Comprehending the roles of perceived usefulness and satisfaction in smoking cessation online health communities: a social capital perspective

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Abstract: This research seeks to unravel the roles of perceived usefulness (PU) and satisfaction in smoking cessation online health communities (OHCs). In the research model, user satisfaction and PU are proposed to motivate users' knowledge-sharing and recommendation behaviours. Social ties, shared language, shared vision, reciprocity, and commitment are antecedents to PU from a social capital perspective, which leads to user satisfaction with smoking cessation OHCs in turn. The research model is empirically validated with survey data collected from the users of two smoking cessation OHCs. The research results show that both PU and satisfaction affect users' knowledge-sharing and recommendation behaviours positively. PU has a significant impact on satisfaction, and PU of smoking cessation OHCs is affected by shared language, shared vision, and commitment. The findings extend the understanding of PU and satisfaction in the context of smoking cessation OHCs and offer practical implications for smoking cessation OHC service providers.

Keywords: social capital; perceived usefulness; smoking cessation; online health community; recommendation behaviour; knowledge-sharing; user satisfaction.

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1   Introduction

Internet-based interventions for smoking cessation have the potential to reduce population smoking prevalence, given their broad reach and effectiveness. Recently, smoking cessation online health communities (OHCs) have attracted considerable attention from scholars and practitioners. Smoking cessation OHCs refer to the collectives of individuals who interact and communicate with each other on stopping tobacco use through particular internet sites (Chen et al., 2019; Mpinganjira, 2018). Previous studies have demonstrated the effectiveness of these OHCs for smoking cessation (Graham et al., 2015, 2016). However, smoking cessation OHCs are facing challenges in the low level of user usage (Saul et al., 2016). Most users use smoking cessation OHCs only minimally, weakening the impacts of such OHCs in smoking cessation (Saul et al., 2016).

Prior literature has posited that the individual users' post-adoption behaviours are essential for the long-term viability of an information system (IS) and its eventual success (Bhattacherjee, 2001; Kim and Son, 2009; Parthasarathy and Bhattacherjee, 1998). Post-adoption behaviours refer to individuals' behaviours after the initial use of IS and focus on the post-stage of IS usage in contrast to initial adoption, which focuses on users' first-time IS use (Bhattacherjee, 2001; Parthasarathy and Bhattacherjee, 1998). Post-adoption behaviours have different forms, such as continuance intention, knowledge-sharing, and recommendations (Bhattacherjee, 2001; Chea and Luo, 2008; Wasko and Faraj, 2005). To unleash the full potential of smoking cessation OHCs and enhance the longevity of such OHCs, identifying factors influencing post-adoption behaviours has been claimed as a priority in smoking cessation OHCs (Graham et al., 2020; Saul et al., 2016).

Prior literature on post-adoption behaviours has mainly focused on users' continuance intention; other post-adoption behaviours that transcend mere use (e.g., knowledge-sharing and recommendation) have not been adequately addressed. For smoking cessation OHCs, users' knowledge-sharing could provide valuable resources for smokers and sustain competitive advantages for OHC service providers (Wasko and Faraj, 2005). Additionally, users' OHC recommendations to outsiders could attract new users and extend the reach of the OHC services (Kim and Son, 2009). Thus, there is great value in examining the factors that influence users' knowledge-sharing and recommendation behaviours in the context of smoking cessation OHCs.

As indicated in IS literature, both perceived usefulness (PU) and satisfaction are two important determinants of users' post-adoption behaviours. For instance, Bhattacherjee (2001) found that PU and satisfaction positively affect users' continuance intention towards an IS. Satisfaction, in turn, is influenced by PU. In a study of e-services conducted by Li and Liu (2014), PU was found to have significant impacts on both continuance intention and word-of-mouth recommendation, while satisfaction exerts significant effects on continuance intention only. However, research has paid scant attention to the particular context of smoking cessation OHCs. To achieve the sustainable development of smoking cessation OHCs and potentially aid efforts to target post-adoption strategies for those who can benefit most from the OHCs, it is necessary to investigate whether PU and satisfaction retain their important roles in determining individuals' post-adoption behaviours regarding smoking cessation OHCs.

Furthermore, the determinants of PU and satisfaction have attracted considerable intention in prior literature. For instance, Agarwal and Karahanna (2000) found the PU of

the World Wide Web to be affected by user characteristics, such as user experience, personal innovativeness, and individual traits of playfulness. In a study of travel-review websites, PU was found to be affected by both hedonic and utilitarian values (Wang and Li, 2019). However, these studies principally examined the antecedents to PU from the user or technology perspectives, and the role of social resources in improving users' PU has not been adequately addressed, notwithstanding the literature stating that social resources (e.g., social capital) can influence individuals' beliefs. Social capital is the actual and potential resources produced among individuals through social relationships (Nahapiet and Ghoshal, 1998). Such resources can allow individuals to obtain benefits, such as accessing useful information and sharing social support (Huang et al., 2019). After a period of usage, users of smoking cessation OHCs will accumulate social capital via interacting with others. The social capital built in smoking cessation OHCs might improve their smoking cessation performance and enhance their perception of usefulness. Thus, it is important to examine whether the social capital formed in smoking cessation OHCs can predict individuals' PU of such OHCs. Meanwhile, as Vaezi et al. (2016) stated, research on the antecedents to satisfaction is still fragmented, and more context-aware investigations are required. Smokers turn to smoking cessation OHCs mainly for support in achieving abstinence goals; consequently, their beliefs about the usefulness of OHCs for quitting smoking might affect their satisfaction. Thus, it is meaningful to examine whether PU can determine user satisfaction with OHCs.

