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INDIVIDUALS' USAGE OF SMOKING CESSATION ONLINE HEALTH COMMUNITIES

Chenglong Li

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University of Turku

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Department of Management and Entrepreneurship
Information Systems Science
Doctoral Programme in Mathematics and Computer Sciences (MATTI)

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ABSTRACT

Smoking is still a significant threat to human health. To reduce the prevalence of smoking, the World Health Organization (WHO) has highlighted the importance of offering help to quit tobacco use. Recently, smoking cessation online health communities (OHCs) have become an important online tool to help smokers kick their smoking habits. Smoking cessation OHCs are collectives of people who communicate with each other about quitting smoking through dedicated sites on the Internet. These OHCs offer substantial benefits to users, such as enriching their medical knowledge, enhancing their emotional comfort, reducing their stress, and improving their smoking cessation performance.

However, smoking cessation OHCs face the great challenge of low levels of participation. Many users only visit these OHCs once and never return, despite the benefits. To improve the longevity of such OHCs and unleash their full potential, therefore, it is imperative to understand what motivates users' continued usage of online smoking OHCs, and what prompts them to contribute knowledge to these OHCs.

Retaining users and knowledge-sharing have been central topics for Information Systems (IS) researchers studying post-adoption stage of OHC usage. However, few studies have investigated users' post-adoption behaviors in the specific context of smoking cessation OHCs. Extant literature has focused primarily on the technology perspective of smoking cessation OHCs and ignored their inherent social factors (such as social support and social capital). An understanding of the interplay of social and technical beliefs that might explain behavioral intentions in this context remains obscure.

This study examines the determining factors of two forms of IS post-adoption behaviors in the context of smoking cessation OHCs: the continuance intention and knowledge-sharing. A mixture of quantitative survey research and qualitative interview research is employed in this study. The quantitative method was used to answer research questions about the determinants of both continuance intention and knowledge-sharing. The qualitative approach was adopted to further examine what determines users' continuance intention toward smoking cessation OHCs.

The empirical data in this study was collected from individual users of smoking cessation OHCs in China and Finland. The results show that continuance intention is influenced by users' systems-related beliefs (e.g., perceived usefulness), by their

social-related beliefs (e.g., perceived informational support, perceived emotional support, and perceived companionship), and by their knowledge-sharing behaviors. Similarly, knowledge-sharing is determined by users' systems-related beliefs (e.g., perceived usefulness), by social-related beliefs (e.g., social ties and reciprocity), and by attitudes (e.g., satisfaction). In addition, users' systems-related beliefs (e.g., perceived usefulness) were found to be affected by their social-related beliefs, such as perceived esteem support, perceived emotional support, shared language, shared vision, and commitment.

This research contributes to the literature on IS post-adoption behaviors and smoking cessation OHCs. Specifically, it contributes to understanding individual users' post-adoption behaviors by highlighting the impacts of different user beliefs and attitudes on two forms of IS usage. It sheds light on the roles of users' systems-related beliefs (e.g., perceived usefulness), social-related beliefs (e.g., social support and social capital), and attitudes (e.g., satisfaction) in determining their usage behaviors. Additionally, it contributes to understanding users' different beliefs by examining the relationships between them. The findings related to the impact of social-related beliefs on systems-related beliefs offer a comprehensive picture of the roles of different users' beliefs in smoking cessation OHCs. Furthermore, it contributes to the literature on smoking cessation OHCs by offering insights into retaining users and motivating their knowledge contributions. The findings on the determinants of both continuance intention and knowledge-sharing extend understanding about how to design and maintain smoking cessation OHCs. From a practical view, this research has important implications for smoking cessation OHC managers, specifically regarding keeping the OHC active and sustainable via retaining users and encouraging them to share knowledge. It also helps smoking cessation intervention designers to develop successful and sustainable digital interventions. By supporting the longevity of smoking cessation OHCs, these findings additionally offer implications to healthcare service providers regarding the needs of versatile smoking cessation assistance and support.

KEYWORDS: IS post-adoption behavior, online health community, continuance intention, knowledge-sharing, social support, social capital, perceived usefulness, satisfaction, smoking cessation

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TIIVISTELMÄ

Tupakointi on suuri uhka ihmisten terveydelle. Tupakoinnin vähentämiseksi Maailman terveysjärjestö (World Health Organization,WHO) on korostanut tupakoinnin lopettamisen avun antamisen merkitystä. Viime aikoina tupakoinnin lopettamiseen liittyvät terveysverkkoyhteisöt (online health communities, OHCs) ovat muodostuneet tärkeiksi verkkotyökaluiksi tupakoinnin lopettamisessa. Tupakoinnin lopettamisen verkkoyhteisöt ovat Internetissä olevia tarkoituksellisia yhteisöjä ihmisille jotka kommunikoivat keskenään tupakoinnin lopettamisesta. Nämä verkkoyhteisöt tarjoavat merkittäviä etuja käyttäjilleen, kuten lääketieteellisen tietämyksen lisääntyminen, henkisen hyvinvoinnin lisääntyminen, stressin vähentäminen, ja tupakoinnin lopettamisen tuloksellisuuden vahvistaminen.

Kuitenkin tupakoinnin lopettamisen verkkoyhteisöt kärsivät alhaisesta osallistumisaktiivisuudesta. Monet käyttäjät käyvät yhteisöissä kerran eivätkä koskaan palaa, hyödyistä huolimatta. Tupakoinnin lopettamisen verkkoyhteisöjen jatkuvuuden kehittämiseksi ja täyden hyödyn realisoimiseksi on välttämätöntä ymmärtää mikä motivoi käyttäjiä jatkamaan käyttöä, ja mikä rohkaisee heitä tuottamaan tietämystä näihin verkkoyhteisöihin.

Käyttäjien säilyttäminen ja tietämyksen jakaminen ovat olleet keskeisiä tietojärjestelmätieteen tutkimusteemoja tutkittaessa terveyden verkkoyhteisöjen käyttöä. Kuitenkin vain harvat tutkimukset ovat selvittäneet käyttäjien käyttöönoton jälkeistä käyttäytymistä juuri tupakoinnin lopettamisen verkkoyhteisöissä. Olemassa oleva kirjallisuus on keskittynyt pääosin tupakoinnin lopettamisen verkkoyhteisöjen tekniikkaan ja laiminlyönyt niihin oleellisesti liittyvät sosiaaliset tekijät (kuten sosiaalinen tuki ja sosiaalinen pääoma). Tällaisessa yhteydessä sosiaalisten ja teknisten tekijöiden vuorovaikutukseen liittyvä ymmärrys jää epämääräiseksi.

Tämä tutkimus tarkastelee määrittäviä tekijöitä kahdelle tietojärjestelmien käyttöönoton jälkeiselle käyttäytymiselle tupakoinnin lopettamisen verkkoyhteisöjen puitteissa: käytön jatkamisen aikomus ja tietämyksen jakaminen. Tässä tutkimuksessa käytetään sekä kvantitatiivista kyselytutkimusta että kvalitatiivista haastattelututkimusta. Kvantitatiivista metodia käytettiin vastaamaan tutkimuskysymyksiin koskien sekä käytön jatkamisen aikomusta että tiedon jakamista. Kvalitatiivista lähestymistapaa käytettiin edelleen tarkentamaan mikä määrittää käytön jatkamisen aikomusta tupakoinnin lopettamisen verkkoyhteisöissä.

Tämän tutkimuksen empiirinen data kerättiin yksittäisiltä käyttäjiltä tupakoinnin lopettamisen verkkoyhteisöissä Kiinassa ja Suomessa. Tulokset osoittavat, että käyttäjän tietojärjestelmään liittyvät uskomukset (esim. koettu hyödyllisyys) ja sosiaaliseen yhteisöön liittyvät uskomukset (esim. koettu tuki informaation muodossa, koettu emotionaalinen tuki, koettu kumppanuus) ja käyttäjien tiedon jakamiseen liittyvä käyttäytyminen vaikuttavat käytön jatkamisen aikomukseen. Samalla tavalla, tietämyksen jakaminen määrittyy tietojärjestelmään liittyvien uskomusten (esim. koettu hyödyllisyys) ja sosiaaliseen yhteisöön liittyvien uskomusten (esim. sosiaaliset siteet ja vastavuoroisuus) sekä mielipiteiden (esim. tyytyväisyys) kautta. Lisäksi käyttäjien sosiaalisen yhteisöön liittyvien uskomusten (esim. koettu kunnioitukseen liittyvä tuki, koettu emotionaalinen tuki, jaettu kielenkäyttö, jaettu visio ja sitoutuminen) havaittiin vaikuttavan käyttäjien tietojärjestelmän liittyviin uskomuksiin (esim. koettu hyödyllisuus).

Tämä tutkimus tuottaa tietoa tietojärjestelmätieteen kirjallisuuteen tietojärjestelmien omaksumisen jälkeisestä käytöksestä ja tupakoinnin lopettamisen verkkoyhteisöistä. Erityisesti se tuottaa tietoa omaksumisen jälkeisestä käytöksestä korostamalla erilaisia käyttäjien uskomuksia ja mielipiteitä kahden käyttäytymismuodon suhteen. Tutkimus valaiseen käyttäjien järjestelmään liittyvien uskomusten (esim. koettu hyödyllisuus), sosiaaliseen yhteisöön liittyvien uskomusten (esim. sosiaalinen tuki ja sosiaalinen pääoma) sekä mielipiteiden (esim. tyytyväisyys) roolia tietojärjestelmän käyttöönoton jälkeisessä käyttäytymisessä. Lisäksi se tuottaa tietoa käyttäjien erilaisista uskomuksista tutkimalla niiden välisiä yhteyksiä. Sosiaaliseen yhteisöön liittyviin uskomuksiin kohdistuvat tutkimustulokset tarjoavat kattavan kuvan erilaisten käyttäjien uskomuksien merkityksestä koskien tupakoinnin lopettamisen verkkoyhteisöjä. Edelleen tutkimus antaa panoksensa tupakoinnin lopettamisen verkkoyhteisöjä koskevaan kirjallisuuteen tarjoamalla näkökulmaa siihen miksi tietyt käyttäjät pysyvät pitkään verkkoyhteisössä, ja mikä motivoi heitä antamaan tietämyksensä tarjolle.

Sekä käyttämisen jatkumiseen että tiedon jakamiseen liittyviin syihin kohdistuvat tutkimustulokset laajentavat ymmärrystämme siitä kuinka suunnitella ja pitää yllä tupakoinnin lopettamisen verkkoyhteisöjä. Käytännön näkökulmasta tutkimuksella on tärkeitä johtopäätöksiä tupakoinnin verkkoyhteisöjen hallinnoijille, erityisesti siihen kuinka pitää yhteisö aktiivisena ja kestävänä säilyttämällä jäsenet ja rohkaisemalla heitä jakamaan tietämystä. Tutkimus myös auttaa tupakoinnin lopettamisen toimenpiteiden suunnittelijoita tuottamaan onnistuneita ja kestäviä interventioita. Tukemalla tupakoinnin lopettamisen verkkoyhteisöjen pitkäikäisyyttä nämä tutkimustulokset tarjoavat näkökulmia terveydenhuollon palveluiden tuottajille tupakoinnin lopettamisen liittyvään monimuotoiseen avustamiseen ja tukeen.

ASIASANAT: tietojärjestelmien omaksumisen jälkeinen käyttäytyminen, terveyden verkkoyhteisö, käytön jatkamisen aikomus, tietämyksen jakaminen, sosiaalinen tuki, sosiaalinen pääoma, koettu hyödyllisyys, tyytyväisyys, tupakoinnin lopettaminen

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Turku, Finland, June 2021
Chenglong Li

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List of Original Publications

This dissertation is based on the following original publications:

I Li., C., Li., H., and Suomi., R. (2019). "Use of Online Health Communities in Smoking Cessation: A Social Support Perspective," Proceedings of the 23rd Pacific Asia Conference on Information Systems (PACIS), Xi'an, China, pp. 1-14.

II Li, C., Li, H. and Suomi, R. (2021), "Antecedents and Consequences of the Perceived Usefulness of Smoking Cessation Online Health Communities", Internet Research, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/INTR-04-2020-0220

III Li, C. "Comprehending User Satisfaction with Smoking-Cessation Online Health Communities: A Social Capital Perspective," International Journal of Telemedicine and Clinical Practices, *accepted manuscript.*

IV Li, C., Li, H., Suomi, R. and Liu, Y. (2021), "Knowledge Sharing in Online Smoking Cessation Communities: A Social Capital Perspective", Internet Research, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/INTR-03-2020-0113

1 Introduction

This chapter aims to present an outline of the research. First, the phenomenon of research interest is demonstrated. Second, the research motivations and objectives are illustrated. Next, research questions are proposed. Finally, the outline of this research and its synopsis are presented.

1.1 Research interest

As reported by the World Health Organization (WHO), tobacco use remains a leading health threat around the world with annual estimated deaths of over 8 million; more than 7 million deaths are the consequence of direct tobacco use, and around 1.2 million are the consequence of second-hand smoke exposure (World Health Organization, 2019). All tobacco products are dangerous to nearly every organ of the human body, causing many diseases and harming the health of smokers and non-smokers who are exposed to second-hand smoke. Tobacco products are products that can be consumed and consist wholly or partly of tobacco, including cigarettes, waterpipe tobacco, cigars, kreteks, cigarillos, bidis, roll-your-own tobacco, chewing tobacco, pipe tobacco, electronic cigarettes, nicotine-containing liquid, and smokeless products (World Health Organization, 2019).

In Finland, although tobacco use is consistently decreasing, 15% of men and 13% of women between the ages 20 and 64 smoke daily in 2018 (The Finnish Institute for Health and Welfare, 2020). Cigarettes are the predominant form of tobacco products consumed in Finland, though other popular tobacco products include snus (a Swedish type of moist snuff) and electronic cigarettes (The Finnish Institute for Health and Welfare, 2020).

To reduce the prevalence of smoking, the WHO has highlighted the importance of offering help to quit tobacco use, as providing access to and encouraging the use of proper support greatly increases the chances of successfully quitting smoking (World Health Organization, 2019). In Finland, a road map has been proposed to end tobacco products by 2030 (Ministry of Social Affairs and Health, 2016). It aims for less than 5% of the adult population to use nicotine-containing products daily. Reaching this ambitious goal will require more assistance with quitting smoking and preventing relapses (Ministry of Social Affairs and Health, 2018).

Different strategies and interventions have been developed to offer smokers assistance with smoking cessation, such as individual face-to-face counselling, face-to-face group cognitive-behavioral therapy, and telephone counselling. However, these traditional methods are still underused and suffer from time and space constraints, as well as limited interest (Lancaster and Stead, 2017; Stead *et al.*, 2017; Stead *et al.*, 2013).

Recently, online health communities (OHCs) designed for smoking cessation have gained attention from scholars and practitioners. A smoking cessation OHC is a collective of persons who communicate with each other on stopping tobacco use through a dedicated website on the Internet (Li *et al.*, 2021; Mpinganjira, 2018). As a Web-based alternative, these OHCs hold the potential to deliver services related to smoking cessation to a broad population to increase population-quit rates. Previous research has found that using a smoking cessation OHC may benefit smokers and lead to positive outcomes related to smoking cessation, such as a decrease in cigarette consumption (Ramo *et al.*, 2015), relapse prevention (Cheung *et al.*, 2015), and short-term abstinence (Graham *et al.*, 2015).

It is not easy for smokers to kick their smoking habits, as smoking is a chronic illness that involves physical dependence on and emotional addiction to nicotine (World Health Organization, 2014). These powerful addictions are difficult to overcome; both the physical and emotional addictions need to be addressed in order to achieve long-term abstinence. Hence, quitting smoking is more like a marathon than a sprint. Although some smokers have successfully quit for significant periods of time, they still need continuous assessments and repeated interventions to prevent relapses, which can occur easily. A longitudinal research spanning 25 years shown that approximately 39% of former smokers—those who successfully quit smoking—reported relapse at least once in their smoking cessation process (Caraballo *et al.*, 2014). Thus, for those who have quit recently, continued usage of a smoking cessation OHC might help maintain the abstinence and aid in achieving permanently smoke-free (Cheung *et al.*, 2015; Cheung *et al.*, 2020). Additionally, OHC users may support other users by offering their tips and stories about quitting smoking (Dickerson *et al.*, 2016; White *et al.*, 2020). Apparently, the usage of a smoking cessation OHC can benefit both former and current smokers.

Nevertheless, few studies have been conducted to explore IS post-adoption behaviors regarding smoking cessation OHCs. In IS literature, post-adoption behaviors refer to individuals' behaviors after the initial use of IS and focus on post-stage use of IS; in contrast, initial adoption focuses on users' first-time use of IS (Bhattacherjee, 2001; Parthasarathy and Bhattacherjee, 1998).

Both continuance intention and knowledge-sharing can be viewed as IS post-adoption behaviors. Specifically, continuance intention refers to individual users' decision to sustain their use of a specific IS service over a long period after their

initial use (Bhattacherjee, 2001). Continuance intention has been emphasized as a critical factor that influences the success of an IS (Bhattacherjee, 2001; Zhou, 2013). User intention to repeat and continue their use of an IS is not only important for building long-term relationships with users, but is also imperative for reducing costs and securing return on investment in running the IS (Bitner *et al.*, 2002). Losing existing users invalidates the effort and money on attracting users. Previous research indicates that retaining existing users costs five times less than acquiring new users (Bhattacherjee, 2001). Though most smoking cessation OHCs are non-profit, it is still necessary to reduce operating costs whenever possible and to investigate the factors that drive users' continuance intention. In addition, users' intentions to maintain their ongoing relationships with these OHCs might lead to increased cessation and population quit rates. Therefore, a study of the antecedents of the continuance intention regarding smoking cessation OHCs is a valuable public health investigation.

Knowledge-sharing is defined as individuals disseminating their knowledge, skills, or experiences to others (Hsu *et al.*, 2007). Unlike continuance intention, which is a prerequisite behavior to receiving IS services, knowledge-sharing is a form of active engagement that is optional (Zou *et al.*, 2018). Users' knowledge-sharing has been demonstrated to be essential for the sustainability of an online community and its long-term success (Chiu *et al.*, 2006; Wasko and Faraj, 2005). Without the contribution from users, a smoking cessation OHC would be of limited value (Chiu *et al.*, 2006). Knowledge-sharing not only provides users with answers to their queries but also enables a productive and cohesive OHC (Kokkodis *et al.*, 2020; Zhao, J. *et al.*, 2016). However, OHC users typically seek information and knowledge but contribute little (Yan *et al.*, 2016; Zhang *et al.*, 2017a). Approximately 1% of an OHC's users generate and share original information and knowledge, 9% only contribute occasionally, and 90% passively lurk (Van Mierlo, 2014). Questions remain regarding how to motivate users to share knowledge and contribute to the sustainable development of an OHC. Therefore, there is a need for further investigation of the factors that influence users' knowledge-sharing in the specific context of smoking cessation OHCs.

1.2 Research motivation and research objective

While numerous studies have researched IS post-adoption behaviors, such as continuance intention and knowledge-sharing, there are still several research gaps that motivate this research.

First, many studies that have examined continuance intention regarding OHCs in the IS domain mainly employed traditional IS theories, such as the technology acceptance model (TAM) (Davis, 1989), the post-acceptance model of IS

continuance (Bhattacherjee, 2001), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al.*, 2003), and the extended unified theory of acceptance and use of technology (UTAUT2) (Venkatesh *et al.*, 2012). These theories focus on IS users' beliefs about utility, such as how perceived usefulness and perceived ease of use determine IS continuance (Davis, 1989; Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012).

However, the aforementioned theories were initially proposed to investigate the use of an IS through a focus on utilitarian functions, and these theories may not be able to entirely capture the multi-faceted nature of smoking cessation OHCs, such as the social function. In fact, many smokers use smoking cessation OHCs not only to satisfy their utilitarian needs (e.g., achieving abstinence) but also to meet their social needs, such as asking for social support from others to reduce uncertainty and stress. In other words, these OHCs not only rely on the utilitarian perspective but also operate as a social-oriented IS for smokers. As a potential variable related to the continuous use of smoking cessation OHCs, social support has not been adequately addressed in prior research, particularly in the continuance intention research regarding smoking cessation OHCs. Thus, it is necessary to examine continuance intention regarding smoking cessation OHCs through different lenses, such as social support and IS utility.

