49]. In SCS adoption context, residents with high affective community commitment may care less about self-pleasure when making SCS adoption decisions.

In contrast to perceived enjoyment, the expected negative interaction effect between perceived usefulness and affective commitment is in the opposite direction. These varying interaction effects may be attributed to the difference in the nature of usefulness and enjoyment of SCS. As a technology-based innovation, the basic and core function of SCS is to provide extrinsic value, such as convenience to community residents, whereas entertainment is merely an auxiliary function of SCS. As a rational user, residents with high affective community commitment may not care considerably about the auxiliary function of SCS (i.e., enjoyment) but will still care about its basic functions (i.e., usefulness). Furthermore, they tend to show favoritism toward the community and its smart community program, as well as look favorably on the performance of SCS. Therefore, they may focus more on the usefulness of SCS. That is, when residents have high affective community commitment, usefulness is more important than enjoyment, and the relationship between perceived usefulness and SCS adoption intention is strengthened.

6. Implications and Limitations

6.1. Theoretical implications

This study offers several research implications. First, to the best of our knowledge, this research is among the first efforts to investigate the SCS adoption of residents. Previous studies on smart community have paid limited attention on user acceptance even though user acceptance is viewed as one of the biggest challenges to smart community [8, 9]. The current study fills this research gap and offers novel insights into future user behavior research in the smart community domain.

Second, this study highlights the significance of affective commitment in technology acceptance research. It is suggested that when investigating individual technology acceptance in groups, such as organizations and communities, researchers should consider the social influence of the group from the relational perspective [15, 17]. The current study considers the role of relational social influence, namely, affective community commitment, and shows that such commitment not only directly influences technology adoption but also moderates the effect of motivations on technology adoption, which is also a response to researchers who call for future researchers to focus more on other types of social influence [16].

We also reveal different interaction effects between affective commitment and perceived usefulness and enjoyment. Previous studies have mainly analyzed the direct effects of technological belief and social influence factors on IT adoption [12, 20, 21]. By contrast, we consider the interaction effects between perceived usefulness and enjoyment and affective community commitment on SCS adoption to enrich the IT adoption research, responding to the recent call for future IS acceptance research to focus more on the possible nonlinear relationship between key constructs [22]. Our research thus improves our understanding of the motivational model of technology acceptance and enriches the technology acceptance research. In addition, Previous researchers have called for additional research on the influence of community commitment on the behavior of residents [34]. Therefore, the current research also enriches the community commitment literature.

6.2. Practical Implication

Our study may provide valuable guidelines for smart community constructions that aim to deliver SCS through various smart community service platforms.

Our findings confirm that both perceived usefulness and enjoyment are key drivers of SCS adoption of community residents. Therefore, to promote SCS adoption, there is a need to enhance the level of residents' perceptions of usefulness and enjoyment. Practitioners may attempt to deliver the functionality and entertainment of SCS to the adopters in the system and services design and promotion stages. For example, they can conduct researches to discover the wants and needs of residents, and transform the findings into SCS delivery, in order to make sure that those SCS are really useful to residents. Besides, promotional campaigns should also emphasize the benefits of SCS, including its convenience, efficiency, and improved performance, to enhance residents' usefulness perception. It is reported that the existing smart community constructions in China tends to focus too much on technologies but neglect services that are relevant to requirements of residents, which may explain the limited SCS acceptance of residents as we outlined earlier. Moreover, Developers should include fun elements into SCS because residents prefer to use interesting and entertaining SCS. We also reveal the direct and indirect significant effects of affective community commitment on the SCS adoption. Given that high affective commitment benefits the SCS adoption of residents, community managers should also focus on building favorable community environment that can help promote affective commitment of residents to their communities, which is also a requirement for community management in community research [34]. For example, they should try to meet various needs of residents better to make residents satisfy with their inhabitations in the community. They can also organize various community activities to cultivate the cohesion and belongingness of residents. In addition, our study that supports the smart community constructions is of significance to smart city, as smart community is the foundation of smart city, and is an important support and indispensable component of smart city [6]. Smart community that will improve the level of public service and efficiency of social management reflects the goals of a smart city [5].

6.3. Limitations and future research

This study has several limitations that may be addressed in future studies. First, although we have investigated SCS adoption by combining the motivational model of IT acceptance and affective community commitment from the valuable perspectives of technological beliefs and social influence factors, we believe other perspectives and factors (such as power, enactment, trust and many others) may also play

significant roles in SCS adoption of community residents, which should be examined in the future. Second, our data collection was limited to China, which may restrict the generalizability of our findings. Although China is the most populous country in the world and provides an ideal context for smart community research, smart community and SCS adoption are worldwide phenomena. Therefore, future

studies should be conducted in different cultural, geographical, economic and political contexts. Furthermore, the uniqueness of each community and the different paths set to achieve the goals behind being smart may also have somewhat influence on our results that may restrict the generalizability of our findings, which deserves to be further examined in the future.

Appendix A. Measurement items

Constructs	Items	Source
Perceived usefulness	1. I think using smart community services is convenient. 2. I think I can save money by using smart community services. 3. I think I can save time by using smart community services. 4. I think using smart community services will enable me to finish my service requirements quickly. 5. I think using smart community services will improve the efficiency of obtaining services.	[30].
Perceived enjoyment	1. I feel that spending time using smart community services may be exciting. 2. I feel that spending time using smart community services may be pleasant. 3. I feel that spending time using smart community services may be interesting.	[50]
Affective community commitment	1. I feel that I am part of the community that I live in. 2. I have a real emotional attachment to the community that I live in. 3. The community I live in has a great deal of personal meaning for me. 4. I feel a strong sense of belonging to the community that I live in. 5. I feel a strong connection to the community that I live in.	[34]
SCS adoption intention	1. I intend to use the smart community services in the next 12 months. 2. I predict that I will use the smart community services in the next 12 months. 3. I plan to use the smart community services in the next 12 months.	[13]

7. References

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