To address these research gaps, this research seeks to examine the roles of PU and satisfaction in the smoking cessation OHCs context. Based on social capital theory (Nahapiet and Ghoshal, 1998), this study proposes a research model that suggests:

1   PU is affected by social capital built in smoking cessation OHCs, including structural capital (i.e., social ties), cognitive capital (i.e., shared language and vision) and relational capital (i.e., reciprocity and commitment)

2   user satisfaction is determined by PU

3   both PU and satisfaction affect users' knowledge-sharing and recommendation behaviours.

This article proceeds as follows. In Section 2, prior literature on social capital theory is reviewed. Then, in Section 3, the proposed research model and hypotheses are presented. In Section 4, the methodology and the results from testing the hypotheses are introduced. Finally, in Section 5, conclusions on the theoretical contributions and practical implications are discussed.

2   Theoretical foundation

2.1   Social capital theory

First developed in community studies, social capital theory focuses on the resources derived through interpersonal relationships among people. Nahapiet and Ghoshal (1998, p.243) defined social capital as "the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network." The social interactions that build

relationships permitting access to and share resources are the central proposition of this theory (Nahapiet and Ghoshal, 1998). Researchers have used social capital theory to study the influences of such resources on individual behaviours and organisational performance in various contexts, such as health promotion (Wakefield and Poland, 2005), collaboration and innovation in smart cities (Bartelt et al., 2020), and knowledge-sharing activities (Chiu et al., 2006).

Moreover, IS scholars have posited that social capital includes three dimensions: structural capital, relational capital, and cognitive capital (Chiu et al., 2006; Nahapiet and Ghoshal, 1998; Wasko and Faraj, 2005). Structural capital describes the impersonal configuration of individuals' social connections, representing who and how one reaches them (Nahapiet and Ghoshal, 1998). This dimension of social capital offers channels for interaction, allowing information to be transmitted to others. IS researchers often measure it by assessing patterns and density of social networks, such as social ties (Chiu et al., 2006). Relational capital represents the affective nature of social relationships or related embeddedness (Nahapiet and Ghoshal, 1998). Specifically, this dimension of social capital concerns the social assets created by the relationships (e.g., reciprocity and commitment) (Nahapiet and Ghoshal, 1998). Finally, cognitive capital refers to resources providing shared interpretations and meanings within a social network, such as shared language and vision (Chiu et al., 2006).

Social capital theory provides an appropriate theoretical lens for explaining PU and satisfaction regarding smoking cessation OHCs. Specifically, in a smoking cessation OHC, individual users can build social ties with others via posting messages for seeking help or responding to others' requests (structural capital). Moreover, the self-disclosure of private information and voluntary sharing behaviours require a reciprocity atmosphere as well as a commitment towards the OHC (relational capital). Finally, users need to share a common language and vision on smoking cessation to make the interaction understandable and possible (cognitive capital). Recent studies have adopted the three dimensions of social capital to investigate the individual behaviours directly in OHCs, such as membership continuance intention and knowledge-sharing (Zhao et al., 2013, 2016). Thus, social capital theory provides a comprehensive view of different aspects of social relationships and allows for further insights into the roles of PU and satisfaction in the current study.

3   Research model and hypotheses

3.1   Research model

This study assumes that both PU and satisfaction related to smoking cessation OHCs determine users' knowledge-sharing and recommendation behaviours. Social capital (i.e., structural capital, cognitive capital, relational capital) is proposed to influence the PU of smoking cessation OHCs positively. PU can trigger user satisfaction. Specifically, in this study, social ties represent structural capital, shared language and vision reflect cognitive capital, and reciprocity and commitment represent relational capital. Figure 1 presents the research model. Table 1 introduces the definitions of the core constructs involved in the proposed research model.
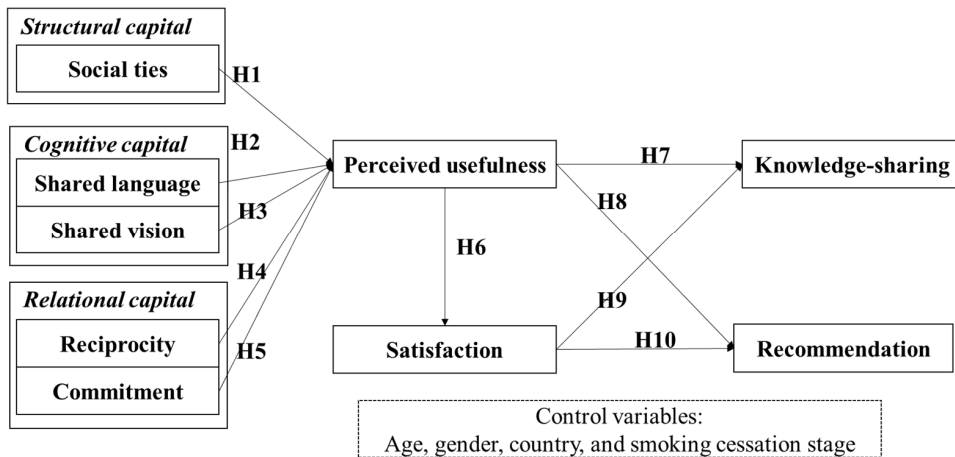
Figure 1   The proposed research model