To address the research gap identified above, this research aims to employ social support theory to explain continuance intention toward smoking cessation OHCs. Specifically, this research seeks to propose a research model that represents a user's beliefs related to the perceptions of both IS utility and social support. In this study, the users' beliefs about IS utility are categorized as systems-related beliefs and those about social support as social-related beliefs. The influences of the aforementioned two types of beliefs on continuance intention are tested in this research, as well as the relationships between systems-related and social-related beliefs.

The second research gap concerns knowledge-sharing in smoking cessation OHCs. Prior research has included examinations of knowledge-sharing in various settings, such as online professional communities (Hsu *et al.*, 2007; Wasko and Faraj, 2005), blogs (Chai *et al.*, 2011), Internet-based discussion communities (Ray *et al.*, 2014), travel-related online communities (Bilgihan *et al.*, 2016), and OHCs (Zhang *et al.*, 2017b; Zhao, J. *et al.*, 2016). Various theoretical lenses have been advanced to explain what encourages individual users to share their knowledge, such as the theory of reasoned action (Bock *et al.*, 2005), social exchange theory (Chang *et al.*, 2015; Yan *et al.*, 2016), and motivation theory (Zhao, L. *et al.*, 2016). These theories focused on users' beliefs about the benefits of sharing knowledge with others, such as rewards and reputation (Yan *et al.*, 2016; Zhao, L. *et al.*, 2016).

However, as these theories did not emphasize the importance of social support in the context of smoking cessation OHCs, they may be unable to sufficiently and effectively explain knowledge-sharing in such OHCs. Users' beliefs about the social

support embedded within the OHCs might be motivators of knowledge-sharing. Little research has tried to ascertain whether social support can determine knowledge-sharing in said OHCs.

In addition, though social support theory holds the value for examining the knowledge-sharing in this context, it cannot explain how social support formed in smoking cessation OHCs. Prior IS research suggests that social capital theory emphasizes the significance of social capital in obtaining various resources to benefit individuals and organizations (Bartelt *et al.*, 2020; Cabrera and Cabrera, 2005; Choi, 2015). This theory can explain the outcomes of social relationships (Bartelt *et al.*, 2020; Cabrera and Cabrera, 2005; Choi, 2015). Additionally, in the literature on healthcare, social capital has been defined as an essential social determinant that influences smoking cessation (Giordano and Lindstrom, 2011; Kouvonen *et al.*, 2008). Thus, the social capital perspective can also provide essential insights into knowledge-sharing behavior in smoking cessation OHCs.

Another research stream on knowledge-sharing focuses on the effects of users' attitudes (such as satisfaction). For instance, Cheung *et al.* (2013) posited that users' intentions to continually share knowledge in an online community of practice are affected by their satisfaction with sharing experiences in the community. Prior literature has suggested that user satisfaction can be affected by various factors, such as information quality and systems quality (Wixom and Todd, 2005). However, as Vaezi *et al.* (2016) stated, understanding of the antecedents and consequences of satisfaction is still fragmented. For instance, in smoking cessation OHCs, users' different beliefs, such as systems-related and social-related beliefs, have not been emphasized as antecedents to satisfaction in prior literature. Thus, additional research is needed.

To sum up, although prior studies examined the effects of users' beliefs and attitudes on knowledge-sharing, their findings may not offer sufficient knowledge for us to understand knowledge-sharing in smoking cessation OHCs. Notably, the effects of users' beliefs about social factors (including social support and social capital) and attitudes (satisfaction) on knowledge-sharing in smoking cessation OHCs have not been highlighted in prior studies. Accordingly, this research aims to conduct a fine-grained investigation of the relationships among users' beliefs (systems-related and social-related), attitudes, and knowledge-sharing in order to provide a more nuanced understanding of what encourages users to share their knowledge within these OHCs.

1.3 Research questions

Based on the above discussion, this research seeks to increase the understanding of users' IS post-adoption behaviors in the specific context of smoking cessation OHCs. The general research question is:

RQ: What are the determinants of individual users' IS post-adoption behaviors in smoking cessation OHCs?

Specifically, the following two sub-questions will be answered:

RQ1: What are the determinants of individual users' continuance intention to use smoking cessation OHCs?

RQ2: What are the determinants of individual users' knowledge-sharing behavior in smoking cessation OHCs?

To answer RQ1, the factors influencing a user's continuance intention to use a smoking cessation OHC are examined. Social support theory was employed as the basic theoretical framework. The effects of the components of social support on continuance intention were examined. Specifically, a qualitative study was conducted to investigate what kind of social support encourages users to continue using OHCs in their process of smoking cessation. A quantitative study was conducted to validate a research model for explaining the relationships among users' social-related beliefs (captured by social support), users' systems-related beliefs (represented by perceived usefulness), and continuance intention. The identified constructs were integrated into the conceptual research framework to reveal the critical elements that determine users' continuance intention regarding smoking cessation OHCs.

To answer RQ2, the determinants of a user's knowledge-sharing in smoking cessation are investigated. Based on the prior literature about the relationships among users' beliefs, attitudes, and behaviors, three research models were proposed to identify the factors that determine knowledge-sharing in smoking cessation OHCs. Specifically, the individual users' systems-related beliefs (captured by perceived usefulness) and social-related beliefs (represented by social support and social capital) about smoking cessation OHCs, as well as their attitudes (measured by satisfaction) toward such OHCs, were considered as the determinants of knowledge-sharing. In addition, users' social-related beliefs were also assumed to affect systems-related beliefs. Using survey data collected from two OHCs for smoking cessation (one in Finland, the other in China), the relationships among the above constructs were tested. The statistically significant constructs were integrated into the research framework to show the critical motivators for knowledge-sharing in the context of smoking cessation OHCs.

This study suggests an overall research framework for illustrating the factors influencing users' IS post-adoption behaviors in smoking cessation OHCs. The core constructs represent individuals' beliefs (measured by social capital and social support), attitudes (captured by satisfaction), and behaviors (represented by continuance intention and knowledge-sharing) regarding smoking cessation OHCs.

These constructs are conceptually and empirically supported by extant theories and research, such as social support theory, social capital theory, and prior IS studies on perceived usefulness and satisfaction. This study extends IS post-adoption research to the field of smoking cessation OHCs. Specifically, the investigation of the impacts of users' beliefs (including social-related and systems-related beliefs) and attitudes on continuance intention and knowledge-sharing enriches IS post-adoption behavior research and contributes to understanding how to retain users and encourage them to move from passive users to active knowledge contributors. Examination of the impacts of users' social-related beliefs on systems-related beliefs advances our understanding of the roles of different beliefs in smoking cessation OHCs. Finally, the research findings generally enrich existing literature on smoking cessation OHCs and improve the knowledge of how to design and sustain a smoking cessation OHC.

Further, this research will provide practical implications for administrators of smoking cessation OHCs. For instance, the explorations of the determinants of continuance intention and knowledge-sharing will help administrators develop managerial strategies to improve retention of existing users and sharing of knowledge. This research can also provide an essential stimulus for healthcare service providers to respond to public health needs in terms of access to versatile forms of smoking cessation support.

1.4 Structure of this research

To answer the proposed research questions, four research articles that together form the key contributions of this study have been selected. Article 1 is a qualitative study, while Articles 2, 3, and 4 are quantitative studies. Figure 1 provides an overview of the relationship between research articles and research objectives.

Article 1, "Use of Online Health Communities in Smoking Cessation: A Social Support Perspective," produces an answer to RQ1 by applying social support theory as the theoretical research framework. This article explores what motivates users to continue the use of smoking cessation OHCs via a qualitative study. Specifically, this article examines what kind of social support obtained from smoking cessation OHCs will encourage users to continually use these OHCs. In this article, three types of social support are identified as direct motivators of continuance intention: perceived informational support, perceived emotional support, and perceived companionship.

Article 2, entitled "Antecedents and Consequences of Perceived Usefulness of Smoking Cessation Online Health Communities," aims to answer both RQ1 and RQ2 by investigating the antecedents and consequences of perceived usefulness. Perceived usefulness reflects users' systems-related beliefs about the systems' ability to encourage successful cessation, while social support reveals users' social-related beliefs about the social resources obtained from smoking cessation OHCs.

This article proposes a model for explaining how users' social-related beliefs (social support) enhance their systems-related beliefs (perceived usefulness), which predicts both continuance intention and knowledge-sharing. The findings of this article supplement the current understanding of IS post-adoption behaviors in smoking cessation OHCs by disentangling the antecedents to perceived usefulness from the social support perspective and pinpointing the influences of perceived usefulness on continuance intention and knowledge-sharing.

The purpose of Article 3 is to answer RQ2 by highlighting the role of perceived usefulness and satisfaction. It is titled "Comprehending the Roles of Perceived Usefulness and Satisfaction in Smoking-Cessation Online Health Communities: A Social Capital Perspective." Satisfaction refers to users' attitudes toward the smoking cessation OHCs. This article examines the influence of satisfaction and perceived usefulness on IS post-adoption behaviors. In addition, by utilizing social capital theory, the article also identifies the impacts of social capital on perceived usefulness regarding smoking cessation OHCs. Furthermore, it investigates the relationship between perceived usefulness and satisfaction to reveal the impacts of users' systems-related beliefs on their attitudes.

Article 4, "Knowledge-Sharing in Online Smoking Cessation Communities: A Social Capital Perspective," responds to RQ2 by applying social capital theory as the theoretical framework. Social capital reflects users' social-related beliefs about the outcomes obtained from community connections and social relationships within smoking cessation OHCs. By employing social capital theory, this article identifies the determinants of knowledge-sharing in these OHCs. Three dimensions of social capital are included in this article: structural capital (i.e., social ties), relational capital (i.e., commitment and reciprocity), and cognitive capital (i.e., shared language and vision).

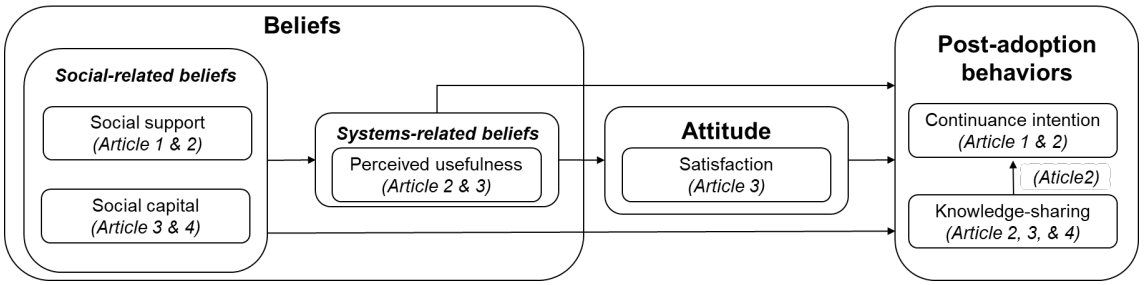


Figure 1. An overview of the relationships among selected research articles

The dissertation consists of five chapters and includes four research articles.

This chapter has briefly introduced the current research, including research interest, research gaps, research motivation, research questions, and an overview of the structure of the dissertation.

Chapter 2 is centered on reviewing prior relevant literature and elaborating on the fundamental theories adopted as the theoretical frameworks of the research articles.

Chapter 3 focuses on the research methodology. It introduces the choices and justifications for the research paradigms and strategies adopted from prior research and methodological practice, and it explains this study's data collection and analysis.

Chapter 4 summarizes and discusses the key findings.

Chapter 5 concludes the dissertation with a summary of the answers to the research questions and outlines the theoretical and practical implications alongside a description of the research's limitations and further research directions.

2 Research Background

This chapter aims to introduce the research background. First, the research on smoking cessation OHCs and IS post-adoption behaviors are discussed by summarizing relevant research. Second, the employed theories and constructs in this study, including social support theory, social capital theory, perceived usefulness, and satisfaction are presented. Finally, the general research framework is illustrated.

2.1 Smoking cessation OHCs research

2.1.1 Smoking cessation OHCs

Online health communities (OHCs), which have been accelerated by developments in information technology, have recently emerged as essential platforms on which users can search for and exchange support in order to improve self-healthcare management (examples include PatientsLikeMe, MedHelp, Care Opinion, and DailyStrength) (Liu *et al.*, 2020; Zhang *et al.*, 2018). There are many definitions of an OHC in the prior literature. For instance, Fan *et al.* (2014, p. 533) defined an OHC as *"a collection of small virtual discussion groups in which people with a common concern about a health topic share information, experiences, and feelings and provide support and encouragement to fellow members."* According to Mpinganjira (2018, p. 686), an OHC is *"a collective of individuals who communicate with each other on health-related issues through dedicated sites [on] the Internet."* For Chen *et al.* (2019, p. 195), OHCs are *"virtual social networks where individuals can share health experiences, post health questions, seek and/or provide support."* Generally speaking, OHCs are online social networks that focus on health issues.

OHCs can be general-purpose communities, such as PatientsLikeMe, which covers over 2800 health issues. However, OHCs can also be specific disease-oriented communities, such as cancer OHCs, hypertension OHCs, and smoking cessation OHCs. Users of OHCs can be a range of people concerned about health problems, such as patients, the family of patients, doctors, physicians, nurses, caregivers, therapists, scientists, and even volunteers (Lu *et al.*, 2017). The formats of OHCs are diverse and include online chatrooms, discussion boards, question and answer

websites, and social media. The advantages of OHCs include no time and location limitations, access to more diverse information and social networks, lack of embarrassment, and cost savings (Fan *et al.*, 2014; Zhang *et al.*, 2018).

The increasing use of OHCs has led to a rising number of studies in the field. Existing studies have examined people's motivation to use OHCs and the outcomes of that use. Specifically, prior studies have found that patients use OHCs to satisfy their unmet needs from offline healthcare services, such as social comparison (Malik and Coulson, 2010), emotional expression (Wentzer and Bygholm, 2013), and informational support (Rupert *et al.*, 2014). Both positive and negative outcomes of OHC usage have been discovered in prior literature. Using OHCs has been found to lead to better physical and psychological conditions (Setoyama *et al.*, 2011; Wentzer and Bygholm, 2013), improved self-management (Yan and Tan, 2014), increased health knowledge (Schulz *et al.*, 2009), and enhanced health attitude (Chen *et al.*, 2019). However, they can also lead to negative consequences, such as online addiction (Malik and Coulson, 2010), loss of privacy (Moorhead *et al.*, 2013), and receiving misinformation (Swire-Thompson and Lazer, 2020).

Recent studies on OHCs have emphasized the value that they can create for different actors involved in them. Specifically, on the one hand, OHCs have been shown to create personal value by benefiting not only patients but also other stakeholders, such as physicians and doctors. For instance, Guo *et al.* (2017) found that OHCs can benefit doctors by offering social returns (reputation) and economic returns (wealth). On the other hand, OHCs have also been shown to create social value. For instance, the research of Goh *et al.* (2016) pointed out that OHCs can generate social value by alleviating rural-urban health disparities. Chamakiotis *et al.* (2020) argued that OHCs could produce social value for patients, clinicians, and students in under-resourced regions with fragile healthcare systems.

In the particular context of OHCs that focus on smoking cessation, the existing research studies more nuanced topics, such as the effectiveness of OHCs on smoking cessation. For instance, the research by Graham *et al.* (2015) shown that people who use a smoking cessation OHC are more likely to quit smoking in three months than non-users. In a Facebook group for young adult smokers, 12-month usage was found to be associated with increased attempts to quit and decreased cigarette consumption (Ramo *et al.*, 2015). Although these findings are promising, there are still inconsistencies in prior studies. For instance, Cheung *et al.* (2015) found that engaging in support groups on WhatsApp is effective in preventing smoking relapse at two-month and six-month follow-ups, but Facebook groups are not.

Another research stream draws on user-generated content (UGC) to classify common topics related to OHCs or the types of social support within them. OHC users have been found to typically share informational support (i.e., advice, referrals, facts, personal experience, and feedback), emotional support (i.e., encouragement),

and esteem support (i.e., praise) (Rocheleau *et al.*, 2015; Zhang and Yang, 2015). This is consistent with research findings related to OHCs that focus on other health concerns, such as Autism Spectrum Disorders (Mohd Roffeei *et al.*, 2015), breast cancer (Wang *et al.*, 2017), and HIV/AIDS (Flickinger *et al.*, 2017). Table 1 presents a preliminary list of prior research on smoking cessation OHCs.

While prior literature provides important insights into the current research on smoking cessation OHCs, less attention has been paid to what determines users' IS post-adoption behaviors. Given the long-lasting and undulant nature of smoking cessation, ongoing assessments and repeated interventions are important (Bailey *et al.*, 2018). Considering the time and financial costs, it is challenging for smokers to repeatedly consult experts in face-to-face environments. Meanwhile, due to smoking-related stigma, some smokers choose to conceal their behavior when consulting professionals (Stuber and Galea, 2009). Smoking cessation OHCs can be a promising solution to the need for continuous assistance in long-term smoking cessation. However, like other online communities related to health issues, smoking cessation OHCs also face a challenge of low usage levels (Saul *et al.*, 2016). Two forms of IS post-adoption behaviors, continuance intention and knowledge-sharing, are thought to be critical for the long-term success of online communities (Bhattacherjee, 2001; Chiu *et al.*, 2006). Therefore, in terms of smoking cessation OHCs, it is crucial to extend the current literature to understand what motivates users' IS post-adoption behaviors.

Table 1. Prior research on smoking cessation online health communities.

Authors	Theory	Research method	Research focus	Key findings
(Richardson *et al.*, 2013)	-	Cohort study	Effectiveness on smoking cessation	Engagement in a smoking cessation OHC is critical to promoting smoking cessation, and the number of visits is predictive of abstinence.
(Cheung *et al.*, 2015)	-	Pragmatic cluster randomized controlled trial	Effectiveness on relapse prevention	A WhatsApp group has a significantly lower relapse rate than a control group at 2-month and 6-month follow-ups, while a Facebook group does not.
(Graham *et al.*, 2015)	-	Randomized trial	Effectiveness on smoking cessation	Average treatment effect weighted abstinence rates at 30-day follow-ups are as follows: 4.2% for non-users, 15.1% for passive users, and 20.4% for both passive and positive users.
(Ramo *et al.*, 2015)	-	Trial	Feasibility and initial efficacy of the OHC	A significant increase in the proportion prepared to quit between the baseline and a 12-month follow-up.
(Thrul *et al.*, 2015)	Transtheoretical model of behavior change	Experiment	The effects of content on engagement	In a Facebook-based smoking cessation OHC, participants at pre-contemplation and contemplation stages engage most when posts relate to the pros and cons of behavior change, while those at the preparation stage engage most when posts relate to awareness about smoking and cessation.
(Zhang and Yang, 2015)	Social support theory	Content analysis	Social support exchange patterns	More posts provide informational support than nurturant support, while more comments provide nurturant support than informational support. Users with longer quitting times tend to provide support, while users at the early quitting stage tend to seek and receive support.
(Cohn *et al.*, 2017)	-	Machine learning	The prevalence and typology of alcohol-related posts in smoking cessation OHCs	Discussion of alcohol is rare in smoking cessation OHCs. Less than 1% of posts are related to alcohol and are produced by 13% of users.

Table 1. Prior research on smoking cessation online health communities (continued).