Table 1   List of definitions of the core constructs

Construct	Definition
Social ties (ST)	The strength of the relationships, interaction frequency, and duration of interaction among users in smoking cessation OHCs (Chiu et al., 2006)
Shared language (SL)	Distinctive smoking-cessation-related terms for which users share a common understanding to facilitate communication in smoking cessation OHCs (Chiu et al., 2006)
Shared vision (SV)	Common values, goals, and concerns regarding smoking cessation (Chiu et al., 2006)
Reciprocity (RECI)	A sense of mutual indebtedness to reciprocate the benefits they receive from others, ensuring ongoing supportive exchanges in smoking cessation OHCs (Chiu et al., 2006; Wasko and Faraj, 2005)
Commitment (COM)	An enduring desire to maintain the relationship with the smoking cessation OHC (Wiertz and de Ruyter, 2007)
Perceived usefulness (PU)	The degree to which a user believes that using a smoking cessation OHC would improve his or her performance of quitting smoking (Davis, 1989)
Knowledge-sharing (KS)	The behaviour of sharing information and personal experience with respect to quitting smoking in a smoking cessation OHC (Hsu et al., 2007)
Recommendation (RECO)	The behaviour of recommending a smoking cessation OHC to others (Kim and Son, 2009)
Satisfaction (SAT)	The degree to which a user is satisfied with previous use of a smoking cessation OHC (Bhattacherjee, 2001)

3.2   Research hypotheses

Users of smoking cessation OHCs can build social ties through different communication functions provided by the OHCs, such as one-to-one private messages and one-to-many

postings (Cobb et al., 2010; Graham et al., 2017). Additionally, social ties can bond users and stream information (Nahapiet and Ghoshal, 1998). The social ties built in smoking cessation OHCs can reduce the time and effort needed to collect smoking-cessation-related information by providing cost-effective information channels. Users can seek and share information on how to quit smoking to reach their abstinence goals via social ties formed within the OHCs. These social ties not only enrich the information on smoking cessation but also reduce the costs of searching and sharing. The work by Luo and Ye (2019) showed that social ties enhance consumers' PU of online out-shopping platforms. Hence, it is reasonable to hypothesise that users are more likely to perceive a smoking cessation OHC as useful in aiding smoking cessation when they build strong social ties with others in the OHC. Therefore, the following hypothesis is proposed:

H1   Social ties are positively linked to the PU of a smoking cessation OHC.

Shared language is defined as common vocabulary, codes, or norms that users adopt in their communications (Chang and Chuang, 2011; Chiu et al., 2006). Shared language can improve users' appraisal and understanding of each other by reducing the effort required to understand each other (Nahapiet and Ghoshal, 1998). In smoking cessation OHCs, users often create common terms (e.g., slang) that are easy to understand for others (van der Tempel et al., 2016). The shared language enables users to combine information on smoking cessation OHCs, avoid misunderstandings in communication, and exchange resources without barriers (Sun et al., 2012). By facilitating mutual understanding and strengthening communication, shared language can reduce the effort required to gain information and resources regarding smoking cessation. This might bolster the PU of smoking cessation OHCs. Previous research has identified shared language as a motivator that determines consumers' PU of online out-shopping platforms (Luo and Ye, 2019). Based on the above, the following hypothesis is posited:

H2   Shared language is positively linked to the PU of a smoking cessation OHC.

Shared vision refers to common goals and values among the users of a smoking cessation OHC (Chang et al., 2012; Chiu et al., 2006). The core vision shared in smoking cessation OHCs is to achieve permanently ceasing smoking through supporting each other (Cobb et al., 2010). Such a common vision binds previously isolated quitters together and helps users see the potential value of using OHCs in aiding smoking cessation. This might also improve users' perception of usefulness with regard to smoking cessation OHCs. Therefore, the following hypothesis is proposed:

H3   Shared vision is positively linked to the PU of a smoking cessation OHC.

Reciprocity is an essential aspect of relational capital, as users often expect the fairness of others rewarding their contributions in the long run (Chiu et al., 2006; Wasko and Faraj, 2005). In an atmosphere of reciprocity, users are more likely to provide useful information and perceive more value in such information (Mathwick et al., 2007). Likewise, reciprocity can facilitate communication in smoking cessation OHCs; in this way, users can obtain more information to promote their smoking cessation. This might affect users' PU of these OHCs. Hence, the following hypothesis is proposed:

H4   Reciprocity is positively linked to the PU of a smoking cessation OHC.

Commitment refers to a sense of belonging and positive feelings towards a smoking cessation OHC (Yu et al., 2013). Prior studies have found that commitment positively

affects users' beliefs. For instance, a study by Magni and Pennarola (2008) revealed that individuals with a high level of commitment are more likely to understand the PU of a newly introduced IS. In the context of smoking cessation OHCs, committed users are likely to perceive such OHCs as a tool to improve their smoking cessation performance, supporting the common goals and values formed in the OHCs. In this way, users with a high level of commitment may be more willing to spend time and effort understanding the use of the OHCs; consequently, they perceive the usefulness of the OHCs more. Thus, the following hypothesis is proposed:

H5   Commitment is positively linked to the PU of a smoking cessation OHC.

The relationship between PU and satisfaction has been widely acknowledged in prior literature. For instance, while studying an online bank system, Bhattacherjee (2001) found that users' perceptions of usefulness positively affect user satisfaction. In a meta-analysis of user satisfaction with information technology, PU was identified as a key predictor of user satisfaction (Mahmood et al., 2000). Thus, based on prior findings, the following hypothesis is suggested:

H6   Users' PU of a smoking cessation OHC is positively linked to their satisfaction with it.

In prior literature, some studies have demonstrated that PU is a key determinant of knowledge-sharing. For instance, Yuan et al. (2016) found that PU positively affects users' knowledge-sharing in travel-oriented communities. Likewise, in the context of knowledge management systems (KMS), PU of KMS has a positive influence on KMS use for sharing and retrieval (Jahmani et al., 2018). Based on these research findings, it is reasonable to assume that users' tendency to share their knowledge will be higher if they perceive smoking cessation OHCs to be useful. Thus, the following hypothesis is suggested:

H7   Users' PU of a smoking cessation OHC is positively linked to their knowledge-sharing.

Moreover, PU has also been found to affect users' recommendation behaviours. For instance, in a study by Li and Liu (2014), the PU of e-services positively influenced word-of-mouth recommendation. Also, Wang and Li (2019) found that PU of travel websites is an essential determinant of the use and generation of electronic word of mouth (eWOM). In the context of smoking cessation OHCs, if users perceive an OHC are useful for smoking cessation, they would like to recommend it to other smokers. Therefore, the following hypothesis is proposed:

H8   Users' PU of a smoking cessation OHC is positively linked to their recommendation.

In IS literature, some scholars have examined knowledge-sharing as a consequence of user satisfaction. For instance, the findings of Cheung et al. (2013) shown that knowledge-sharing in an online community of practice is influenced by user satisfaction. Following their findings, when users of a smoking cessation OHC feel satisfied with it, they tend to share their knowledge with others in the OHC. Therefore, the following hypothesis is offered:

H9   Users' satisfaction with a smoking cessation OHC is positively linked to their knowledge-sharing.

Some studies found that user satisfaction also affects users' recommendation behaviours. For instance, in the research conducted by Morgeson (2011), user satisfaction with websites is significantly associated with users' word-of-mouth recommendation behaviours. Users are more likely to recommend a website to others when they are satisfied with it. Based on his research results, it is sensible to suppose that users' recommendation behaviours are motivated by their satisfaction with smoking cessation OHCs. The more satisfied users feel, the higher the likelihood that they will speak positively about their experience and recommend the OHCs to other people beyond the OHCs. Therefore, the following hypothesis is suggested:

H10   Users' satisfaction with a smoking cessation OHC is positively linked to their recommendation behaviour.

4   Methodology

4.1   Data measures

The constructs included in the proposed model were measured by adopting previously validated scales using a five-point Likert scale (see Appendix). All items were re-worded to fit the context of smoking cessation OHCs. Specifically, the items of social ties, shared language, and shared vision were taken from the work by Chiu et al. (2006), while reciprocity came from research by Wasko and Faraj (2005). Items for PU and satisfaction were based on the research by Bhattacherjee (2001). Knowledge-sharing was measured by items from the study of Hsu et al. (2007). Commitment was measured by using items from Liang et al. (2011) recommendation behaviours were taken from Kim and Son (2009).

Prior literature has suggested considering age, gender, and smoking cessation stage when investigating smoking cessation (Messer et al., 2008; Wetter et al., 1999; Zhang and Yang, 2015). Additionally, since this study collected data from two countries with different cultures, there might be cultural differences between the two user groups. Therefore, this study set country, gender, age, and smoking cessation stage as control variables in the research model.