Authors	Theory	Research method	Research focus	Key findings
(Graham *et al.*, 2017)	-	Randomized trial	The effects of social network formation and evolvement in the OHC on abstinence	The abstinence rate is 7.7% for non-users, 10.7% for passive users, and 20.7% for active users. In-degree increases from Week 2 to Week 12 among passive and active users are associated with abstinence, and out-degree-aware increases from Week 2 to Week 12 among active users are associated with abstinence.
(Granado-Font *et al.*, 2018)	-	Content analysis	The social support types	The most frequent messages provide informational and emotional support. The most frequent coping strategies include physical activity, treatments, and humor.
(Pearson *et al.*, 2018)	-	Trial	The effects of peer sentiment about nicotine replacement therapy (NRT) in OHCs on NRT use	Greater exposure to positive nicotine replacement therapy (NRT) sentiments is related to an increased likelihood of NRT use among users who do not receive free NRT, while no significant association is found among users who receive free NRT.
(Amato *et al.*, 2019)	-	Experiment	Smoking status detection from user-generated content (UGC)	Passive inference of smoking status from UGC is possible and reliable for smokers who produce content in OHCs. Messages indicating abstinence tend to be written shortly after study enrolment (median = 14 days).
(Wang *et al.*, 2019)	-	Machine learning	Smoking status detection from user-generated content (UGC)	The domain-specific features, author-based features, and thread-based features of a post can help to improve smoking status detection performance.

2.1.2 IS post-adoption behaviors in smoking cessation OHCs

As stated in Chapter 1, this dissertation focuses on two IS post-adoption behaviors, continuance intention and knowledge-sharing, in smoking cessation OHCs. This section summarizes relevant research on these topics.

2.1.2.1 IS continuance intention research

IS continuance intention has received massive attention from scholars and practitioners, and a large number of studies have been conducted on continuance intention in different contexts. There are two main research streams. The first research stream generally draws on the IS post-acceptance model proposed by Bhattacherjee (2001). This research model suggests that users' perceptions of the usefulness of an IS (perceived usefulness) as well as their satisfaction with it are direct determinants of user intention to continue using the IS. Users' confirmation is formed when they assess, after their first-time use, whether their pre-exceptions are consistent with the actual use. The confirmation affects both perceived usefulness and satisfaction. In this model, perceived usefulness reflects users' beliefs in terms of post-adoption expectations, confirmation reveals users' beliefs about pre-adoption expectations, and satisfaction can be viewed as an attitude toward using the IS. This research model has been employed to examine IS continuance intention in numerous contexts, such as online learning (Chiu *et al.*, 2007; Chiu and Wang, 2008; Dağhan and Akkoyunlu, 2016), social networks (Chiu and Huang, 2017; Lin *et al.*, 2014), mobile payment (Cao *et al.*, 2018; Zhou, 2013), and mobile health (Cho, 2016; Kim *et al.*, 2019).

The second research stream focuses on examining users' beliefs and attitudes as core motivators of IS continuance intention. This is achieved by employing the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975), the theory of planned behavior (TPB) (Ajzen, 1991), the technology acceptance model (TAM) (Davis, 1989), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al.*, 2003), and its extension UTAUT2 (Venkatesh *et al.*, 2012) to investigate IS continuance intention. These studies mainly assume that users' continuance intention is affected by their differing beliefs about using an IS and their attitude toward the IS. Specifically, users' beliefs about the use of an IS have been shown to be important antecedents to continuance intention, such as perceived usefulness in TAM (Davis, 1989), and effect expectancy in UTAUT (Venkatesh *et al.*, 2003) and UTAUT2 (Venkatesh *et al.*, 2012). Existing studies also indicate that users' beliefs about the difficulty of performing a behavior can influence continuance intention; this is exemplified by perceived behavioral control in TPB (Ajzen, 1991), and by the

facilitating conditions in both UTAUT and UTAUT2 (Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012).

Users' attitudes toward using an IS have also been posited as a prominent determinant of IS continuance intention. For instance, TPB assumes that an individual's behavioral intention is affected by his/her attitude toward the behavior directly (Ajzen, 1991). When individuals' attitudes toward a behavior are positive, they are more likely to perform the behavior. Some researchers have argued that users' attitudes can mediate the effect of beliefs on behavioral intention (Davis, 1989; Fishbein and Ajzen, 1975). That is to say, users' attitudes can exert both direct and indirect influences on users' behavioral intentions.

In addition, some other factors that may affect users' continuance intention have been discussed. UTUAT2 demonstrates that other factors, such as hedonic motivation, price value, and habit, can also have impacts on users' behavioral intention (Venkatesh *et al.*, 2012). Moderators have been tested to examine how individual differences can moderate the relationships between determinants and behavioral intention, such as gender, age, and experience (Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012).

In short, these prior IS continuance intention studies assume that users' beliefs about using an IS (i.e., perceived usefulness, perceived ease of use) and attitude (i.e., satisfaction) can determine their continuance intention. Their previous behavior, such as habit and experience, can also impact continuance intention. Users' characteristics, such as age and gender, can moderate the relationships between determinants and continuance intention.

As summarized above, continuance intention has been much examined in IS field. However, scant attention has been paid to the smoking cessation OHCs. As with other IS, continuance intention is important for smoking cessation OHCs because it is critical to the long-term development and success (Bhattacherjee, 2001). Additionally, users' continuance intention toward smoking cessation OHCs is sometimes necessary for the achievement of long-term abstinence, as such platforms can afford behavioral interventions for smoking cessation, such as counselling and social support (Cobb *et al.*, 2011; Graham *et al.*, 2015). Nicotine dependence makes it is very difficult for smokers to permanently break their smoking habit (Henningfield and Heishman, 1995). Most smokers need repeated assistance (such as social support from OHCs) to quit. Although outcomes are not conclusive, using such OHCs has been shown to enhance the performance of smoking cessation in terms of short-term abstinence (Graham *et al.*, 2015), relapse prevention (Cheung *et al.*, 2015; Cheung *et al.*, 2020; Cheung *et al.*, 2017), and use of nicotine replacement therapy (NRT) (Pearson *et al.*, 2018). Thus, a better understanding of continuance intention regarding smoking cessation OHCs is needed in order to design a sustainable OHC and support smokers to achieve long-term abstinence.

What keeps users in smoking cessation OHCs may vary from the reasons in other research settings. Current research on OHCs has begun to emphasize the impact of social factors within OHCs (such as social support) on users' IS continuance behavior. For instance, Wang *et al.* (2012) found that emotional support is positively related to extended usage of cancer OHCs. Several qualitative studies have also suggested that one of the main reasons that users stay is to satisfy their social needs. For instance, the research by Hoybye *et al.* (2005) suggested that the main reasons for users' continued use are counteracting social isolation, sharing information and support, and forming social intimacy with peers. Zhang (2016) pointed out that sustained use occurs when an OHC fulfills users' needs for autonomy (feeling that one's behavior is voluntary), competence (feeling that one has the capacity to effectively achieve goals), and relatedness (feeling connected to others warmly and positively). Three mechanisms in OHCs are identified that satisfy these needs and thus contribute to continued use. Specifically, autonomy-supportive mechanisms involve feeling respected and supported, not being pressed by others, and receiving rationales about others' decisions. Competence-cultivating mechanisms include asking for and providing information related to health issues. Relatedness-cultivating mechanisms include finding similarities with other users, offering emotional support, and forming subgroups for closer interactions (Zhang, 2016). These findings highlight a need to investigate the role that users' beliefs regarding social factors (such as social support) play in sustaining users in smoking cessation OHCs, as well as a need to more fully explore users' beliefs about an IS (such as perceived usefulness) and attitude (such as satisfaction).

2.1.2.2 Knowledge-sharing research

Knowledge-sharing refers to a conveyance behavior wherein individuals disseminate their obtained knowledge, skills, and experiences to others (Chiu *et al.*, 2006; Hsu *et al.*, 2007). Knowledge-sharing has been widely examined by IS researchers in various contexts, such as professional online communities (Wasko and Faraj, 2005), question and answer websites (Zhao, L. *et al.*, 2016), online investment communities (Park *et al.*, 2014), and OHCs related to general health management (Zhang *et al.*, 2017b).

Prior studies have examined individuals' knowledge-sharing in online communities from various perspectives. One of the primary determinants of knowledge-sharing that has been identified in the literature is users' beliefs about social factors, such as social capital. For instance, Chiu *et al.* (2006) examined the effects of each dimension of social capital on knowledge-sharing in online professional communities, including structural capital (captured by social ties), relational capital (represented by trust, the norm of reciprocity, and identification),

and cognitive capital (measured by shared language and shared vision), and they found that social ties, reciprocity, and identification increased the quantity of knowledge-sharing, while trust and shared language exhibited significant influences on quality of knowledge-sharing. In the study on health Q&A communities by Zhang *et al.* (2017a), social capital (including structural capital, relational capital, and cognitive capital) was found to indirectly affect users' knowledge-sharing intention via their intrinsic and extrinsic motivations. The social capital theory has been widely applied in research on knowledge-sharing in online settings to investigate how social factors, such as social ties, reciprocity, commitment, shared language, shared vision, and others, affect users' intentions or actions toward knowledge-sharing in online communities. Such studies include those of Wasko and Faraj (2005), Chai *et al.* (2011), Chang and Chuang (2011), Chang *et al.* (2012), Hau *et al.* (2013), Yu *et al.* (2013), Yao *et al.* (2015), Zhao, J. *et al.* (2016), and Mojdeh *et al.* (2018).

In OHCs, social support has been posited as an important social factor that can directly affect knowledge-sharing. For instance, Yan *et al.* (2016) found that social support exerts a positive influence on both general knowledge-sharing and specific knowledge-sharing behavior in OHCs.

The second important motivator of knowledge-sharing is users' beliefs about using an IS. One of the widely used theories to investigate the impact of beliefs on knowledge-sharing is the technology acceptance model (TAM). TAM explains the beliefs related to using an IS (such as an online community) by focusing on users' beliefs about usefulness and ease of use, which in turn affect users' intention to share knowledge. For instance, Hung and Cheng (2013) used TAM to examine the effects of perceived ease of use and perceived usefulness on knowledge-sharing intentions in online communities and found that both positively affect users' intention to share knowledge. TAM has also been commonly used in other some studies, including those conducted by Hsu and Lin (2008), Papadopoulos *et al.* (2013), Hung *et al.* (2015), and Bilgihan *et al.* (2016), as a way to clarify the relationships between users' beliefs about using an IS and knowledge-sharing behavior.

The third predictor of knowledge-sharing that has been reported in prior studies is user attitude toward a behavior, such as using the theory of planned behavior (TPB) to examine the influence of users' attitudes on knowledge-sharing. Here, a positive attitude toward a behavior (such as knowledge-sharing behavior) is a primary determinant of users' intention to share knowledge (Cho *et al.*, 2010). In the literature on knowledge-sharing in online communities, TPB has been used to study how attitude contributes to individual knowledge-sharing behavior, such as in studies conducted by Ho *et al.* (2011) on Chinese Wikipedia and Hung *et al.* (2015) on professional online communities. In addition, one type of attitude (user satisfaction) has also been shown to positively impact knowledge-sharing in online communities (Chen, 2007; Cheung *et al.*, 2013).

Some personal factors have also been mentioned in prior literature as determinants of knowledge-sharing, such as knowledge-sharing self-efficacy (e.g., Chen and Hung, 2010; Lai and Chen, 2014; Lin *et al.*, 2009). User characteristics, such as gender and culture, have also been considered as significant moderators of knowledge-sharing in online settings (Chai *et al.*, 2011; Siau *et al.*, 2010).

To sum up, existing studies on the motivation to share knowledge in online communities provide a rich foundation for studying the determinants of knowledge-sharing in smoking cessation OHCs. Users' beliefs about social factors (such as social capital and social support) and about using an IS (such as perceived usefulness) as well as their attitudes (such as user satisfaction) and individual characteristics (such as gender and national culture) have been suggested as significant influencers of knowledge-sharing in online communities.

However, little research has been conducted to test the effects of these factors on knowledge-sharing in the specific setting of smoking cessation OHCs. Further, only limited attention has been paid to identifying what has been shared in smoking cessation OHCs via content analysis. For instance, Myneni *et al.* (2016) identified twelve topics: social support, benefits, virtual rewards, motivation, traditions, progress, obstacles, cravings, conflict, relapse, friends and family members, and nicotine replacement therapy. In the research on smoking cessation OHCs on WhatsApp and Facebook platforms that was performed by Cheung *et al.* (2017), three types were categorized: sharing views and experience (55.5%), encouragement (28.7%), and knowledge and information (15.8%). These studies concentrate on what knowledge is shared in said OHCs. However, why users share their knowledge is rarely investigated in this context.

In addition, there are some discrepancies in the findings related to motivation to share knowledge in different online communities. For instance, prior findings related to the effects of reciprocity on knowledge-sharing are contradictory: some found a positive influence (Chai *et al.*, 2011; Chang and Chuang, 2011), some found a negative influence (Wasko and Faraj, 2005), and some found no significant influence at all (Lin *et al.*, 2009; Wiertz and de Ruyter, 2007). Sergeeva and Andreeva (2016) suggested bringing the research context back into knowledge-sharing research. Hence, it is interesting to test whether users' systems-related beliefs (such as perceived usefulness), social-related beliefs (such as social capital and social support), and attitude (such as satisfaction) influence knowledge-sharing in the particular setting of smoking cessation OHCs.

2.2 Related theories and theoretical elements

In this section, the study's fundamental theories and theoretical elements will be introduced. Two theories (social support theory and social capital theory) and two

theoretical elements (perceived usefulness and satisfaction) are adopted to study the determinants of users' IS post-adoption behaviors in smoking cessation OHCs and to answer the research questions raised in Chapter 1.

2.2.1 Social support theory

Social support theory, which originates from the fields of health and psychology, posits that social interactions between individuals and support from others have potent effects on one's health conditions (Cobb, 1976; Kaplan *et al.*, 1977; LaRocco *et al.*, 1980). Social support has a complex meaning because it involves a series of interactions and processes, such as the generating conditions, outcomes, and types of social support. Focusing first upon the generating conditions, Lin *et al.* (1979, p. 109) defined social support as the *"support accessible to an individual through social ties to other individuals, groups, and the larger community.*" To highlight the functions of social support, Cobb (1976, p. 300) succinctly defined social support as *"the information and actions that lead an individual to believe that he or she is cared for and loved, esteemed and valued and belongs to a network of communication and mutual obligation."* Prioritizing the outcomes, Farmer and Farmer (1996, p. 433) described social support as *"the processes of social exchange that contribute to the development of individuals' behavioral patterns, social cognition, and values."* Generally, social support concerns supportive interactions embedded within social relationships. It has been developed as a research interest in various fields, such as medical, social science, education, and information systems (Callaghan and Morrissey, 1993; Farmer and Farmer, 1996; Huang *et al.*, 2019).

Prior research has posited that social support has a positive influence on various health issues, such as mental health, alcohol withdrawal, cancer, and smoking cessation (Mermelstein *et al.*, 1986; Peirce *et al.*, 2000; Slevin *et al.*, 1996; Thoits, 2011). Two main research models illustrate the beneficial influences of social support on human health:

(1) The buffering effects, in which social support buffers or protects people from negative effects of stressors (such as health-related issues) by affecting how people assess and cope with stressors.

(2) The direct effects, through which social support exerts a direct positive impact on human health regardless of stressors.

These buffering effects are widely recognized as a core function of social support, which assists in solving problems and reducing stress (Cohen and Wills, 1985; Huang *et al.*, 2019; Thoits, 1986). Specifically, social support can protect people from the negative health consequences of stressful events (i.e., smoking cessation) via the stress-buffering function (such as received and perceived support) (Cobb,

1976). Received support is that which one actually receives in reality, while perceived support is one's perception of available support within his or her social relationships. Both received and perceived support can improve individuals' coping performance and reassess the situation as less stressful (Cutrona and Russell, 1990).

As stated by Schaefer *et al.* (1981, p. 385), *"social support can have a number of independent components serving a variety of supportive functions."* These functions might include the enhancement of problem-solving or the restoration of emotional stability, which each contribute to different aspects of a person's health and well-being (Huang *et al.*, 2014). In order to examine the different types of social support, various classifications have been developed. One commonly used typology of social support is the social support behavior code (SSBC) proposed by Cutrona and Suhr (1992). According to the SSBC, there are five different types of social support:

(1) Informational support refers to exchanging information about health issues or how to deal with them.

(2) Emotional support refers to communicating love or caring.

(3) Esteem support refers to communicating respect and confidence in abilities.

(4) Network support refers to communicating belonging to a group or persons with similar interests and concerns.

(5) Tangible support refers to exchanging goods or services needed for health issues.

Recent research has employed social support theory to understand the role of social support in OHCs, mainly through two lenses. The first focuses upon identifying the types of social support exchanges in OHCs by, for example, employing the SSBC to detect the types and frequencies of social support in an OHC. In various OHCs, such as those focused upon HIV/AIDS (Coursaris and Liu, 2009), cancer (Huang *et al.*, 2014), and smoking cessation (Zhang and Yang, 2015), informational and emotional support are two main subtypes of social support, followed by esteem support and network support. Tangible support, however, is rare in OHCs.

The second lens examines the effects of social support on various individual behaviors. Example topics include the effectiveness of social support in OHCs on health behaviors (Lieberman *et al.*, 2003), the features of online social networks in OHCs and their associations with users' support behaviors (Cobb *et al.*, 2010; Healey *et al.*, 2014), and the influences of different types of social support on individuals' IS usage behavior (Wang *et al.*, 2017).

Social support theory is suitable for explaining users' IS post-adoption behaviors. This is because, first, the prior literature suggests a positive relationship between social support and health. Social support can buffer people from the

negative outcomes of stressful events, including smoking cessation. This may help to explain the positive effects of social support from OHCs on smoking cessation. Second, social support theory is valuable because it classifies the types of social support and investigates their impacts on smoking cessation. While smoking cessation OHCs are groups of people with a shared goal of stopping tobacco use, users need varying types of social support to handle withdrawal symptoms and reduce stress. This may help identify the different roles that different types of social support play in predicting users' IS post-adoption behaviors. Hence, social support theory has been selected to investigate the determinants of IS post-adoption behaviors in smoking cessation OHCs. This theory is applied to answer RQ1 and RQ2 and contributes to an understanding of the impacts of social support on users' continuance intention and knowledge-sharing regarding smoking cessation OHCs.

2.2.2 Social capital theory

Social capital is defined 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"* and *"[s]ocial capital thus comprises both the network and the assets that may be mobilized through that network."* (Nahapiet and Ghoshal, 1998, p. 243) Social interactions, which build relationships that permit access to and sharing of resources, are the central proposition of this theory (Nahapiet and Ghoshal, 1998). The resources from social capital include *"network ties of good will, mutual support, shared language, shared norms, social trust, and a sense of mutual obligation that people can derive value from"* (Ellison *et al.*, 2006; Huysman and Wulf, 2004, p. 1). Researchers have used social capital theory to study the influences of such resources on individual behaviors and organizational performance in various contexts, such as in health promotion (Wakefield and Poland, 2005), collaboration and innovation in smart cities (Bartelt *et al.*, 2020), membership continuance intention (Zhao, J. *et al.*, 2016), and knowledge-sharing (Chiu *et al.*, 2006; Wasko and Faraj, 2005).

According to Nahapiet and Ghoshal (1998), there are three main dimensions of social capital: structural capital, relational capital, and cognitive capital. Structural capital describes the impersonal configuration of individual social connections, representing who and how one reaches them (Nahapiet and Ghoshal, 1998). This dimension of social capital offers channels for interaction and allows for the transfer of information. Relational capital represents the affective nature of social relationships or related embeddedness (Nahapiet and Ghoshal, 1998; Wasko and Faraj, 2005). Specifically, this dimension of social capital focuses upon the types of social relationships (e.g., friendship) and the social assets that are created by the relationships (e.g., trust, respect, and commitment) (Nahapiet and Ghoshal, 1998).

Finally, cognitive capital refers to resources that provide common representations, interpretations, and meanings among people, such as a shared language and vision (Chiu *et al.*, 2006). The structural, relational, and cognitive dimensions of social capital are highly interconnected and mutually reinforcing (Nahapiet and Ghoshal, 1998).

Social capital is a central subject in much knowledge-sharing scholarship, and its role in improving knowledge-sharing behavior has been acknowledged (Chiu *et al.*, 2006; Wasko and Faraj, 2005). IS researchers have posited that social capital theory offers a research framework for exploring knowledge-sharing in various contexts, such as in online communities for legal professionals (Wasko and Faraj, 2005), in online communities related to IT (Chiu *et al.*, 2006), in online communities relevant to commercial issues (Wiertz and de Ruyter, 2007), in a blog (Chai *et al.*, 2011), in online communities related to the game (Hau and Kim, 2011), and in social networking sites (SNS) (Mojdeh *et al.*, 2018). For instance, in work by Chiu *et al.* (2006), structural capital (measured by social interaction ties) and relational capital (measured by reciprocity and identification) positively affect the quantity of knowledge-sharing in online communities, while cognitive capital (measured by shared language and vision) and relational capital (measured by trust) positively impact the quality of knowledge-sharing. In a study on online health communities, the structural capital (represented by network density) was found to determine both externalization and combination of knowledge creation (Zhao, J. *et al.*, 2016).

In addition, social capital has also been discussed as an important social determinant of smoking cessation. Based on a longitudinal cohort study in the United Kingdom, Giordano and Lindstrom (2011) found that social capital, as measured by trust and social participation, is positively related to smoking cessation. Similarly, a population-based associational study in Finland suggested that higher levels of social capital (i.e., higher levels of trust and reciprocity) are associated with a greater likelihood of smoking cessation (Nieminen *et al.*, 2013).

For the reasons enumerated below, social capital theory is also an appropriate framework for examining IS post-adoption behaviors in this study. First, social capital theory emphasizes the importance of social capital in acquiring different resources that benefit individuals (Bartelt *et al.*, 2020; Nahapiet and Ghoshal, 1998). Prior literature suggests that this theory will be able to explain the outcomes gained because of social relationships and community participation (Bartelt *et al.*, 2020; Choi, 2015; Nahapiet and Ghoshal, 1998; Zhang *et al.*, 2017a).

Second, social capital has been recognized as an important research framework for explaining knowledge-sharing that is grounded in the social relationships and community connections that are inherent to online communities (Chiu *et al.*, 2006; Wasko and Faraj, 2005). This fits the purpose of examining knowledge-sharing in the specific context of smoking cessation OHCs in this research.

Third, social capital has also been identified as a central topic in the study of smoking cessation behaviors, and prior literature indicates that social capital is positively linked with smoking cessation (Giordano and Lindstrom, 2011; Nieminen *et al.*, 2013). This may help to explain the positive influence of social capital within OHCs on smoking cessation.

Fourth, users of smoking cessation OHCs can form social capital via interactions and communication with others. Social ties can be formed through the sharing of information and support with other users (structural capital). The sharing of knowledge requires an atmosphere of reciprocity (relational capital). To smooth the transfer of knowledge from the provider to the receiver, it is helpful if both possess the same foundational knowledge related to smoking cessation (cognitive capital). Thus, it is reasonable to believe that social capital theory can provide a comprehensive research framework for explaining the different effects of social relationships on IS post-adoption behaviors in smoking cessation OHCs. This theory is applied to answer RQ2 and contributes to an understanding of the impacts of social capital on knowledge-sharing in OHCs for smoking cessation.

2.2.3 Perceived usefulness and satisfaction

In prior literature, researchers have posited that perceived usefulness is a crucial element in predicting users' IS post-adoption behaviors. Perceived usefulness, originating from the technology acceptance model (TAM), refers to users' perception that using an IS would improve their job performance (Davis, 1989). TAM posits that perceived usefulness determines individuals' intention to use an IS (Davis, 1989). Perceived usefulness has been widely used to study the initial adoption of new technologies. A meta-analysis of TAM has shown that the direct effects of perceived usefulness on users' behavioral intentions to adopt an IS are profound (King and He, 2006).

Additionally, perceived usefulness has been applied to investigate users' post-adoption behaviors. For instance, in the IS post-acceptance model proposed by Bhattacherjee (2001), users are assumed to develop a post-acceptance expectation (perceived usefulness) after their first-time acceptance of an IS and a period of initial use, and perceived usefulness is supposed to be a predictor for both satisfaction and continuance intention. Bhattacherjee (2001) empirically validated the associations among perceived usefulness, satisfaction, and continuance intention in regards to online banking services. He found that perceived usefulness is a critical element affecting both satisfaction and continuance intention. The positive relationship between perceived usefulness and continuance intention has been validated in various contexts, such as online travel services (Li and Liu, 2014), mobile health (Cho, 2016), enterprise 2.0 (Jia *et al.*, 2017), OHCs (Wu, 2018), wearable

technologies (Nascimento *et al.*, 2018), and financial technologies (Shiau *et al.*, 2020). Specific to the context of smoking cessation-related IS, perceived usefulness has been reported to influence users' continued use of mobile health and quick response code (QRC) technologies that are related to smoking cessation (Ali *et al.*, 2019).

Furthermore, a relationship between perceived usefulness and other forms of post-adoption behaviors has been discovered in recent studies. For instance, Li and Liu (2014) found that perceived usefulness of online travel services exerts a positive influence on users' word of mouth (WOM) behavior. In the study of online travel communities by Yuan *et al.* (2016), perceived usefulness is an essential factor in predicting users' knowledge-sharing. Likewise, in the work of Wang and Li (2019), perceived usefulness is an important antecedent to users' use and generation of electronic word of mouth (eWOM).

In the prior literature, the antecedents to perceived usefulness of an IS have also been given considerable attention. According to TAM, perceived usefulness is influenced by perceived ease of use (Davis, 1989). In the post-acceptance model, perceived usefulness is affected by confirmation (Bhattacherjee, 2001). Additional external factors have also been reported. For example, a good fit between the technology use and the task has been found to directly affect the perceived usefulness of e-commerce (Klopping and McKinney, 2004). Further, the research findings of Zhang *et al.* (2012) indicated that system features, including perceived communication efficiency and information process support, have positive influences on the perceived usefulness of computer-mediated communication media. In the context of general OHCs, Wu (2018) uncovered that information quality, social support, and service quality predict perceived usefulness. In the study by Wang and Li (2019), information quality, curiosity fulfilment, and enjoyment have been identified as antecedents to the perceived usefulness of travel review websites.

Perceived usefulness has also been found to act as a mediator for users' IS adoption behaviors, post-adoption behaviors, and attitudes. For instance, studies by Venkatesh (2000) and Agarwal and Karahanna (2000) both indicated that there is an indirect path from perceived ease of use to users' behavioral intention to use an IS that is mediated by perceived usefulness. Matute *et al.* (2016) found that perceived usefulness mediates the effects of the quantity, quality, and credibility of word of mouth on users' online repurchase intentions. In the context of massive open online courses (MOOCs), Wu and Chen (2017) discovered that perceived usefulness is an essential mediator for the effects of social influence on users' attitudes.

In addition to perceived usefulness, user satisfaction with an IS has also been found to affect users' IS post-adoption behaviors. Bhattacherjee (2001, p. 359) viewed satisfaction as a type of attitude and defined it as users' affect with (feelings about) prior IS use. His research findings indicate that satisfaction positively

influences users' continuance intention regarding online banking services. In other words, if users feel satisfied with an IS based upon their prior use, they are likely to maintain their use of the IS (Bhattacherjee, 2001). The direct effects of satisfaction on continuance intention have been validated in various research settings, such as e-learning (Chiu *et al.*, 2007; Chiu and Wang, 2008; Limayem and Cheung, 2008), mobile services (Gao *et al.*, 2015), digital textbooks (Joo *et al.*, 2017), social network sites (Bae, 2018; Islam *et al.*, 2017; Lin *et al.*, 2017), and AI-powered Chatbot (Ashfaq *et al.*, 2020).

In addition, satisfaction affects other post-adoption behaviors beyond continuance intention. For instance, Cheung *et al.* (2013) found that satisfaction positively affects user intention to continue their knowledge-sharing in online communities of practice. Similarly, in the work of Morgeson (2011), satisfaction is an important determinant of reuse intention and WOM in both e-government and e-business contexts.

The determinants of satisfaction have also been studied in prior IS literature. According to the IS post-acceptance model, user satisfaction is influenced by perceived usefulness and by confirmation of expectation (Bhattacherjee, 2001). Joo *et al.* (2017) found that users' expectations, perceived enjoyment, and perceived usefulness positively affect their satisfaction with digital textbooks. In the work of Bae (2018), the discrepancy between gratifications obtained and gratifications sought is found to influence user satisfaction with social networking sites. Specifically, the discrepancies between gratifications obtained and gratifications sought in terms of socialization, social support, and entertainment significantly affect user satisfaction. In the context of the AI-powered Chatbot, information quality, service quality, perceived usefulness, and perceived enjoyment are key predictors of satisfaction (Ashfaq *et al.*, 2020).

Satisfaction has also been reported as a critical mediator for IS post-adoption behaviors. In the IS post-acceptance model, confirmation exerts an indirect influence on continuance intention via satisfaction (Bhattacherjee, 2001). In the study by Hsiao *et al.* (2016) on mobile social networking apps, satisfaction fully mediates the relationship between perceived usefulness and continuance intention and partially mediates the paths from perceived enjoyment and social ties to continuance intention. The research findings of Chen *et al.* (2012) indicated that satisfaction is an important mediator for the effects of image, critical mass, and subject norms on eWOM in the context of Web 2.0.

Based on the prior literature, perceived usefulness and satisfaction have been used as important constructs in this study's examination of users' post-adoption behaviors. Specifically, prior research on perceived usefulness indicates that it can capture users' beliefs about the usefulness of the systems, and it allows for explanation of the direct effects of systems-related beliefs on IS post-adoption

behaviors (such as continuance intention and knowledge-sharing). Meanwhile, the mediating role of perceived usefulness suggests that it will be helpful for crafting a better understanding of the underlying mechanism and the relationships between determinants and IS post-adoption behaviors.

Previous research findings on user satisfaction with an IS suggest that satisfaction can represent users' attitudes toward the IS, and it is suitable for examining the direct influence of satisfaction on users' IS post-adoption behaviors. Also, prior studies of these mediating effects indicate that user satisfaction can be used to test the indirect influence of various user beliefs (such as systems-related and social-related beliefs in this study) on IS post-adoption behaviors.

Thus, perceived usefulness is utilized in this research to answer RQ1 and RQ2. It contributes to the explanation of the motivations of users of smoking cessation OHCs to continue using the OHCs and to share knowledge. Satisfaction is employed to answer RQ2, and it contributes to further understanding of the determinants of knowledge-sharing in smoking cessation OHCs.

2.3 The conceptual research framework

This study aims to investigate IS post-adoption behaviors in smoking cessation OHCs, specifically continuance intention and knowledge-sharing behaviors. Figure 2 presents the overall conceptual research framework, which is supported by prior studies that posit that users' beliefs can directly and indirectly (through attitudes, such as satisfaction) affect their behavioral intentions. There are two types of user beliefs: (1) systems-related beliefs, which focus on the utilitarian perspective of using smoking cessation OHCs and are measured by perceived usefulness, and (2) social-related beliefs, which emphasize the social factors embedded within smoking cessation OHCs as measured by social support and social capital. In addition, users' characteristics, including age, gender, country, use patterns, and stage of smoking cessation, have also been proposed to significantly affect the relationships among beliefs, attitudes, and behavioral intentions. In summary, the components of this framework can be classified into five categories: systems-related beliefs, social-related beliefs, attitudes, post-adoption behaviors, and moderators.

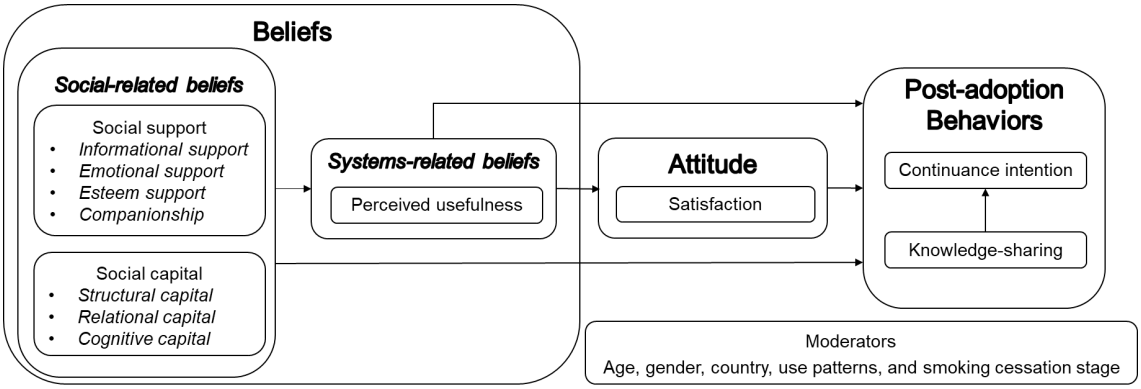


Figure 2. The overall conceptual research framework of this study.

In this research, continuance intention is proposed to be determined by users' different beliefs. Also, users' characteristics, such as age, country, gender, and smoking cessation stage, might moderate the relationships between determinants and continuance intention. Specifically, users' beliefs can be categorized into two groups in this research. One is users' systems-related beliefs that focus on the utilitarian perspective of using these OHCs in improving their quitting performance. Such beliefs can be captured by perceived usefulness. The other group is users' social-related beliefs that emphasize social factors embedded in smoking cessation OHCs. Health literature has highlighted social capital and social support as two crucial social factors that can influence human health, particularly in the context of smoking cessation (Giordano and Lindstrom, 2011; Mermelstein *et al.*, 1986; Nieminen *et al.*, 2013). Therefore, these social factors should be considered when examining the IS post-adoption behaviors in smoking cessation OHCs. In this research, social capital and social support are identified as social-related beliefs related to smoking cessation OHCs. Social support includes informational, emotional, esteem, and companionship. Social capital contains three dimensions: structural capital, cognitive capital, and relational capital. Social-related beliefs are proposed to have a direct and indirect (via systems-related beliefs) influence on users' continuance intention.

Knowledge-sharing is supposed to be determined by users' systems-related beliefs, by their social-related beliefs, and by their attitudes. Users' age, country, gender, and smoking cessation stages are moderators in this research. Specifically, users' social-related beliefs, including social capital and social support, are assumed to affect knowledge-sharing directly and indirectly (through systems-related beliefs and attitudes). Systems-related beliefs are represented via perceived usefulness. User satisfaction is viewed as an attitude that reveals the evaluation of prior usage of smoking cessation OHCs.

3 Research Methodology

This chapter seeks to present the research philosophy, research strategy, and research methods applied in this study. First, three major research paradigms, positivist, interpretive, and critical research, are introduced. Next, the two research strategies adopted for this study, the interview and survey research methods, are discussed. Specifically, the interview method is applied to study IS continuance in smoking cessation OHCs, and the survey method is used to investigate both IS continuance and knowledge-sharing in these OHCs. Third, data collection is illustrated through a description of the interview and survey design, data collection procedures, and data samples. The chapter concludes with a presentation of data analysis, including interpretive analysis of interview data and structural equation modeling of survey data as well as validity and reliability.

3.1 IS research paradigms

All research is grounded in a set of philosophical assumptions regarding the nature of the world and knowledge. In order to conduct rigorous and insightful research, it is therefore pivotal for researchers to understand these philosophical assumptions (Lee, 2004). According to Chua (1986), there are three kinds of beliefs associated with ways of observing and studying the world. The first kind of beliefs are those related to the notion of knowledge (epistemological and methodological assumptions). Epistemological assumptions determine what is to count as acceptable truth by specifying the criteria and process for assessing truth claims. Methodological assumptions influence which the research methods are deemed suitable for the collection of valid evidence. The second kind of beliefs are those connected to physical and social reality (ontological assumptions). Ontological assumptions assume that physical and social reality exists in an objective way that is external to an independent researcher or exists in a subjective plane where human beings are active makers of their social reality. The last set of beliefs are related to the relationship between theory and practice; they center on the role of theories in the world of practice. It has been a convention since Kuhn (1970) to call a set of these beliefs and philosophical assumptions that are shared by a community of researchers as *paradigms*. Mingers (2001, p. 242) defined paradigm as *"a construct*

that specifies a general set of philosophical assumptions covering ontology (what is assumed to exist), epistemology (the nature of valid knowledge), ethics or axiology (what is valued or considered right), and methodology." In the domain of IS, Orlikowski and Baroudi (1991), based on the work of Chua (1986), summarized three broad research paradigms: positivist, interpretive and critical.

Ontologically, positivist IS researchers generally presume that reality is objective and separate from researchers (observers). Hence, the nature of reality can be unproblematically captured, described, and measured (Orlikowski and Baroudi, 1991; Weber, 2004). Regarding the nature of knowledge (epistemology), positivists generally concern themselves with the empirical testing of theories. That is, they focus on exploring whether the theories (or hypotheses) can be "verified" or "falsified" through deductive reasoning. Here, the research objects have qualities that are independent of the researchers. Hence, positivist researchers primarily use sample surveys, laboratory experiments, and field experiments to discover underlying regularities (Weber, 2004). The data collected by positivist researchers are deemed true measures of reality (validity), and research results can be reproduced by positivist researchers (reliability) (Weber, 2004). With respect to axiology, positivists consider themselves to be independent of the social phenomena being studied, so the researchers assume a value-neutral stance. There is no place for researchers' subjective opinions or moral judgments (Orlikowski and Baroudi, 1991).

Interpretive researchers generally assume that reality and people (including researchers) are inseparable. Reality is socially constructed through social constructions, such as language, shared meanings, and consciousness. Interpretive research highlights the importance of symbolic action, social-political, and subjective meanings in the processes through which humans construct and reconstruct their realities (Orlikowski and Baroudi, 1991). In contrast to positivism, interpretive researchers' epistemological assumptions concern generating theories (or hypotheses) through inductive reasoning. The philosophical base of interpretive research is hermeneutics and phenomenology, meaning the research objects are interpreted in light of the meaning structure of peoples' lived experiences (Weber, 2004). Interpretive researchers often use the field study method to generate valid knowledge. The research conclusions of interpretive research should be plausible and defensible (validity). Interpretive research is reliable when researchers recognize and address the implications of their subjectivity (Weber, 2004). Regarding axiology, interpretive research is value bound, as researchers are always implicated in the studied phenomena, and their opinions, feelings, and expectations play essential roles (Orlikowski and Baroudi, 1991).

Ontologically, critical researchers assume that reality is historically constituted and that people's capability to change material and social circumstances are

constrained by various forms of economic, political, social, and cultural domination (Orlikowski and Baroudi, 1991). Critical research seeks to critique to the status quo through the exposure of alienating and restrictive social conditions within social systems, thereby helping to eliminate the causes of alienation and domination (Chua, 1986; Orlikowski and Baroudi, 1991). This is different from positivist and interpretive research, both of which are content to predict or explain phenomena. The epistemological beliefs that knowledge is grounded in historical and social practices guide the research methods of critical research toward long-term historical studies, such as ethnographic studies (Orlikowski and Baroudi, 1991). With respect to axiology, critical research is also value bound, as the role of researchers within this paradigm is always expected to progress beyond researching and theorizing to proactively and actively effecting change in the studied phenomena (Chua, 1986; Orlikowski and Baroudi, 1991).

Each IS research paradigm can reflect certain aspects but is blind to others (Mingers, 2001). Adopting only one IS research paradigm often results in a limited view of the studied phenomena. Since IS research is multidisciplinary and characterized by a plurality of research paradigms, it is recommended to combine different research methods, preferably from different paradigms, to get more prosperous and reliable research results (Mingers, 2001). Thus, this study adopts a combination of positivist and interpretive paradigms. Specifically, a mixture of interpretive interview and positivist survey research is employed to answer the proposed research questions.