4.2   Data collection

Empirical data for this study were collected via an online survey. The target respondents came from two OHCs designed for smoking cessation: smoking cessation bar in China and the Stumppi.fi in Finland. Smoking cessation bar is the most popular OHC aiming at helping Chinese smokers to achieve abstinence and operated on the famous Chinese communication platform: Baidu post bar. Stumppi.fi is an online platform for assisting Finnish smokers to stop using tobacco products and is maintained by the Organisation for Respiratory Health in Finland. Though these two OHCs are hosted by different organisations and in two different countries, they share common structures and functions, such as starting new threads for discussion, posting messages for seeking help,

commenting or responding to others' postings in a thread, and sending private messages. In addition, both OHCs offer anonymity to protect users' privacy.

Respondents were requested to provide demographic information about age, gender and smoking cessation stage. They were also asked to report their usage experience and perceptions of using the OHCs for aiding their smoking cessation. All respondents obtained a gift for their submissions. A total of 185 submissions were obtained (139 in China and 46 in Finland). After dropping 12 abnormal submissions (12 in China) that were repetitive and incomplete, 173 submissions were finally confirmed as a valid sample for subsequent statistical analysis. Table 2 summarises the descriptive statistics of the sample.

Table 2   The demographic profile of the respondents

Measure	Items	Frequency	Percentage (%)
Country	Finland	46	26.6
	China	127	73.4
Gender	Male	103	59.5
	Female	64	37.0
	Unwilling to disclose	6	3.5
Age	15–24	17	9.8
	25–44	117	67.6
	45–65	35	20.2
	> 65	4	2.3
Smoking cessation stage	Pre-contemplation	4	2.3
	Contemplation	45	26.0
	Preparation	19	11.0
	Action	40	23.1
	Maintenance	50	28.9
	Termination	15	8.7

4.3   Assessment of common methods bias and collinearity

To check common method bias in this research, Harman's single-factor test was conducted (Podsakoff et al., 2003), and no single component was found to account for more than 50% of the total variance explained. Thus, the common method bias was unlikely to be an issue in this research. In addition, the variance inflation factor (VIF) was calculated to measure collinearity (Kock and Lynn, 2012). All VIFs from the full collinearity test were below the recommended upper limit of 3.3 (Kock and Lynn, 2012), indicating that the research model was free of collinearity.

4.4   Data analysis and results

In this research, partial least squares (PLS) 3.0 was used for data analysis and hypotheses testing. The analysis included two parts: the test of the measurement model and the test of the structural model. To test the measurement model, convergent validity and discriminant validity were assessed. Convergent validity was demonstrated when the

factor loading for each item exceeded 0.70, Cronbach's alpha was higher than 0.70, composite reliability (CR) was above 0.70, and the average variance extracted (AVE) for each construct was greater than 0.50 (Chin, 1998; Hulland, 1999; Tenenhaus et al., 2005). Table 3 shows that convergent validity was established in this study. In addition, the value of the square root of the AVE for each construct was stronger than its correlation with other constructs, indicating that discriminant validity was also established in this research (see Table 4) (Chin, 1998).

Table 3   Results of convergent validity

	Factor loading	*Cronbach's alpha*	*CR*	*AVE*
COM1	0.890	0.844	0.906	0.763
COM2	0.842			
COM3	0.887			
KS1	0.925	0.935	0.954	0.838
KS2	0.901			
KS3	0.923			
KS4	0.912			
PU1	0.828	0.799	0.87	0.627
PU2	0.840			
PU3	0.784			
PU4	0.708			
RECI1	0.843	0.704	0.869	0.769
RECI2	0.910			
RECO1	0.834	0.812	0.877	0.641
RECO2	0.800			
RECO3	0.845			
RECO4	0.718			
SAT1	0.804	0.812	0.874	0.635
SAT2	0.746			
SAT3	0.812			
SAT4	0.823			
SL1	0.807	0.775	0.856	0.597
SL2	0.762			
SL3	0.749			
SL4	0.773			
SV1	0.870	0.786	0.875	0.701
SV2	0.769			
SV3	0.868			

Notes: KS, knowledge-sharing; PU, perceived usefulness; COM, commitment; RECI, reciprocity; RECO, recommendation; SAT, satisfaction; SL, shared language; SV, shared vision; ST, social ties; CR, composite reliability; AVE, average variance extracted.

Table 3   Results of convergent validity (continued)

	Factor loading	*Cronbach's alpha*	*CR*	*AVE*
ST1	0.953	0.952	0.965	0.875
ST2	0.908			
ST3	0.935			
ST4	0.944			

Notes: KS, knowledge-sharing; PU, perceived usefulness; COM, commitment; RECI, reciprocity; RECO, recommendation; SAT, satisfaction; SL, shared language; SV, shared vision; ST, social ties; CR, composite reliability; AVE, average variance extracted.

**Table 4**   Correlations and square roots of AVE

	KS	*PU*	*COM*	*RECI*	*RECO*	*SAT*	*SL*	*SV*	*ST*
KS	0.915								
PU	0.571	0.792							
COM	0.691	0.681	0.873						
RECI	0.479	0.398	0.451	0.877					
RECO	0.421	0.638	0.479	0.434	0.801				
SAT	0.445	0.561	0.459	0.403	0.513	0.797			
SL	0.507	0.595	0.544	0.448	0.57	0.517	0.773		
SV	0.485	0.619	0.591	0.508	0.632	0.448	0.684	0.837	
ST	0.812	0.508	0.673	0.384	0.299	0.354	0.519	0.414	0.935

Notes: KS, knowledge-sharing; PU, perceived usefulness; COM, commitment; RECI, reciprocity; RECO, recommendation; SAT, satisfaction; SL, shared language; SV, shared vision; ST, social ties.

To test the structural model, the path coefficients and the R^2 values were evaluated via the bootstrapping procedure in PLS 3.0. Figure 2 presents the results of the structural model. Specifically, the R^2 value for PU of smoking cessation OHCs, satisfaction, knowledge-sharing and recommendations were 58.0%, 31.7%, 58.0% and 47.0%, respectively. As postulated, shared language ($\beta = 0.249$, $p < 0.01$), shared vision ($\beta = 0.229$, $p < 0.05$) and commitment ($\beta = 0.367$, $p < 0.001$) had significant positive influences on PU. Social ties and reciprocity were not antecedents to PU. PU, in turn, significantly affected satisfaction ($\beta = 0.579$, $p < 0.001$), knowledge-sharing ($\beta = 0.255$, $p < 0.01$) and recommendations ($\beta = 0.592$, $p < 0.001$), respectively. Satisfaction had positive influences on knowledge-sharing ($\beta = 0.206$, $p < 0.01$) and recommendations ($\beta = 0.208$, $p < 0.001$). Therefore, H2, H3, H5, H6, H7, H8, H9 and H10 were supported.

The results of the control variable test indicated that country affected both knowledge-sharing ($\beta = 0.469$, $p < 0.001$) and recommendations ($\beta = –0.170$, $p < 0.05$) in smoking cessation OHCs significantly. Gender had significant impacts on knowledge-sharing ($\beta = 0.146$, $p < 0.05$) but not recommendations. The smoking cessation stage influenced knowledge-sharing ($\beta = –0.109$, $p < 0.05$) but not recommendations. Age did not affect knowledge-sharing or recommendations.

Figure 2   The structural model
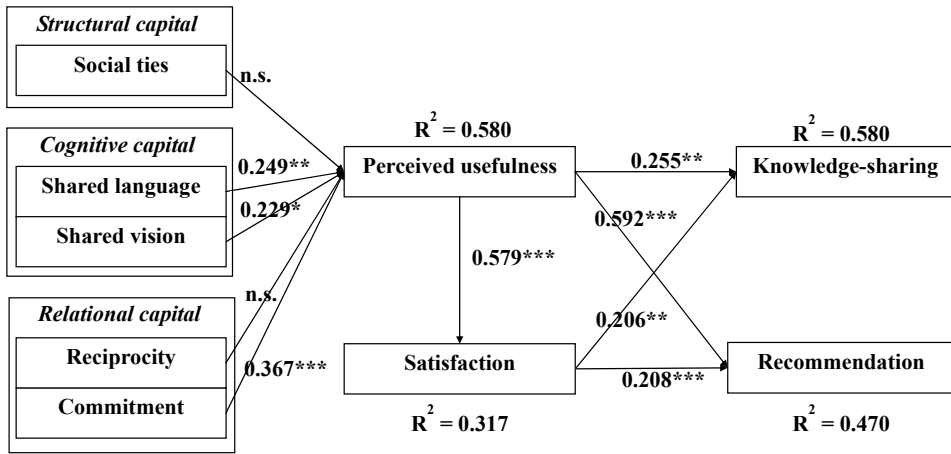
Notes: ***$p < 0.001$; **$p < 0.01$; * $p < 0.05$ and n.s., not significant.

5   Discussion and conclusions

5.1   *Discussion*

From a social capital perspective, this research proposes and validates a theoretical model to explore the roles of PU and user satisfaction in predicting both knowledge-sharing and recommendation behaviours in smoking cessation OHCs. The findings of this research offer several points of interest.