3.2 Combination of quantitative and qualitative research

Quantitative and qualitative methods are the most widely used classification of research methods in IS field. Quantitative research methods are rooted in natural science to investigate the natural world (Myers, 1997). They are based on positivist paradigms, and the survey methods, numerical methods, and laboratory experiments are typical examples of quantitative methods (Myers, 1997). Qualitative research methods are established in social science and enable scholars to study humans and the social and cultural contexts within which they live (Myers, 1997). Examples of qualitative research methods include interviews, observations, documents, and texts (Myers, 1997). IS researchers are encouraged to combine quantitative and qualitative research methods to obtain rich insights into the studied phenomena and find plausible answers to research questions (Mingers, 2001; Venkatesh *et al.*, 2013). As Venkatesh *et al.* (2013, pp. 24-25) stated, a combination of quantitative and qualitative research methods can offer three beneficial abilities: (1) to *"address confirmatory and explanatory research questions simultaneously,"* (2) to *"provide*

stronger inferences than a single method or worldview," and (3) to *"produce a greater assortment of divergent and/or complementary views."*

Hence, a combination of quantitative and qualitative methods was used to investigate the IS post-adoption behaviors in smoking cessation OHCs. Specifically, qualitative research methods were used in this study to answer RQ1, while quantitative research methods were used to answer RQ1 and RQ2. Table 2 summarizes the research methods used in this study, as well as the research articles and research questions.

Table 2. The overview of research methods applied in articles.

Research method	Article applied	Research questions and research aims	
Qualitative research (interview)	Article 1	RQ1: What are the determinants of users' continuance intention toward smoking cessation OHCs in their smoking cessation process?	To explore what kind of social support encourages users to continue using smoking cessation OHCs.
Quantitative research (survey)	Article 2	RQ1: What are the determinants of users' continuance intention toward smoking cessation OHCs in their smoking cessation process? RQ2: What are the determinants of users' knowledge-sharing behavior in smoking cessation OHCs?	To investigate the role of the perceived usefulness of smoking cessation OHCs in predicting users' continuance intention and knowledge-sharing.
	Article 3	RQ2: What are the determinants of users' knowledge-sharing behavior in smoking cessation OHCs?	To explore the roles of satisfaction and perceived usefulness in predicting users' knowledge-sharing.
	Article 4	RQ2: What are the determinants of users' knowledge-sharing behavior in smoking cessation OHCs?	To explore what kind of social capital affects users' knowledge-sharing in smoking cessation OHCs.

3.2.1 Survey research method

In IS literature, the survey research method has been one of the most popular means for investigating various human behaviors and IS usage (Chen and Hirschheim, 2004; Orlikowski and Baroudi, 1991; Palvia *et al.*, 2004; Palvia *et al.*, 2003). As Newsted *et al.* (1998, p. 553) posited, surveys have certain merits: (1) *they "are easy to administer and are simple to score and code,"* (2) *they "allow the research to determine the values and relations of variables and constructs,"* (3) *they "provide*

responses that can be generalized to other members of the population studied and often to other similar populations," (4) *they "can be reused easily and provide an objective way of comparing responses over different groups, times, and places,"* (5) *they "can be used to predict behavior,"* (6) *they "permit the theoretical propositions to be tested in an objective fashion,"* and (7) *they "help confirm and quantify the findings of qualitative research."* The survey research method has three distinguishing characteristics. First, it is designed to produce quantitative descriptions of certain aspects of the study population. Second, it collects data by asking individuals structured and predefined questions, and last, the data collected is sample-based, and the findings can be generalized to the whole population (Pinsonneault and Kraemer, 1993).

Prior IS literature suggests that the survey research method is advantageous when the research questions are "what" and "how" questions. As Pinsonneault and Kraemer (1993, p. 78) stated, the survey research method is most suitable when: (1) the research questions about the phenomena are "what is happening?", "how and why is it happening?", and "how much and how many?"; (2) it is not possible or not desirable to control the independent and dependent variables; (3) the phenomena of interest must be studied in its natural setting; and (4) the phenomena of interest occur in the current time or the recent past. Yin (2018, p. 46) also suggested that the survey research method is appropriate for studies that center on contemporary events and require no control over behavioral events.

The current study aims to identify the salient determinants of IS post-adoption behaviors (continuance intention and knowledge-sharing) in smoking cessation OHCs and to understand how the determinants affect those post-adoption behaviors. The research questions in this study are typical "what" and "how" questions. Therefore, the survey research method is suitable for investigating the relationships between specific determinants and continuance intention and knowledge-sharing.

The survey research method can be employed for different goals, such as exploration, description, and explanation (Pinsonneault and Kraemer, 1993). An exploration survey aims to become more familiar with a research interest and to discover preliminary concepts related to it. It focuses on determining what concepts will be measured in a study and how to best measure them. An exploration survey seeks to elicit various responses from people with different views in a loosely structured way, providing a foundation for the design of a more rigorous survey. Description surveys aim to discover what situations, events, viewpoints, and attitudes are occurring within a population. It simply describes the distribution of some phenomena in a population or among subsets of the population. Description surveys ascertain facts, but do not test theories, whereas explanation surveys test theories and causal relationships. An explanation survey is concerned with both the

existence of causal relationships between variables and why the relationships exist (Pinsonneault and Kraemer, 1993).

The current research can be considered both explanation and exploration. This study is an example of explanation survey research, as the proposed research models and hypotheses are built on theories and prior empirical findings. The theories and theoretical constructs underpinning this study are social support theory, social capital theory, perceived usefulness, and satisfaction. In addition, this study's focus on the effects of social support on users' IS post-adoption behaviors toward smoking cessation OHCs can be seen as an exploration purpose, as various types of social support have not yet been tested as determinants of IS post-adoption behaviors within smoking cessation OHCs.

3.2.2 Interview research method

The qualitative interview research method is widely used in IS field (Myers and Newman, 2007). Kvale (1983, p. 174) defined the qualitative interview research method as "*an interview, whose purpose is to gather descriptions of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena*." It has been said that qualitative interviews are like night goggles, *"permitting us to see that which is not ordinarily on view and examine that which is looked at but seldom seen."* (Rubin and Rubin, 2005, p. vii) Good qualitative interview research is able to obtain deeply contextual, nuanced, and authentic data regarding interviewees' real-world experiences and perspectives by engaging interviewees directly in a conversation (Schultze and Avital, 2011). As the qualitative interview research method allows researchers to focus on a specific phenomenon, it is appropriate for this study, which seeks to explain users' complex and nuanced IS post-adoption behaviors.

However, qualitative interviews do not automatically guarantee the generation of rich data and meaningful insights. There are some potential difficulties, problems, and pitfalls that can arise, such as artificiality of interview, lack of trust, lack of time, level of entry, and elite bias (Myers and Newman, 2007). To overcome these difficulties, qualitative researchers have recommended using a dramaturgical model for the interview (Myers and Newman, 2007). The interview has a stage, props, actors, audiences, scripts, an entry, and exit. The performance quality impacts the extent to which the interviewees disclose important information, which in turn, influences the quality of data (Myers and Newman, 2007).

Interviews can be classified into three basic types: structural interviews, unstructured interviews, and semi-structured interviews (Berg and Lune, 2017). In structural interviews, all questions are pre-formulated and strictly regulated regarding order and time. This type of interview is often used in surveys in which

the interviews are not necessarily conducted by the researchers. In unstructured interviews, no question is pre-formulated, and interviewees are free to say what they want. In semi-structured interviews, some questions are pre-formulated but strict adherence is not required and new questions might sometimes emerge during the conversation. Semi-structured interviews are a combination of unstructured and structured interviews, and have the advantages of both. Semi-structured interviews offer interviewees the opportunity to add important insights as they arise during the conversation, while the previously prepared questions provide focus (Berg and Lune, 2017). Thus, the semi-structured interviews have been used in this study.

The qualitative interview research method can be positivist, interpretive, or critical, depending on the philosophical assumptions made by the researchers (Myers and Newman, 2007). The qualitative interview research method employed in this research is interpretive. It focuses on individual experiences and perspectives and helps to examine the determinants of continuance intention in the particular context of smoking cessation OHCs. Interpretive interview research is conducted in Article 1 to explore the determinants of continuance intention and answer RQ1: "*What are the determinants of users' continuance intention toward smoking cessation OHCs in their smoking cessation process?"*

There are many data collection interview techniques, such as face-to-face interviews, telephone interviews, and email interviews (Opdenakker, 2006). The email interview method was used in this research. Email interview overcomes geographical barriers (Bowden and Galindo-Gonzalez, 2015; Burns, 2010), which allows researchers to extend their reach to potential interviewees. It can be particularly advantageous when targeting people located in isolated geographical areas that may be difficult to access, such as vulnerable populations or the military (Bowden and Galindo-Gonzalez, 2015; Cook, 2012).

Email interview also decreases research costs. Since an email interview does not require any travel, and interviewees often write down their answers, it can save the costs of transportation and transcription (Bowden and Galindo-Gonzalez, 2015; Bowker and Tuffin, 2016).

The email interview method is also advantageous because it prioritizes interviewees' comfortability (Fritz and Vandermause, 2018). Unlike interviewees in real-time, email interview interviewees can answer questions at their convenience, such as from the comfort of their home. This may encourage interviewees to feel safer when sharing personal experiences, such as sensitive information or embarrassing moments (Bowden and Galindo-Gonzalez, 2015; Fritz and Vandermause, 2018). Also, the asynchronous communication of email interviews gives interviewees more control over their level of involvement, allowing them to control the amount of time devoted to the interview or to conceal their privacy

(Mason and Ide, 2014; Meho, 2006). This may make interviewees more willing to share intimate details of their personal experiences.

Email interviewing also promotes iterative reflections throughout the interview process. In an email interview, both interviewers and interviewees have time to reflect on the questions and responses (Fritz and Vandermause, 2018; Ratislavová and Ratislav, 2014). For interviewers, the back-and-forth email communication may extend for days and weeks, allowing them to clarify descriptive data, chase further detection, and confirm the accuracy of their interpretation of the interviewees' perspective. Interviewees have more time to reflect before crafting written responses, resulting in more thoughtful and relevant data.

Last, the email interview method streamlines the interview (Bowden and Galindo-Gonzalez, 2015; Fritz and Vandermause, 2018). Unlike transcribing an oral interview, the written responses of email interviews are easily converted to transcribed data. Even though the transcripts of email interviews are often shorter than face-to-face interviews, the data gathered via email interviews is more succinct and concrete than that collected verbally. Sometimes face-to-face interviewees offer additional information that email interviewees do not provide, but this extra information is not always related to the research questions (Bowden and Galindo-Gonzalez, 2015).

Collecting data via email interviews also has disadvantages. First, email interviews lack some of the social cues that contribute to a complete understanding of interviewees' experiences (Fritz and Vandermause, 2018; Meho, 2006). Unlike face-to-face interviews, email interviewers cannot observe and interpret interviewees' paralanguage, body gestures, tone, and visual cues. This may cause misinterpretations of interviewees' responses. This issue has recently been somewhat mitigated by interviewee use of written cues, such as capitalization, bold text, emojis, and emoticons, to present tone and mood (Fritz and Vandermause, 2018).

The second disadvantage of email interviews is the delay in responses (Bowden and Galindo-Gonzalez, 2015). Interviewers may have to wait for days or weeks to receive a response from interviewees, as they can reply to questions at their convenience. This time lag may result in a low volume of responses and the loss of respondents at multiple stages throughout the interview. Interviewers should inform interviewees of the time frame of the email interviews and send email reminders about answering questions (Bowden and Galindo-Gonzalez, 2015; Fritz and Vandermause, 2018; Meho, 2006).

Email interview is appropriate for this research for the following reasons. First, this method allows for efficient and convenient data collection. Second, it protects respondents' privacy, as they were kept anonymous during the email interviews. Third, as the target population is the users of two smoking cessation OHCs who can

access the Internet and are competent in online communication via email, sample bias is less critical. Fourth, since users can employ written cues (i.e., capitalization, bold or italic text, and emoji) in smoking cessation OHCs, the lack of social cues does not appear to be a severe concern.

3.3 Data collection

3.3.1 Data collection timeline

This study's data collection consisted of four steps. In November 2018, a pilot study for questionnaire survey was performed in Finland incorporated with Stumppi.fi. Second, from November 2018 to April 2019, a formal questionnaire survey was conducted in China. From December 2018 to April 2019, a formal questionnaire survey was conducted in Finland. Last, from February 2019 to May 2019, interviews were conducted among the users of Stumppi.fi in Finland (see Figure 3).

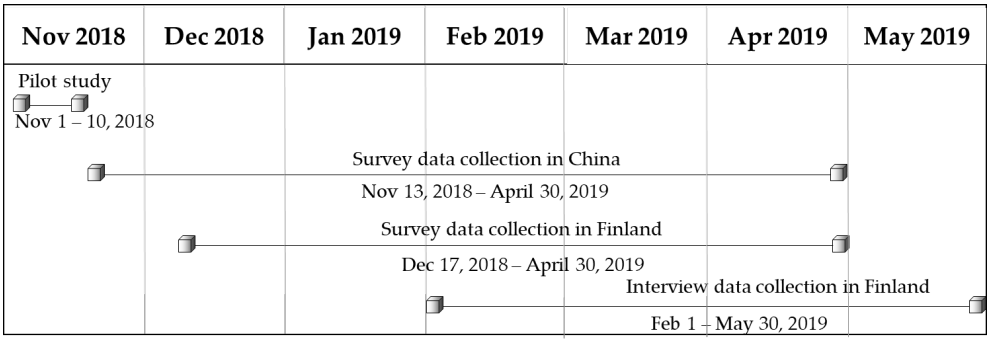


Figure 3. Data collection timeline.

3.3.2 Survey data collection

An online survey was employed for data collection, and two nonprofit smoking cessation OHCs—Stumppi.fi in Finland and the smoking cessation bar in China — were selected for this research. Stumppi.fi is an online platform in Finland that assists smokers in achieving abstinence. It was initially supported in 2004 by Finland's government-supervised not-for-profit Slot Machine Association. However, since January 2017, its financial support has come from the Ministry of Social Affairs and Health and the Funding Centre for Social Welfare and Health Organizations. The language of Stumppi.fi is Finnish. It has operated an OHC for ex-smokers and current smokers in Finland since 2007. It had more than 9,000 registered members by the end of 2018.

The smoking cessation bar is an OHC that aims to help Chinese smokers stop using tobacco products via mutual support and supervision. It was first established in 2006 on Baidu Tieba (the Chinese communication platform that is also called Baidu Post Bar) by an individual concerned about smoking cessation. It has been the most popular smoking cessation OHC in China, and the number of total participants surpassed 70,000 by the end of 2020. The language of this OHC is Chinese.

Even though the two OHCs are run in different nations and managed by different organizations, they share some structural and functional similarities. Specifically, both OHCs provide the most important and easy-to-use functions for users, such as starting a new thread for communication, asking questions to look for help, responding to others' postings in a discussion thread, and communicating via private messages. In addition, all members of these two platforms are kept anonymous to protect their privacy.

An ethical permit was obtained from the Ethics Committee of University of Turku before data collection began. The questionnaire of the online survey was initiated in English and then translated into Chinese and Finnish. IS researchers who are native speakers of the respective languages reviewed the questionnaire in each language to ensure the validity of content and translation. In addition, one officer of Stumppi.fi reviewed the questionnaire in both Finnish and English. Subsequently, a pilot study with Stumppi.fi users (N = 20) was conducted to test the questionnaire in Finnish. Based on their feedback, the questionnaires were further revised in all languages.

The questionnaire consists of three parts. First, informed consent was presented along with the research purpose, the voluntary nature of participation, the expected time commitment, data confidentiality, the research team's contact information, and a question to confirm intent to participate. Only those who confirmed their participation proceeded to the next part of the questionnaire, in which respondents were asked to offer background information and their smoking history. The third and final part included questions used to measure each construct in the research models, such as perceptions of social support and social capital in the smoking cessation OHCs, and intention to continue the use of the OHC.

All measurement items for the constructs included in this study were adapted from well-established scales in previous literature. A five-point Likert scale, ranging from "strongly disagree" to "strongly agree," was used to measure all construct items. The strategy of using previously validated instruments is commonly used and recommended in IS field. According to Boudreau *et al.* (2001), this strategy enables scholars to assure comparability between studies, to cumulate knowledge in IS field, and to efficiently gather timely data. In the current research, some measurement items were revised to fit the research context. Table 3 summarizes the measurement items included in this research.

The online questionnaire was officially released on December 17, 2018, in Finland and on November 23, 2018, in China. The participants were recruited by releasing the online survey questionnaire on the two target smoking cessation OHCs. By April 30, 2019, 235 users had responded (48 in Finland, 187 in China). Each respondent who completed the Finnish questionnaire received a free electronic movie ticket as an incentive, and each who completed the Chinese version received a red envelope containing a random amount of money from 1 RMB to 3 RMB.

Among the 235 answers, 50 respondents (2 in Finland, 48 in China) reported that they were unwilling to participate in the online survey, and 12 respondents (all in China) offered untrusted responses (for instance, the same answer choice for all questions). Finally, 173 answers (46 in Finland, 127 in China) were deemed valid samples for data analysis.

Among the respondents, 37.0% were female, 59.5% were male, and 3.5% concealed their gender information. The majority of the respondents were between 25 and 44 (67.6%), and all were smokers at different stages of smoking cessation. Table 4 presents all the respondents' demographic information and smoking cessation stages.

Table 3. The measurement items in this study.

Construct	Measurement items	References
Social ties	1. I maintained close social relationships with some members of the smoking cessation OHC. 2. I spent a lot of time interacting with some members of the smoking cessation OHC. 3. I knew some members of the smoking cessation OHC on a personal level. 4. I was in frequent communication with some members of the smoking cessation OHC.	(Chiu *et al.*, 2006)
Commitment	1. I was proud to belong to the smoking cessation OHC. 2. I felt a sense of belonging to the smoking cessation OHC. 3. I cared about the long-term success of the smoking cessation OHC.	(Liang *et al.*, 2011)
Reciprocity	1. I knew that other members would help me, so it's only fair to help other members. 2. I knew that someone would help me if I were in a similar situation.	(Wasko and Faraj, 2005)
Shared vision	1. Members of the smoking cessation OHC shared the vision of helping others solve their smoking problems. 2. Members of the smoking cessation OHC shared the same goal of supporting each other. 3. Members of the smoking cessation OHC shared the same sense that helping others was pleasant.	(Chiu *et al.*, 2006)
Shared language	1. The members of the smoking cessation OHC used common terms. 2. The members of the smoking cessation OHC used understandable communication patterns during the discussion. 3. The members of the smoking cessation OHC used understandable narrative forms to post messages or articles. 4. The members of the smoking cessation OHC were always on the same frequency when we talked about smoking cessation.	(Chiu *et al.*, 2006)
Knowledge-sharing	1. I frequently participated in knowledge-sharing activities within the smoking cessation OHC. 2. I usually spent a lot of time in knowledge-sharing activities within the smoking cessation OHC. 3. I usually shared information with others in the smoking cessation OHC actively. 4. I usually involved myself in discussions of various topics within the smoking cessation OHC.	(Hsu *et al.*, 2007)
Perceived usefulness	1. Using the smoking cessation OHC made my smoking cessation proceed faster (productivity). 2. Using the smoking cessation OHC made my smoking cessation proceed better (performance). 3. Using the smoking cessation OHC helped me make better decisions regarding smoking cessation(effectiveness). 4. Overall, using the smoking cessation OHC was useful in smoking cessation.	(Bhattacherjee, 2001)

Table 3. The measurement items in this study (continued).

Construct	Measurement items	References
Satisfaction	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	(Bhattacherje e, 2001)
Recommen-dation	1. I would recommend this smoking cessation OHC to other smokers. 2. I will say positive things about this smoking cessation OHC to others. 3. I would recommend this smoking cessation OHC when someone seeks my advice on smoking cessation. 4. I would recommend this smoking cessation OHC to others via social media.	(Kim and Son, 2009)
Perceived emotional support	1. When I faced difficulties, some people in the smoking cessation OHC were on my side. 2. When I faced difficulties, some people in the smoking cessation OHC comforted and encouraged me. 3. When I faced difficulties, some people in the smoking cessation OHC listened to me talk about my personal feelings. 4. When I faced difficulties, some people in the smoking cessation OHC expressed interest in and concern for my well-being.	(Liang *et al.*, 2011)
Perceived informational support	1. Some people in the smoking cessation OHC have been ready to offer suggestions when I needed help. 2. When I encountered a problem, some people in the smoking cessation OHC gave me information to help me overcome the problem. 3. When I faced difficulties, some people in the smoking cessation OHC helped me discover the cause and offered suggestions.	(Liang *et al.*, 2011)
Perceived esteem support	1. Some members of the smoking cessation OHC have shown confidence in my ability to deal with smoking. 2. Some members of the smoking cessation OHC have made me feel that I was good at making decisions about quitting smoking. 3. Some members of the smoking cessation OHC have made me feel that I was capable of handling my smoking cessation.	(Oh *et al.*, 2013)
Smoking cessation stage	1. I am not intending to quit smoking in the next 6 months 2. I am intending to quit smoking in the next 6 months 3. I am intending to take actions on smoking cessation in the next month 4. I have taken actions to quit smoking in the past 6 months 5. I am in the maintenance stage of smoking cessation (maintenance means that I am still working on preventing relapse) 6. I have successfully quit smoking with zero temptation and 100% self-efficacy	(Prochaska and Velicer, 1997)

Table 4. Interviewees' demographic data and smoking cessation stages.

Measure	Items	Frequency	Percentage (%)
Country	Finland	46	26.6
	China	127	73.4
Age	15–24	17	9.8
	25–44	117	67.6
	45–65	35	20.2
	> 65	4	2.3
Gender	Male	103	59.5
	Female	64	37.0
	Unwilling to disclose	6	3.5
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

3.3.3 Interview data collection

The data for the qualitative study were mainly collected through email interviews. At the end of the online survey, we asked each respondent to offer their email addresses for the voluntary further email interviews. Twenty-nine Finnish respondents left their email addresses, while no Chinese respondents were willing to provide their email addresses.

A semi-structured email interview questionnaire was designed to answer RQ1 ("*What are the determinants of users' continuance intention toward smoking cessation OHCs in their smoking cessation process?").* Table 5 presents the research questions of the email interview. The interview questions were in Finnish and sent to respondents via email, and seven of them replied in Finnish. Their responses were then translated by a translator who is fluent in both English and Finnish.

All interviewees were users of Stummpi.fi in Finland and had used the OHC for a certain period after their first-time adoption. Among the interviewees, four were female, and three were male. The majority of the interviewees were aged between 25 and 44 (four respondents). All interviewees were smokers at different stages of smoking cessation. Table 6 presents all the interviewees' demographic information and descriptive characteristics.

Table 5. The research questions of email interviews.

Open questions
1. Why do you use Stumppi.fi in your smoking cessation?
2. Is Stumppi.fi useful to support your smoking cessation? Please provide explanations for your answer.
3. Do you get information such as advice/suggestions to support your smoking cessation from Stumppi.fi? If yes, could you tell us one of your stories?
4. Do you get support from other members of Stumppi.fi when you need more support for smoking cessation rather than from your family? If yes, could you tell us one of your stories?
5. Do you feel accompanied and supported emotionally by the other members of Stumppi.fi in your smoking cessation? If yes, could you tell us one of your stories?

(Note: When asking interviewees about Stumppi.fi, I referred to the smoking cessation OHC in Stumppi.fi but not to the Stumppi.fi website.)

Table 6. The descriptive characteristics of the interviewees.

	Characteristics	Number (%)
Age	15-24	1 (14.3%)
	25-44	4 (57.1%)
	45-64	1 (14.3%)
	65 years or older	1 (14.3%)
Gender	Female	4 (57.1%)
	Male	3 (42.9%)
Length of use	Less than 1 year	4 (57.1%)
	1-3 years	2 (28.6%)
	3-5 years	0
	5-7 years	0
	More than 7 years	1 (14.3%)
Education Level	Less than upper secondary school or vocational school	2 (28.6%)
	Upper secondary school or vocational school	4 (57.1%)
	Short-cycle tertiary education	1 (14.3%)
Personal Income In Previous Year	Less than €15,000	3 (42.9%)
	€15,000 - €29,999	2 (28.6%)
	€30,000 - €44,999	1 (14.3%)
	More than €45,000	1 (14.3%)
Smoking Cessation Stage	Contemplation	1 (14.3%)
	Preparation	1 (14.3%)
	Maintenance	2 (28.6%)
	Termination	3 (42.9%)
Activities	Posting	3 (42.9%)
	Lurking	4 (57.1%)

3.4 Data analysis

3.4.1 Analysis of quantitative data

Structural equation modeling (SEM) was used for the quantitative data analysis of three articles (2, 3, and 4). SEM is a multivariate statistical analysis technique used to assess the proposed structural model by testing assumed causal relationships among multiple dependent and independent constructs and to estimate the measurement model by testing the loadings of observed items or measurements on their expected latent constructs (Gefen *et al.*, 2000). SEM enables researchers to effectively assess measurement models and structural paths simultaneously, particularly when the structural model includes multiple dependent variables, latent constructs based on multi-item indicator variables, or multiple levels of constructs in the structural model (Astrachan *et al.*, 2014). It has been extensively employed in various domains, such as marketing research, IS, and management (Urbach and Ahlemann, 2010).

There are two main approaches to SEM analysis, one is Covariance-based SEM (CB-SEM), which is employed in LISREL, EQS, and AMOS, and the other is partial least squares SEM (PLS-SEM), which is employed in PLS and PLS-Graph (Gefen *et al.*, 2000). These two approaches differ in their statistical assumptions, estimation procedures, and outcomes. CB-SEM uses a maximum likelihood (ML) estimation procedure to reproduce *"the theoretical covariance matrix (i.e., minimizing the difference between the observed and estimated covariance matrix), without focusing on explained variance" (Hair et al., 2011, p. 139)*. CB-SEM is primarily used to confirm or reject theories by determining how well a proposed theoretical model can fit the covariance matrix of the empirical data (Hair Jr *et al.*, 2017). In contrast, PLS-SEM employs a regression-based ordinary least squares (OLS) estimation method and aims to explain the latent constructs' variance by *"minimizing the error terms and maximizing the R^2 values of the (target) endogenous constructs"* (Hair Jr *et al.*, 2017, p. 17). PLS-SEM is primarily used for predictive applications and theory building by focusing on explaining the variance in the dependent variables when testing the model (Hair Jr *et al.*, 2017).

Hair Jr *et al.* (2017, p. 23) explained the rules of thumb for choosing between CB-SEM and PLS-SEM. They recommended that researchers use PLS-SEM when the goal is predicting key target constructs or identifying key "driver" constructs. It also works better when the structural model involves formatively measured constructs, the sample size is small, or the data are non-normally distributed. The objective of the current research is to explore the motivators of IS post-adoption behaviors regarding smoking cessation OHCs, the sample size of the current study

is relatively small, and the data are not normally distributed. Therefore, PLS-SEM is the proper method.

In the three selected articles, research models and hypotheses were analyzed by means of SmartPLS 3.0. After data collection, all survey data were ordered via the statistical software, SPSS 26.0, and then transferred to SmartPLS for further analysis. Specifically, the data analysis included two steps. The first was the evaluation of the measurement model through the assessment of convergent and discriminant validity. Convergent validity can be evaluated via certain standard estimates: the factor loading of each measurement item on the respective constructs must exceed 0.7, each construct's composite reliability (CR) must be higher than the cutoff value of 0.7, and the average variance extracted (AVE) by each construct must be above 0.5. Discriminant validity can be evaluated via two techniques. One is the criterion proposed by Fornell and Larcker (1981): item loadings should be greater on their intended construct than on other constructs, and the square root of each construct's AVE should exceed the correlations between the construct and others. The other is the Heterotrait–Monotrait (HTMT) criterion proposed by Henseler *et al.* (2015), which states that the HTMT ratio confidence interval should be lower than 0.90 at least (Henseler *et al.*, 2015).

The second step revolved around testing the relationships between various latent variables included in the research models and using PLS-SEM to evaluate the structural model by examining the size and significance of path coefficients, the coefficient of determination (R^2 value), and the predictive relevance (Q^2 value) (Hair Jr *et al.*, 2017). Detailed results of the PLS-SEM test of Articles 2, 3, and 4 are given in the original publications.

3.4.2 Analysis of qualitative data

All email interviews were originally transcribed in Finnish and then translated into English. The English transcripts were analyzed together with the Finnish transcripts to identify the types of social support and their importance to the continued use of the smoking cessation OHC in Stumppi.fi. The unit of analysis is user perception of and feeling regarding social support in the smoking cessation OHC.

First, different types of social support were extracted from the transcripts by using the social support framework (see Table 7). Messages containing information on quitting smoking, such as advice or personal stories, were classified as informational support. Messages including emotional expressions, such as empathy or encouragement, were considered to be perceived emotional support. Messages reflecting companionship activities with others, such as chatting or building a friendship, were viewed as perceived companionship.

Second, we examined whether these different types of social support were mentioned as reasons for using the OHC or not. Here, we applied narrative analysis (Berg and Lune, 2017). Through these procedures, we were able to identify three types of social support that drive continuance intention. There were three possible answers regarding social support: "Yes" (social support was considered a determinant), "No" (social support was not considered to be a determinant), and "No response" (social support was not mentioned as a determinant).

In addition, respondents' demographical data from the online survey and their answers from email interviews were integrated to establish contextualization (such as age, gender, use patterns, length of use, and smoking cessation stage). Table 8 summarizes the results of the qualitative data analysis.

Table 7. The concepts and descriptions of subtypes of social support.

Concept	Description
Perceived informational support	Users' perceptions of information on smoking cessation and how to deal with it, such as advice, personal experiences, and referrals in smoking cessation OHCs (Cutrona and Suhr, 1992).
Perceived emotional support	Users' perceptions of communicating caring or understanding, such as empathy, encouragement, and congratulations in smoking cessation OHCs (Cutrona and Suhr, 1992).
Perceived companionship	Users' perceptions of engaging in social activities with others, such as chatting, friendship, and other activities in smoking cessation OHCs (Huang *et al.*, 2014; Yan and Tan, 2014).

Table 8. An overview of the components of social support and interviewees' characteristics.

Participant	Age	Gender	Activity	Length of use	Cessation stage	Perceived informational support	Perceived emotional support	Perceived Companionship
1	25-44	Female	Posting	< 1 year	Maintenance	Yes	Yes	Yes
2	≥ 65	Female	Posting	> 7 years	Termination	No	Yes	Yes
3	15-24	Male	Lurking	< 1 year	Contemplation	Yes	Yes	No answer
4	25-44	Female	Lurking	< 1 year	Preparation	Yes	Yes	No answer
5	45-64	Male	Posting	1-3 years	Termination	Yes	Yes	No answer
6	25-44	Female	Lurking	< 1 year	Termination	No	No	No
7	25-44	Male	Lurking	1-3 years	Maintenance	Yes	Yes	Yes

4 Research Findings

This chapter summarizes the main findings of this research. First, the findings of each article are presented. Second, the determinants of continuance intention and knowledge-sharing regarding smoking cessation OHCs are summarized. Next, the findings on the relationships between social-related beliefs and systems-beliefs are demonstrated. Fourth, the moderator results are outlined. Finally, there is a summary of answers to this study's research questions.

4.1 Summary of research articles

This dissertation includes four research articles to answer the research questions raised in Chapter 1. In this section, the presentation of each article will summarily emphasize the research purposes, research method, key findings, and contributions to the synopsis.

4.1.1 Research article 1: determinants of continuance intention: a social support perspective

Article 1, "Use of Online Health Communities in Smoking Cessation: A Social Support Perspective," has been published in the proceedings of the Pacific Asia Conference on Information Systems (PACIS 2019). Based on the social support theory, this article explores the types of social support that motivate users to continue their use of smoking cessation OHCs. The data were gathered via semi-structured email interviews with users of Stumppi.fi, which runs an OHC for smokers in Finland.

This article contributes an answer to research question one (RQ1); the findings indicate that perceived emotional support, perceived informational support, and perceived companionship are three primary motivators for continuance intention related to smoking cessation OHCs. The perceived informational support includes personal experiences and medical information, the perceived emotional support includes empathy and congratulation, and the perceived companionship comprises the presence of key users, group formation, friendship development, and social activities beyond the OHCs. In addition, users' characteristics, including use patterns

(posting or lurking) and smoking cessation stage, have been found to influence the paths from informational support and companionship to continuance intention. Figure 4 illustrates the key findings of this article.

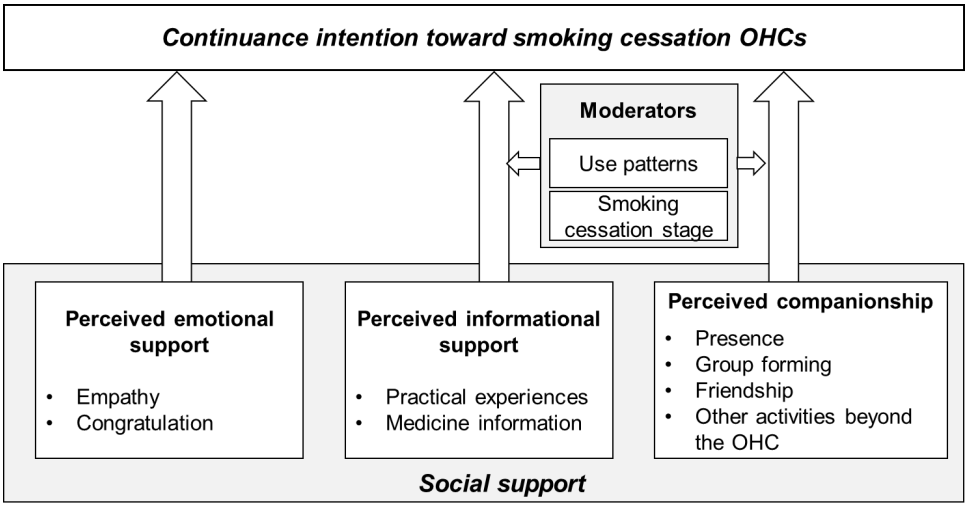


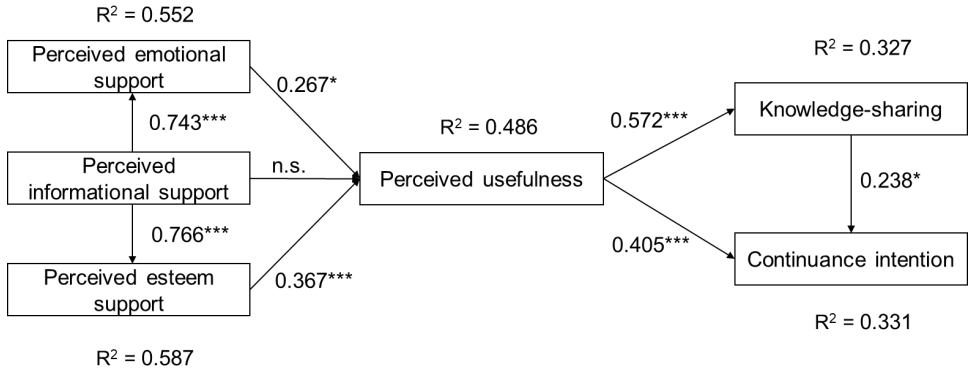
Figure 4. The roles of three types of social support in determining continuance intention.

4.1.2 Research article 2: the role of perceived usefulness

Article 2 is entitled "Antecedents and Consequences of the Perceived Usefulness of Smoking Cessation Online Health Communities," which has been published at Internet Research. The purpose of this article is to investigate the role of perceived usefulness in relation to smoking cessation OHCs.

Based on social support theory and the prior literature on perceived usefulness, three subtypes of social support (informational, emotional, and esteem support) are hypothesized to be the antecedents to perceived usefulness, which positively influences continuance intention and knowledge-sharing. Empirical data were collected via an online survey (N = 173) with users of two smoking cessation OHCs.

The results offer the following key findings: first, the perceived usefulness of smoking cessation OHCs is directly determined by perceived emotional support and perceived esteem support. Second, perceived informational support indirectly affects perceived usefulness via perceived emotional support and perceived esteem support. Third, perceived usefulness exerts positive influences on both knowledge-sharing and continuance intention. Fourth, knowledge-sharing positively affects continuance intention. The results are presented in Figure 5.



*(Notes: ***: p < 0.001; *: p < 0.05; n.s.: not significant)*

Figure 5. The antecedents and consequence of perceived usefulness.

This article helps to answer research questions one (RQ1) and two (RQ2). The results indicate that users' perceived usefulness motivates both their continuance intention and knowledge-sharing. This article further reveals that perceived usefulness is determined by users' perceptions of emotional support and esteem support. Perceived informational support affects perceived usefulness indirectly via perceived emotional support and perceived esteem support.

4.1.3 Research article 3: the role of satisfaction and perceived usefulness

Article 3, entitled "Comprehending the Roles of Perceived Usefulness and Satisfaction in Smoking Cessation Online Health Communities: A Social Capital Perspective," is a manuscript that has been accepted by the International Journal of Telemedicine and Clinical Practices. This article seeks to investigate the roles of perceived usefulness and satisfaction regarding smoking cessation OHCs from a social capital perspective. In the proposed research model, both perceived usefulness and satisfaction have positive impacts on knowledge-sharing and recommendation behaviors. In addition, users' perceived usefulness is influenced by three dimensions of social capital, including structural capital (i.e., social ties), cognitive capital (i.e., shared language and vision), and relational capital (i.e., reciprocity and commitment). Empirical data were collected via online surveys with users from two OHCs for smoking cessation.

The research results show that both perceived usefulness and satisfaction affect knowledge-sharing positively, though not to the same extent. In this study, perceived usefulness exerts a stronger influence on both knowledge-sharing and recommendation than does satisfaction. In addition, perceived usefulness is affected

by shared language, shared vision, and commitment. The research results are illustrated in Figure 6.

The findings of this article contribute to answering research question two (RQ2) as well as to the investigation of the impacts of both perceived usefulness and satisfaction on knowledge-sharing. This article also clarifies the elements that determine perceived usefulness from a social capital perspective.

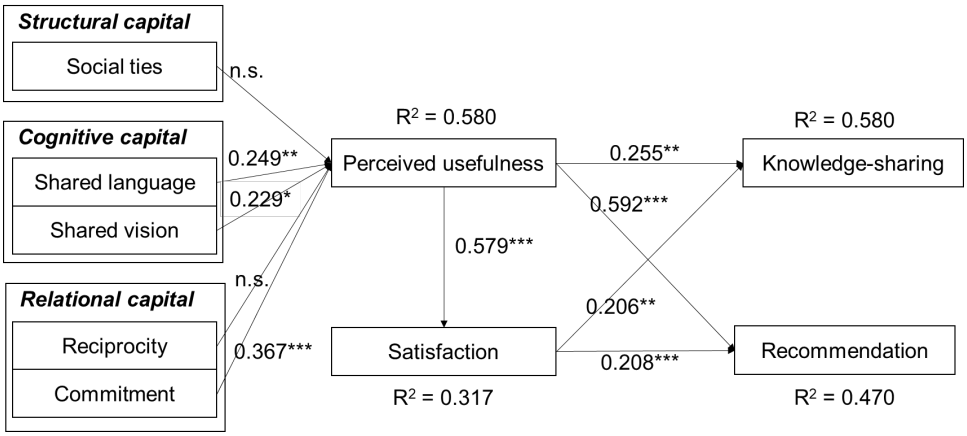


Figure 6. The roles of perceived usefulness and satisfaction.

4.1.4 Research article 4: determinants of knowledge-sharing: a social capital perspective

Article 4 is titled "Knowledge-Sharing in Online Smoking Cessation Communities: A Social Capital Perspective," which has been published at Internet Research. This article examines the motivators of knowledge-sharing in smoking cessation OHCs through the lens of social capital. Based on social capital theory, there are three dimensions of social capital that are proposed as determinants of knowledge-sharing: structural capital (i.e., social ties), relational capital (i.e., reciprocity and commitment), and cognitive capital (shared language and vision). Empirical data were collected via online surveys with users of two smoking cessation OHCs.