First, in the particular context of smoking cessation OHCs, social capital presents a useful perspective for explaining users' PU. This study clarified the relationships between three dimensions of social capital and PU regarding smoking cessation OHCs. However, the three dimensions of social capital have different associations with PU. Specifically, structural capital (i.e., social ties) was found not to be an antecedent to PU of smoking cessation OHCs. This is contrary to previous studies. For instance, studying online out-shopping platforms, Luo and Ye (2019) found that structural capital positively affects the PU of these platforms. In smoking cessation OHCs, even though social ties provide opportunities for communication, they are not enough to enhance users' perception of usefulness in improving smoking cessation performance. This might be because of the complex nature of smoking cessation, such as social stigma. Even though some smokers build close relationships with others, it is still possible for them to hide their quitting behaviour due to stigma. Strong relationships do not guarantee users' perception of usefulness regarding smoking cessation OHCs. Furthermore, the findings suggested that cognitive capital, including shared language and shared vision, affects PU positively. This is consistent with prior findings. For instance, Luo and Ye (2019) found that shared language exerts positive influences on the PU of online out-shopping platforms. In smoking cessation OHCs, shared language and vision enhance the efficiency of communication (Huang et al., 2017). Through shared language and vision, users could understand more information to aid their smoking cessation. Moreover, regarding relational capital, the findings of this study suggested that reciprocity has no influence on

PU, but commitment does. In smoking cessation OHCs, a reciprocity atmosphere might not be adequate to bolster users' PU. In addition, committed users have a strong sense of belonging and desire to remain in the relationship with the OHCs; therefore, they are more likely to spend time and effort learning and understanding the value of using the OHCs in helping to quit smoking. Consequently, users with a high level of commitment will perceive the OHCs as useful in smoking cessation.

Second, this study found significant impacts of PU on both knowledge-sharing and recommendation behaviours. The findings on the former connection between PU and knowledge-sharing align with prior research. For instance, studying online travel communities, Yuan et al. (2016) found that PU affects knowledge-sharing significantly. The findings on the latter association between PU and recommendation are also in alignment with prior research. For instance, Li and Liu (2014) found that PU positively influences users' word-of-mouth recommendations in the context of online travel services. In smoking cessation OHCs, when a user perceives the OHC to be useful in aiding smoking cessation, they are more likely to share their knowledge with others within the OHCs, as well as recommend these OHCs to outsiders.

Third, this research found satisfaction positively affects both knowledge-sharing and recommendation. These findings confirm prior research as well (Cheung et al., 2013; Morgeson, 2011). Specifically, Morgeson (2011) found that users' intention to continue using an IS and recommendation behaviour are determined by user satisfaction with it. Additionally, the findings of Cheung et al. (2013) shown that users' continuance intention to share knowledge in an online community is motivated by their satisfaction. The results of the current study demonstrate that users of a smoking cessation OHC are more likely to share their knowledge within the OHC and recommend it to others when they feel satisfied with the OHC.

Finally, this research found that the PU of smoking cessation OHCs predicts user satisfaction. This finding aligns with past research results (Bhattacherjee, 2001; Mahmood et al., 2000). For instance, Bhattacherjee (2001) study suggested that a user's satisfaction with an IS is affected by their beliefs about usefulness. Likewise, in smoking cessation OHCs, when a user perceives that OHCs are useful for helping them to quit smoking habits, they tend to feel satisfied with the OHCs.

5.2 Conclusions

This study has several theoretical implications. First, this study extends the application of social capital theory to explain IS post-adoption behaviours in the particular context of smoking cessation OHCs from the standpoint of social capital in predicting PU of such OHCs. In addition, the consideration for the roles of different dimensions of social capital in influencing post-adoption behaviours furthers IS studies from the view of the social capital built in smoking cessation OHCs in addressing public health issues.

Second, this study advances research on IS post-adoption behaviours by examining how PU and satisfaction influence different post-adoption behaviours (i.e., knowledge-sharing and recommendation) in smoking cessation OHCs. Unlike prior research, which has mainly focused on continuance intention (Bhattacherjee, 2001), this study integrates two other forms of post-adoption behaviours, including knowledge-sharing and recommendations. The findings of this study indicate that both

knowledge-sharing and recommendations could be facilitated by enhancing users' PU and satisfaction in the context of smoking cessation OHCs.

Third, different from previous literature, which has primarily investigated the determinants of PU from the user and technology perspectives (e.g., Agarwal and Karahanna, 2000; Wang and Li, 2019), this study contributes to PU research by employing social capital theory to unpack the antecedents to PU. The findings on cognitive capital (shared language and shared vision) and relational capital (commitment) as antecedents to PU of smoking cessation OHCs suggest that PU can be explicated from a social capital perspective, which highlights the importance of social resources embedded within, available through and derived from social relationships. That is to say, cognitive capital and relational capital can contribute to desired outcomes for smoking cessation OHCs, such as PU in the current study. This extends our understanding of how social capital dimensions contribute to users' beliefs about smoking cessation OHCs.

Fourth, examining the components that construct social capital helps us to understand the dimensions of social capital. Specifically, finding the significant effects of relational capital (commitment) and cognitive capital (shared language and vision) on PU offers further support for concluding that relational and cognitive capital can affect users' perceptions of usefulness (Luo and Ye, 2019). The insignificant effects of structural capital (social ties) on the PU of smoking cessation OHCs suggest that the roles of different dimensions of social capital might vary in predicting users' PU due to different contexts.