The research findings of this article indicate that social ties and reciprocity are two important motivators for knowledge-sharing in smoking cessation OHCs. The stage of smoking cessation moderates the relationships between motivators and knowledge-sharing. The research results are summarized in Figure 7.

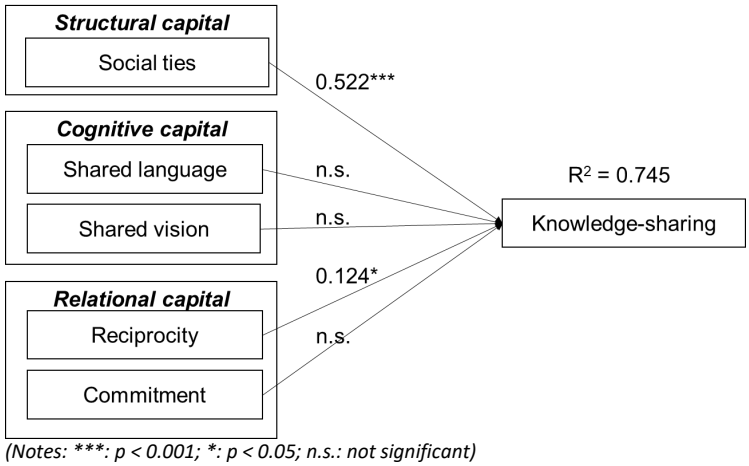


Figure 7. The role of three dimensions of social capital in determining knowledge-sharing.

This article contributes to the knowledge required for answering research question two (RQ2) by clarifying the role of each dimension of social capital that encourages knowledge-sharing in smoking cessation OHCs. The research results of Article 4 show that structural capital (social ties) and relational capital (reciprocity) directly influence knowledge-sharing in those OHCs.

4.2 Research findings for the continuance intention

To examine the determinants of continuance intention regarding smoking cessation OHCs, qualitative research (Article 1) and a quantitative study (in Article 2) were performed. In the qualitative study, perceived informational support, perceived emotional support, and perceived companionship were found to be important motivators for users' continuance intention. Specifically, perceived emotional support is the main reason that users continued their use of smoking cessation OHCs. One important form of perceived emotional support is empathy; respondents stated that the other users could truly understand and empathize with the struggle of quitting smoking and could support them empathetically. In comparison, support from non-smoking partners and family members is inadequate.

Perceived informational support is another important motivator. A type of perceived informational support that was required by respondents is personal experience related to quitting smoking. Users of smoking cessation OHCs are often in the process of quitting or have quit smoking for a while, making them knowledgeable about the real-life journey of smoking cessation. This allows them to offer realistic and authentic details of quitting and practical advice. This is consistent with prior research, such as that by Coley *et al.* (2013), that found personal

experience is more convincing and accepted than expertise information. Perceived informational support, might thereby increase users' return visits. The other form of perceived informational support is information about substitutive products, medicines, and their side effects.

Perceived companionship is the third motivator. The subtypes of perceived companionship include presence, subgroup forming, friendship, and participation in other activities outside the OHC. Presence means the key users present in the smoking cessation OHCs. Subgroup forming refers to developing a subgroup of users who are at a similar stage of quitting. Friendship means users become Facebook friends. Other activities refer to arranging social events outside of the OHCs, such as face-to-face activities.

In the quantitative study (Article 2), the amount of variance of continuance intention toward smoking cessation OHCs was found to be 33.1 %. The perceived usefulness and knowledge-sharing were found to be important factors that directly influence users' continuance intention toward smoking cessation OHCs.

Specifically, perceived usefulness has been found to be an important determinant of continuance intention ($\beta = 0.405$, $p < 0.001$). This finding is consistent with prior studies in different research contexts, such as online banking (Bhattacherjee, 2001), e-government (Hamid *et al.*, 2016), and general OHCs (Wu, 2018). In the context of smoking cessation OHCs, when users perceive these OHCs to be useful for enhancing their quitting performance, they are likely to continue using them.

Knowledge-sharing ($\beta = 0.238$, $p < 0.05$) was found to have a positive influence on continuance intention toward smoking cessation OHCs. In prior literature, limited attention has been paid to the association between different post-adoption behaviors. This finding indicates that the more knowledge users contribute to smoking cessation OHCs, the stronger their intention to sustain their usage.

To sum up, users' continuance intention toward smoking cessation OHCs is influenced by their systems-related beliefs (measured by perceived usefulness), by their social-related beliefs (measured by perceived informational support, perceived emotional support, and perceived companionship), and by other IS post-adoption behavior (measured by knowledge-sharing).

4.3 Research findings for the knowledge-sharing

To examine the determinants of knowledge-sharing in smoking cessation OHCs, three research models based on social support theory (in Article 2) and social capital theory (in Articles 3 and 4) have been developed and tested. The amount of variance of knowledge-sharing illustrated by the research models is 32.7% in Article 2, 58.0% in Article 3, and 74.5% in Article 4. A user's systems-related beliefs (perceived usefulness), social-related beliefs (social capital), and attitude (satisfaction) toward

smoking cessation OHCs are important motivators of knowledge-sharing. A user's systems-related beliefs are affected by his/her social beliefs about social support and social capital.

Specifically, perceived usefulness reflects a user's utilitarian perceptions regarding the use of smoking cessation OHCs. Perceived usefulness positively affects knowledge-sharing in Article 2 ($\beta = 0.572$, $p < 0.001$) and in Article 3 ($\beta = 0.255$, $p < 0.01$). This finding is in line with prior research. For instance, in the work of Yuan *et al.* (2016), perceived usefulness affects users' knowledge-sharing in the context of travel-oriented online communities. Similarly, users of smoking cessation OHCs are more likely to want to share their knowledge with others when they perceive the OHC as useful for faring better with the smoking cessation process.

A users' beliefs reflecting social capital also directly affect his/her knowledge-sharing. In Article 4, social ties and reciprocity have positive influences on knowledge-sharing. The significant impact of social ties on knowledge-sharing supports previous findings in other settings. For instance, Chai *et al.* (2011) found that social ties motivate knowledge-sharing among bloggers. In a study on HIV OHCs, users with stronger social ties are more likely to share their knowledge with other users (Chen and Shi, 2015). The impacts of reciprocity on knowledge-sharing in smoking cessation OHCs also confirm prior findings in various contexts, such as blogs (Chai *et al.*, 2011) and online communities (Chang and Chuang, 2011).

User satisfaction is another important determinant behind knowledge-sharing in these OHCs. In Article 4, satisfaction has a positive influence on knowledge-sharing ($\beta = 0.206$, $p < 0.01$). This supports prior findings related to the positive influences of satisfaction on users' behavioral intentions. For instance, Cheung *et al.* (2013) found that user satisfaction affects users' intention to continue sharing knowledge in online communities of practice. Similarly, satisfied users of smoking cessation OHCs are more likely to distribute their knowledge in the OHCs.

To summarize, the determinants of knowledge-sharing in smoking cessation OHCs include users' systems-related beliefs, which are measured by perceived usefulness, users' social-related beliefs, which are represented by social ties and reciprocity, and users' attitudes toward these OHCs, which are measured by satisfaction.

4.4 Research findings for the relationships between different beliefs

A significant relationship between users' social-related beliefs and systems-related beliefs has been discovered in this research. Specifically, from a social support perspective, in Article 2, perceived usefulness has been found to be determined by perceived esteem support ($\beta = 0.367$, $p < 0.001$) and perceived emotional support

($\beta = 0.267$, $p < 0.05$). When users perceive a high level of emotional support and esteem support within smoking cessation OHCs, they tend to believe the OHCs are useful for smoking cessation. Also, perceived informational support exerts an indirect impact on perceived usefulness via perceived emotional support and perceived esteem support.

Prior research has pointed out that social support is an important factor in determining perceived usefulness in OHCs (Wu, 2018). In the current study, two subtypes of social support (perceived emotional support and perceived esteem support) are identified as prominent factors that affect the perceived usefulness of smoking cessation OHCs. These findings confirm those of previous research (e.g., Wu, 2018) and suggest that users' systems-related beliefs (perceived usefulness) can be affected by users' social-related beliefs regarding social support, which is closely related to the specific nature of smoking cessation OHCs. In addition, the indirect effects of perceived informational support on perceived usefulness indicate that different types of social-related beliefs play different roles in triggering users' systems-related beliefs regarding smoking cessation OHCs.

In Article 3, from a social capital lens, three subtypes of social capital were found to affect perceived usefulness positively: shared language ($\beta = 0.249$, $p < 0.01$), shared vision ($\beta = 0.229$, $p < 0.05$), and commitment ($\beta = 0.367$, $p < 0.001$). These findings are consistent with prior studies. For instance, Choi and Chung (2013) found that perceived social capital has a significant influence on perceived usefulness of social networks. Likewise, the research findings of Luo and Ye (2019) suggested that cognitive capital positively affects users' perceptions of utilitarian value regarding online out-shopping platforms. Users of smoking cessation OHCs who feel a higher level of shared language, shared vision, and commitment are more likely to perceive the OHCs as useful for supporting their smoking cessation. Furthermore, these findings also indicate that users' systems-related beliefs (perceived usefulness) can be clearly explained with the social capital lens, which is also relevant in the context of the smoking cessation OHCs.

Past IS literature has also indicated that mediating mechanisms exist between determinants and IS post-adoption behaviors. For example, users' perceptions of usefulness have been demonstrated as mediators between determinants and IS post-adoption behaviors and attitudes (e.g., Matute *et al.*, 2016; Wu and Chen, 2017). Therefore, a post hoc mediation analysis was conducted to test the mediating effects of perceived usefulness. The results show that perceived usefulness fully mediates the path from perceived esteem support to knowledge sharing (direct effect $\beta = 0.049$, $p > 0.05$; indirect effect $\beta = 0.094$, $p < 0.05$). This finding suggests that perceived esteem support, though seemingly unrelated to users' knowledge-sharing behavior, can influence knowledge-sharing by contributing to the formation of perceived usefulness among users. Also, perceived usefulness fully mediates the

path from commitment to recommendation (direct effect: $\beta = -0.001$, $p > 0.05$; indirect effect: $\beta = 0.148$, $p < 0.01$) and satisfaction (direct effect: $\beta = 0.064$, $p > 0.05$; indirect effect: $\beta = 0.149$, $p < 0.01$). In other words, even though commitment exerts no direct influence on recommendation and satisfaction, it can indirectly affect users' IS post-adoption behaviors (recommendation) and their attitudes (satisfaction) via perceived usefulness.

These findings on the mediating effects of perceived usefulness suggest that social-related beliefs are likely to indirectly influence users' IS post-adoption behaviors through the mediation by perceived usefulness, which captures users' systems-related beliefs. The mediation proposition of perceived usefulness helps differentiate the impact of each subtype of social-related beliefs (such as social support and social capital) on users' IS post-adoption behaviors in smoking cessation OHCs. What is more, the indirect influence mechanisms of perceived esteem support and commitment not only confirm the significance of these social-related beliefs on IS post-adoption behaviors, but also suggest that when studying the impact of social-related beliefs on IS post-adoption behaviors, it is necessary to examine the relationships between social-related and systems-related beliefs.

4.5 Research findings for the moderators

Prior IS literature has suggested that individual characteristics, such as gender, age, and use patterns, have moderating effects on individuals' IS post-adoption behaviors, (Chai *et al.*, 2011; Hung *et al.*, 2015; Lai and Chen, 2014). Previous research on smoking cessation has also found differences related to gender, age, and smoking cessation stage in smoking cessation (Messer *et al.*, 2008; Wetter *et al.*, 1999). In addition, as the empirical data in the quantitative research were collected in two countries with different cultural backgrounds, it is reasonable to consider the country as a moderator in this study. Thus, age, country, gender, use patterns, and smoking cessation stage were investigated as moderators in this research. Although this is not the primary research purpose of examining these moderating effects, the findings might offer a more nuanced understanding of IS post-adoption behaviors in smoking cessation OHCs.

Regarding studies on continuance intention, the test of the smoking cessation stage and use patterns as moderators has been presented in Article 1, and the investigation of age, gender, country, and smoking cessation stage as moderators has been conducted in Article 2. In the former, the results show that the smoking cessation stage and use patterns have effects on the path from perceived informational support and perceived companionship to continuance intention regarding smoking cessation OHCs. In the later, age, country, gender, and smoking cessation results indicate that gender, age, and smoking cessation stage are

moderators, while the country is not. Age moderates the relationship between knowledge-sharing and continuance intention. Gender has a significant moderating influence on the path from perceived emotional support to perceived usefulness. Smoking cessation stage moderates the association between perceived usefulness and continuance intention. More details about these moderating effects can be found in Articles 1 and 2 of this dissertation.

Moving on to studies on knowledge-sharing, four moderators have been examined in Article 2: age, gender, country, and smoking cessation stage. Additionally, one moderator (smoking cessation stage) has been investigated in Article 4. In Article 2, age has a significant moderating effect on the path from knowledge-sharing to continuance intention, and gender moderates the relationship between perceived emotional support and perceived usefulness. In Article 4, the smoking cessation stage exerts significant moderating influences on the paths from social ties, shared vision, and commitment to knowledge-sharing.

Finally, a summary of the moderating effects of age, gender, country, smoking cessation stage, and use patterns is presented in Table 9.

Table 9. Summary of moderating effects in this research.

Moderator	Study on continuance intention	Study on knowledge-sharing
Age	Age has significant moderating effects on the paths from knowledge-sharing to continuance intention (Article 2)	Age has significant moderating effects on the paths from knowledge-sharing to continuance intention (Article 2)
Gender	Gender has significant moderating effects on the paths from perceived emotional support to perceived usefulness (Article 2)	Gender has significant moderating effects on the paths from perceived emotional support to perceived usefulness (Article 2)
Country	No moderating effects (Article 2)	No moderating effects (Article 2)
Smoking cessation stage	The smoking cessation stage has effects on the paths from perceived informational support and perceived companionship to continuance intention toward smoking cessation OHCs (Article 1), from perceived usefulness to continuance intention (Article 2).	The smoking cessation stage has significant moderating effects on the paths from social ties, shared vision, and commitment to knowledge-sharing (Article 4)
Use patterns	Use patterns have effects on the paths from perceived informational support and perceived companionship to continuance intention regarding smoking cessation OHCs (Article 1).	-

4.6 Summary of research findings

This research aimed to extend the understanding of users' IS post-adoption behaviors in the specific context of smoking cessation OHCs. A general research question was proposed as follows:

> *RQ: What are the determinants of individual users' IS post-adoption behaviors in smoking cessation OHCs?*

Various answers to the main research question can be isolated from the previous discussion.

In the IS post-adoption stages, users of smoking cessation OHCs can choose to continue using those OHCs (continuance intention) and to contribute their knowledge to the OHCs (knowledge-sharing). Users' systems-related beliefs, social-related beliefs, and attitudes are found to have direct and significant effects on users' IS post-adoption behaviors. Meanwhile, users' social-related beliefs are found to indirectly affect users' IS post-adoption behaviors via their systems-related beliefs.

The determinants of continuance intention and knowledge-sharing are presented as follows: the direct determinants of continuance intention include social-related beliefs related to social support (represented by perceived informational support, perceived emotional support, and perceived companionship) and systems-related beliefs (captured by perceived usefulness). Users' systems-related beliefs can be determined by social-related beliefs about social support, such as perceived emotional support and perceived esteem support. Furthermore, users' continuance intention can be affected by their knowledge-sharing.

The direct determinants of knowledge-sharing include social-related beliefs about social capital (social ties and reciprocity), systems-related beliefs (perceived usefulness), and users' attitudes (satisfaction). Users' systems-related beliefs can be influenced by their social-related beliefs, including their beliefs about social capital (shared language, shared vision, and commitment) and those beliefs about social support (perceived emotional support and perceived esteem support). Furthermore, users' social-related beliefs (perceived esteem support) have an indirect influence on knowledge-sharing via systems-related beliefs (perceived usefulness), and users' social-related beliefs (commitment) also exert an indirect effect on attitude (satisfaction) via perceived usefulness.

5 Conclusions

This chapter presents the contributions to and implications for the research and practice based on the empirical findings. First, the theoretical contributions to the literature on both IS post-adoption behaviors and smoking cessation OHCs are discussed. Then, the implications for practice are presented. Finally, the limitations of this study and avenues for future research are discussed.

5.1 Theoretical contributions

From a theoretical perspective, this research makes contributions to IS research and research related to smoking cessation OHCs. First, this research contributes to understanding the antecedents to IS post-adoption behaviors through different lenses, including users' systems-related beliefs, social-related beliefs, and attitudes. While IS post-adoption behaviors have been studied extensively by IS researchers, the understanding of the drivers of such behaviors in the particular context of smoking cessation is still fragmented. This research argues that, while similar to other online communities that connect people with similar concerns, smoking cessation OHCs have some unique features. Thereby, the determinants of IS post-adoption behaviors in these OHCs may vary from those in other online communities. For instance, unlike in some online communities where users can gain monetary rewards or hedonic benefits, users of smoking cessation OHCs primarily desire to obtain information and support to assist their smoking cessation. Thus, some determinants identified in prior studies (e.g., rewards and enjoyment) might be unable to explain IS post-adoption behaviors in this case. In addition, the significance of social resources (e.g., social support) and social relationship formation and development inherent to the smoking cessation OHCs suggests that social-related factors might be important motivators of IS post-adoption behaviors in these OHCs. By examining the interplay of users' beliefs (including systems-related and social-related beliefs), attitudes, and behaviors, this study offers a more integrated view of the impacts of individuals' beliefs and attitudes on IS post-adoption behaviors, including continuance intention and knowledge-sharing.

In the traditional IS literature, continuance intention is mainly affected by individual users' beliefs about using an IS (i.e., perceived usefulness) (Bhattacherjee,

2001). The results of this study confirm prior findings on the crucial role of perceived usefulness in predicting users' continuance intention. The results also suggest that continuance intention toward smoking cessation OHCs is affected by users' social-related beliefs, such as beliefs about social support. This study indicates that perceived informational support, perceived emotional support, and perceived companionship are the primary motivators of continuance intention regarding smoking cessation OHCs. In addition, users' beliefs about using such OHCs (perceived usefulness) are directly influenced by their perceptions of emotional support and esteem support and are indirectly influenced by perceptions of informational support. Hence, in the post-adoption stage, the impacts of individual users' beliefs on continuance intention are multidimensional and caused not only by beliefs about using an IS (perceived usefulness) but also by beliefs about social support. This finding provides evidence that continuance intention can be clearly explained through social support theory, which is highly related to the settings of smoking cessation OHCs.

The determinants of knowledge-sharing are comparably more complex. In this research, perceived usefulness is a prominent determinant of knowledge-sharing in smoking cessation OHCs, which confirms that users' systems-related beliefs play essential roles in predicting knowledge-sharing in such OHCs. Users' social-related beliefs, which can be classified into beliefs about social capital and beliefs about social support, also influence knowledge-sharing in smoking cessation OHCs. Users' beliefs about social capital, such as structural capital (social ties) and relational capital (reciprocity), have direct impacts on knowledge-sharing in these OHCs. This further demonstrates that structural and relational capital can promote users' knowledge-sharing in the OHCs. Users' beliefs about social support, such as perceived esteem support, exert an indirect influence on knowledge-sharing via perceived usefulness. In this indirect way, users' social-related beliefs also affect knowledge-sharing.

In this research, satisfaction (attitude), is another important determinant of knowledge-sharing. By going beyond the extant focus on the impacts of satisfaction on continuance intention (Vaezi *et al.*, 2016), this research provides evidence that satisfaction can also affect other forms of IS post-adoption behaviors, such as knowledge-sharing. In smoking cessation OHCs, individual users are more likely to share their knowledge with other users if they feel satisfied with the OHCs. Meanwhile, users' satisfaction is influenced by systems-related beliefs (perceived usefulness). Users tend to be satisfied with smoking cessation OHCs when they perceive that such OHCs to be useful to enhance their smoking cessation performance.