Finally, as Vaezi et al. (2016) advised being aware of contexts when investigating the antecedents to satisfaction, this study addressed this call by examining how PU predicts satisfaction in the particular context of smoking cessation OHCs. The current study indicated that users' satisfaction could be influenced by PU. When users perceive the OHCs as useful in helping them quit smoking, they are more likely to feel satisfied with the OHCs.

This research also offers several practical implications. First, the findings on the positive influences of both PU and satisfaction on post-adoption behaviours (i.e., knowledge-sharing and recommendation) suggest that the OHC service providers could motivate users' knowledge-sharing and recommendations by increasing users' PU of and satisfaction with smoking cessation OHCs. Second, the findings from the social capital perspective suggest that it is crucial to exploit the power of social capital in smoking cessation OHCs in affecting PU. Specifically, the findings of positive effects of shared language, shared vision, and commitment on PU suggest that OHC providers should focus on their strategies for promoting shared language among users, inspiring the shared vision of smoking cessation, and cultivating users' commitment towards OHCs. For instance, OHC service providers could encourage users to participate in online activities often, thereby facilitating the development of shared language and commitment. In addition, providers can clearly define and display the missions and goals in the OHC to strengthen the common vision of quitting smoking among users. Therefore, users of a smoking cessation OHC will perceive it as useful, eventually contribute more knowledge into it, and recommend it to other people.

5.3   *Limitations and future research*

This research has several limitations that point to future research directions. First, this study collected a relatively restricted sample of users from two smoking cessation OHCs.

Future research may collect data from OHCs that focus on other health topics to enhance the generalisability of the research findings, such as quitting alcohol and drug abuse prevention. Second, regarding the antecedents to the PU of smoking cessation OHCs, the five social capital elements proposed in the research model may not fully capture social capital's effects on PU in these OHCs. Thus, other facets of each dimension (e.g., trust in the relational dimension) could be considered in future research.

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Appendix A

Measurement items and their sources

Construct		Measurement items	Reference
Social ties (ST)	ST1	I maintained close social relationships with some members of the smoking cessation OHC.	
	ST2	I spent a lot of time interacting with some members of the smoking cessation OHC.	
	ST3	I knew some members of the smoking cessation OHC on a personal level.	
	ST4	I was in frequent communication with some members of the smoking cessation OHC.	Chiu et al. (2006)
Commitment (COM)	CO1	I was proud to belong to the smoking cessation OHC.	
	CO2	I felt a sense of belonging to the smoking cessation OHC.	
	CO3	I cared about the long-term success of the smoking cessation OHC.	Liang et al. (2011)
Reciprocity (RECI)	RECI1	I knew that other members would help me, so it's only fair to help other members.	
	RECI2	I knew that someone would help me if I were in a similar situation.	Wasko and Faraj (2005)
Shared vision (SV)	SV1	Members of the smoking cessation OHC shared the vision of helping others solve their smoking problems.	
	SV2	Members of the smoking cessation OHC shared the same goal of supporting each other.	
	SV3	Members of the smoking cessation OHC shared the same sense that helping others was pleasant.	Chiu et al. (2006)
Shared language (SL)	SL1	The members of the smoking cessation OHC used common terms.	
	SL2	The members of the smoking cessation OHC used understandable communication patterns during discussion.	
	SL3	The members of the smoking cessation OHC used understandable narrative forms to post messages or articles.	
	SL4	The members of the smoking cessation OHC were always on the same frequency when we talked about smoking cessation.	Chiu et al. (2006)

Measurement items and their sources (continued)

Construct		Measurement items	Reference
Knowledge-sharing (KS)	KS1	I frequently participated in knowledge-sharing activities within the smoking cessation OHC.	
	KS2	I usually spent a lot of time in knowledge-sharing activities within the smoking cessation OHC.	
	KS3	I usually shared information with others in the smoking cessation OHC actively.	
	KS4	I usually involved myself in discussions of various topics within the smoking cessation OHC.	Hsu et al. (2007)
Perceived usefulness (PU)	PU1	Using the smoking-cessation OHC made my smoking cessation proceed faster (productivity).	
	PU1	Using the smoking-cessation OHC made my smoking cessation proceed better (performance).	
	PU3	Using the smoking-cessation OHC helped me make better decisions regarding smoking cessation (effectiveness).	
	PU4	Overall, using the smoking-cessation OHC was useful in smoking cessation.	Bhattacherjee (2001)
Satisfaction (SAT)		How do you feel about your overall experience of using this online community?	
	1	Very dissatisfied, dissatisfied, neutral, satisfied, very satisfied	
	2	Very displeased, displeased, neutral, pleased, very pleased	
	3	Very frustrated, frustrated, neutral, contented, very contented	
	4	Very terrible, terrible, neutral, delighted, very delighted	Bhattacherjee (2001)
Recommendation (RECO)	RECO1	I would recommend stumppi.fi to other smokers.	
	RECO2	I will say positive things about stumppi.fi to others.	
	RECO3	I would recommend stumppi.fi when someone seeks my advice on smoking cessation.	
	RECO4	I would recommend stumppi.fi to others via social media.	Kim and Son (2009)