Second, this study enriches existing research on perceived usefulness by investigating the impacts of users' social-related beliefs on it. The research findings

show, from a social support perspective, that perceived usefulness is influenced by perceived esteem support and emotional support, as well as by shared language, shared vision, and commitment from a social capital perspective. This indicates that perceived usefulness can be well explained from the social perspective (social support and social capital), which is particularly related to the context of smoking cessation OHCs. By examining the impacts of social support and social capital on perceived usefulness in this particular research setting, this study extends understating of the determinants of perceived usefulness in such OHCs and offers support of the value of contextualizing the determinants of systems-related beliefs from a social perspective. Meanwhile, the mediating role of perceived usefulness suggests that users' social-related beliefs also indirectly affect IS post-adoption behaviors via systems-related beliefs. This indicates that social-related beliefs affect IS post-adoption behaviors in both direct and indirect ways (via systems-related beliefs), and further offers a complete understanding of the impacts of users' different beliefs on IS post-adoption behaviors in smoking cessation OHCs.

Third, this study advances the IS post-adoption literature by examining the relationships between knowledge-sharing and continuance intention. Previous studies have not precisely examined the influence of knowledge-sharing on continuance intention in the context of smoking cessation OHCs. Thus, findings on the role of knowledge-sharing in triggering continuance intention extend our understanding of the interdependence of different IS post-adoption behaviors and suggest that IS continuance research should consider the impacts of other IS post-adoption behaviors beyond the users' motivation to continue use.

Last but not least, users' characteristics, such as gender and smoking cessation stage, were significant moderators in this research. This provides further evidence that user context is crucial for explaining how varying user beliefs affect IS post-adoption behaviors, thereby advancing our understanding of the antecedents to IS post-adoption behaviors for particular user groups in this particular context.

This research also contributes to the literature on smoking cessation OHCs. While prior studies have focused on the effectiveness and user-generated content of such OHCs, this research examines the antecedents to two IS post-adoption behaviors that are essential for the long-term success of these OHCs. This study's findings on antecedents to continuance intention and knowledge-sharing offer new insights that may bolster the longevity of smoking cessation OHCs, especially regarding how to retain users and how to motivate user contributions. In particular, findings on the relationships between users' beliefs (both users' systems-related and social-related beliefs), attitudes, and IS post-adoption behaviors extend understanding of the design and optimization of smoking cessation OHCs.

Additionally, a sustainable and successful smoking cessation OHC holds the potential to be a valuable tool for meeting smokers' individual cessation needs, for

increasing overall population-quit rates, and for vastly reducing the societal public health burden. This investigation of IS post-adoption behaviors in smoking cessation also furthers prior studies on the ability of such OHCs to create personal values for smokers and to produce social values to address public health issues.

5.2 Practical implications

This research mainly offers practical implications for the managers of smoking cessation OHCs. First, the findings show that users' systems-related beliefs (perceived usefulness) positively affect both continuance intention and knowledge-sharing. This suggests that OHC administrations should improve user perception of the usefulness of their OHCs (specifically regarding smoking cessation). Users' beliefs regarding social support, including perceived esteem support and perceived emotional support, are antecedents to perceived usefulness. Hence, the OHC managers should focus on strategies and approaches for facilitating the sharing of emotional and esteem support. For instance, they can add warm and caring language to make the OHCs feel more empathetic and friendly. In addition, users' beliefs about social capital, including cognitive capital (i.e., shared language and shared vision), and relational capital (i.e., commitment), are also determinants of perceived usefulness. Therefore, it is crucial for OHC administrations to boost relational capital (such as commitment) and to create cognitive capital (such as a shared language and vision) that facilitates perceived usefulness of smoking cessation OHCs. This can be achieved by highlighting and reminding users of the common goal of quitting smoking and by inviting smoking cessation experts to update content regularly.

Second, users' beliefs about social support, including perceived informational support, perceived emotional support, and perceived companionship, are the primary motivators of continuance intention toward smoking cessation OHCs. Thus, it is essential for OHC managers to encourage users to engage in multiple interactions that incorporate informational support, emotional support, and companionship activities. For instance, OHC managers can regularly schedule and arrange various social activities, such as sharing smoking cessation achievements, social life events, and jokes, in order to motivate users to join in intense interactions.

Third, users' beliefs regarding social capital, including social ties and reciprocity, have direct influences on knowledge-sharing. Thus, OHC managers need to motivate users to form strong social connections and develop a helping atmosphere. This can be achieved by arranging campaigns to facilitate interactions between existing users and to create fresh social relationships between newcomers. In addition, OHC managers can highlight the importance of helping others who are facing similar difficulties in order to develop reciprocity norms. They can also integrate reputation or rating systems to identify and reward knowledge contributors.

Fourth, users' attitudes toward smoking cessation OHCs positively affect knowledge-sharing. As satisfied users are more likely to contribute their knowledge into smoking cessation OHCs, OHC managers should focus on strategies and approaches that provide this satisfaction. Specifically, the findings show that perceived usefulness is a primary determinant of satisfaction. Thus, OHC managers can take the measures to facilitate users' perceptions of usefulness that are mentioned above.

Fifth, individual characteristics, such as gender and smoking cessation stage, are important moderators in this research. Accordingly, OHC managers should pay more attention to user-specific characteristics and offer differential services tailored to users' specific needs, thereby maintaining users and nurturing knowledge-sharing.

5.3 Research limitations and future research

This dissertation has limitations that must be considered when generalizing the research findings. First, because of the limits inherent in email interviews and online surveys, the data collected in this research may only capture users' beliefs, attitudes, and behaviors at a certain point in time. As users' beliefs, attitudes, and behaviors may change while engaging in smoking cessation OHCs, further research could be conducted to examine changes in users' beliefs, attitudes, and behaviors regarding smoking cessation OHCs. For instance, a longitudinal study would allow for further examination of the changes in users' beliefs and attitudes and the effects of such changes on their IS post-adoption behaviors.

Second, since the quantitative survey is the main research method employed in this study, the utilized instruments and their limiting factors followed prior research. Additionally, there may be other external factors that affect users' IS post-adoption behaviors. For instance, the five factors of social capital that are examined in this study may not fully capture social capital's effects on continuance intention and knowledge-sharing in these OHCs. Other facets of each dimension, such as trust in the relational dimension, could be taken into consideration in future research. As this study only tested the moderating effects of age, gender, country, and smoking cessation stage, other noteworthy factors related to smoking cessation, such as socio-economic status, can be included in future research on this topic.

Third, this research is limited to two different IS post-adoption behaviors: knowledge-sharing and continuance intention. Further research could investigate other IS post-adoption behaviors, such as governance, justification, or endorsement (Zou *et al.*, 2018).

Finally, a relatively restricted sample of users was recruited to participate in this study. Even though the respondents from the two smoking cessation OHCs were well-matched to the research foci, additional data could be gathered from more

settings to increase the generalizability of our findings. Further research could also include other contexts, such as OHCs that focus on alcohol and addiction, in the empirical investigation.

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6 Appendix

Appendix 1: Survey questionnaire in English

Dear Participants,

Please read the following information before you fill in the survey.

This survey aims at investigating knowledge-sharing behavior within healthcare virtual support communities for smokers. The survey includes three parts: Section One will ask you basic information about your demographic background; Section Two will ask you about your smoking habit; and Section Three will ask you about your experience with Stumppi.fi, a healthcare virtual support community for smokers. Completing this survey questionnaire will take approximately 20 minutes.

Your participation in this research is voluntary. If you agree to take part in the research, please answer the questions truthfully in accordance with your actual circumstances and experience. We will strictly follow the law and ethical research guidelines in Finland in ensuring the confidentiality of any personal information that you have disclosed. No one else except identified members in research team can gain access to the information.

You do not have to take part in this research if you do not wish to do so. You may also choose to stop participating in the survey at any time.

Thank you for your cooperation!

○Agree
○Disagree

Section1: Demographic Background

Q1: What is your age?

1. 15-24 years old
2. 25-44 years old
3. 45-64 years old
4. 65 years or older

Q2: What is your gender? *If you don't want to answer this question, you can skip it.*

1. Male 2. Female

Q3: What is the highest level of education you have completed?

1. Less than upper secondary school or vocational school
2. Upper secondary school or vocational school
3. Bachelor's degree
4. Master's degree
5. Doctor's degree

Q4: Including salaries, self-employment, and any other source of income, what is your combined personal income (before taxes) during the last 12 months? *If you don't want to answer this question, you can skip it.*

1. Less than €15,000
2. €15,000 - €29,999
3. €30,000 - €44,999
4. €45,000 - €60,000
5. More than €60,000

Section2: Smoking experience

Q5: Please select the statement that best describes your intention towards quitting smoking.

1. I am not intending to quit smoking in the next 6 months.
2. I am intending to quit smoking in the next 6 months.
3. I am intending to take actions on smoking cessation in the next month.
4. I have taken actions to quit smoking in the past 6 months.
5. I'm working to inhibit restart of smoking
6. I have successfully quitted smoking with zero temptation and 100% self-efficacy.

Q6: On average, how many cigarettes or alternatives do you smoke per day?

1. I smoke but not every day
2. Less than 5 per day
3. 5-9 cigarettes per day
4. 10-14 cigarettes per day
5. 15- 24 cigarettes per day
6. 25 cigarettes or more per day

Section 3: Stumppi.fi use experience and perceptions

Q7: How long have you used Stumppi.fi?

1. Less than 1 years
2. 1–3 years
3. 3–5years
4. 5–7 years
5. More than 7 years

Q8: How often do you visit Stumppi.fi?

1. Never
2. Less than once per week
3. Once a week
4. Multiple times per week, but not every day
5. Once per day
6. Multiple times a day

Q9: How much time do you spend on visiting Stumppi.fi each time on average?

1. Less than 10 minutes
2. 10 to 30 minutes
3. 30-60 minutes
4. More than 1 hour

Q10: What do you do when you visit stuppi.fi? *You can select multiple options*.

1. Read posts
2. Comment on posts
3. Start a new topic or ask a question

Q11: How often do you post messages in Stumppi.fi?

1. None
2. Less than one post per week
3. One post per week
4. Multiple posts per week, but not every day
5. One post per day
6. Multiple posts per day

Q12 to Q23 contain statements about your experience in using Stumppi.fi. Please indicate the extent to which you agree with each statement. (1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, and 5= Strongly agree)

Q12: Emotional support
When faced with difficulties in smoking cessation, some people in Stumppi.fi were on my side with me.
When faced with difficulties in smoking cessation, some people in Stumppi.fi comforted and encouraged me.
When faced with difficulties in smoking cessation, some people in Stumppi.fi listened to me talk about my private feelings.
When faced with difficulties in smoking cessation, some people in the Stumppi.fi expressed interest and concern in my well-being.

Q13: Informational support
Some people in Stumppi.fi offered suggestions when I need help in smoking cessation.
When I encountered a problem in smoking cessation, some people in the Stumppi.fi gave me information to help me overcome the problem.
When faced with difficulties in smoking cessation, some people in the Stumppi.fi helped me discover the cause and provided me with suggestions.

Q14: Esteem support
There were members in Stumppi.fi who showed confidence in my ability to deal with smoking.
There were members in Stumppi.fi who made me feel that I was good at making decisions toward smoking cessation.
There were members in Stumppi.fi who made me feel I was capable of handling my smoking cessation.

Q15: Reciprocity
I knew that other members will help me, so it's only fair to help other members.
I knew that someone would help me if I were in a similar situation.

Q16: Shared vision
Members in Stumppi.fi shared the vision of helping others solve their smoking problems.
Members in Stumppi.fi shared the same goal of supporting each other.
Members in Stumppi.fi shared the same value that helping others was pleasant.

Q17: Shared language
The members in Stumppi.fi used common terms.
The members in Stumppi.fi used understandable communication pattern during discussion.
The members in Stumppi.fi used understandable narrative forms to post messages or articles.
The members in Stumppi.fi were always on the same frequency when we talked about smoking cessation.

Q18: Social ties
I maintained close social relationships with some members in Stumppi.fi.
I spent a lot of time interacting with some members in Stumppi.fi.
I knew some members in Stumppi.fi on a personal level.
I had frequent communication with some members in Stumppi.fi.

Q19: Commitment
I was proud to belong to the membership of Stumppi.fi.
I felt a sense of belonging to Stumppi.fi.
I cared about the long−term success of Stumppi.fi.

Q20: Knowledge sharing behavior
I frequently participated in knowledge sharing activities in Stumppi.fi.
I usually spent a lot of time in knowledge sharing activities in Stumppi.fi.
I usually actively shared information with others in Stumppi.fi.
I usually involved myself in discussions of various topics in Stumppi.fi.

Q21: Perceived usefulness
Using Stumppi.fi made my smoking cessation proceed faster (productivity).
Using Stumppi.fi made my smoking cessation proceed better (performance).
Using Stumppi.fi helped me make better decisions toward smoking cessation (effectiveness).
Overall, using Stumppi.fi was useful in smoking cessation.

Q22: Continuance intention
I intended to continue using Stumppi.fi rather than discontinue its use.
My intention was to continue using Stumppi.fi than use any alternative online communities.
If I could, I will continue using Stumppi.fi.

Q23: Satisfaction

How did you feel about your overall experience of using Stumppi.fi?

Very dissatisfied, dissatisfied, neutral, satisfied, very satisfied
Very displeased, displeased, neutral, pleased, very pleased
Very frustrated, frustrated, neutral, contented, very contented
Very terrible, terrible, neutral, delighted, very delighted

Appendix 2: Survey questionnaire in Chinese

亲爱的参与者，

在填写调查表之前，请阅读以下信息。
该问卷调查旨在调查戒烟在线社区的用户使用行为。该调查包括三个部分：第一部分将询问您的个人基本信息；第二部分询问您的吸烟习惯；第三部分询问您使用百度戒烟吧的经历和感受。完成此调查问卷大约需要 20 分钟。
您参与此项研究是自愿的。如果您同意参与该研究，请根据您的实际情况和感受如实回答问题。我们将严格遵守法律和研究道德准则，确保您个人信息的保密性。除了研究团队成员，其他任何人不能访问这些信息。
如果您不希望参与这项研究，您不必回答该问卷。您也可以选择随时终止答题。
谢谢您的合作！

您同意参与这次网络调查么？
〇同意
〇不同意

第 1 部分：个人基本信息

您的年龄属于以下哪一组？ [单选题] *
〇15-24 岁
〇25-44 岁
〇45-64 岁
〇65 岁或以上

你的性别是什么？ 如果您不想回答此问题，可以跳过它。 [单选题]
〇男
〇女

您完成的最高教育水平是什么？ 如果目前是在校学生，请选择您已经完成的最高学位。 [单选题] *
〇初中及初中以下
〇高中及中专
〇大专
〇本科
〇硕士及以上

包括工资，自营和任何其他收入来源，您过去一年的个人收入(税前)有多少？如果您不想回答这个问题，可以跳过它。 [单选题] *

○不到 6000 元
○¥6000 - ¥20999
○¥21000 - ¥31999
○¥32000 - ¥59999
○超过 60000 元

第 2 部分：吸烟习惯

以下选项中，请选择最能符合您目前戒烟的陈述。 [单选题]
○我不打算在接下来的 6 个月内戒烟
○我打算在接下来的 6 个月内戒烟
○我打算在下个月采取行动戒烟
○在过去的 6 个月里，我采取了戒烟行动
○我正处于戒烟的维持阶段(维持阶段意味着我仍努力防止复吸)
○我已成功戒烟，确保没有任何诱惑，并且实现 100％自我效能

平均而言，您每天吸多少支烟？ [单选题] *
○我吸烟但不是每天都吸烟
○每天不到 5 支香烟
○每天 5-9 支香烟
○每天 10-14 支香烟
○每天 15 至 24 支香烟
○每天 25 支或更多的香烟

第 3 部分：百度戒烟吧使用经验和感受

您使用戒烟吧已经多久了？ [单选题] *
○不到 1 年
○3 年
○5 年
○5-7 岁
○超过 7 年

你多久访问一次百度戒烟吧？ [单选题] *
○决不
○每周不到一次
○每周一次
○每周多次，但不是每天都有
○每天一次
○一天多次

你平均每次花多少时间访问百度戒烟吧？ [单选题] *
○不到 10 分钟
○10 至 30 分钟
○30-60 分钟
○超过 1 小时

当您访问百度戒烟吧时你做些什么？ [多选题] *
□阅读帖子
□评论帖子
□开始一个新主题或问一个问题

你多久在百度戒烟吧里发帖或回帖？ [单选题] *
○没有
○每周不到一个帖子
○每周一个帖子
○每周多个帖子，但不是每天都有
○每天一个帖子
○每天多个帖子

以下陈述是有关使用百度戒烟吧的经验或感受。请基于李克特量表选出您在多大程度上同意每个陈述。（1=非常不同意，2=不同意，3=中立，4=同意，5=非常同意）

情感支持
戒烟过程中，当面临困难时，戒烟吧里的一些戒友会和我站在一起。
戒烟过程中，当面临困难时，戒烟吧里的一些戒友会安慰和鼓励我。
戒烟过程中，当面临困难时，戒烟吧里的一些戒友会倾听我的个人感受。
戒烟过程中，当面临困难时，戒烟吧里的一些戒友会对我表达关心。

信息支持
戒烟过程中，当我需要帮助时，戒烟吧里的一些戒友会提供建议。
戒烟过程中，当我遇到问题时，戒烟吧里的一些戒友会提供相关信息，帮我解决问题。
戒烟过程中，当我面临困难时，戒烟吧里的一些戒友会帮我发现原因并向我提出解决方案。

尊重支持
戒烟吧里有戒友表现出对我戒烟能力的信心。
戒烟吧里有戒友让我觉得我擅长做出有关戒烟的决定。

戒烟吧里有戒友让我觉得我有能力处理好戒烟。

互惠
戒烟吧中，我知道其他戒友会帮助我，所以帮助其他戒友是公平的。
戒烟吧中，我知道如果我遇到相似的处境，会有人帮助我的。

共同愿景
戒烟吧的戒友们拥有共同的愿景，那就是帮助他人解决吸烟问题。
戒烟吧的戒友们拥有共同的目标，那就是互相支持。
戒烟吧的戒友们拥有共同的价值观，那就是帮助他人是快乐的。

共同语言
戒烟吧的戒友们使用共同的术语。
戒烟吧的戒友们使用易于理解的沟通模式。
戒烟吧的戒友们使用易于理解的叙事形式。
戒烟吧的戒友们在交流戒烟中往往想法一致。

社会关系
我与戒烟吧中的一些戒友保持着亲密的社交关系。
我花了很多时间与戒烟吧中的一些戒友保持互动。
私人层面上，我很了解戒烟吧中的一些戒友。
我经常和戒烟吧中的一些戒友沟通交流。

承诺
我很荣幸成为戒烟吧中的一员。
我对戒烟吧有一种归属感。
我关心戒烟吧的长期成功。

知识共享行为
我经常参加戒烟吧中的知识共享活动。
我通常在戒烟吧的知识共享上花很多时间。
我经常在戒烟吧中积极地与他人共享信息。
我经常参与讨论戒烟吧中的各种主题。

感知有用性
使用戒烟吧让我戒烟进程更快。
使用戒烟吧让我戒烟效果更好。
使用戒烟吧让我做出更有利于戒烟的决定。
总的来说，使用戒烟吧对戒烟非常有用。

持续使用意愿
我打算继续使用戒烟吧，而不是停止使用它。
我打算继续使用戒烟吧，而不是使用其他替代品。
如果可以，我会继续使用戒烟吧。

满意度
您对使用戒烟吧的整体体验有何看法？
非常不满→非常满意
非常不高兴→非常高兴
非常沮丧→非常满足
非常失望→非常称愿

Appendix 3: Survey questionnaire in Finnish

Arvoisa osallistuja,

lue ohjeet huolellisesti ennen kuin vastaat kyselyyn.

Tämän tutkimuksen tarkoituksena on selvittää tietämyksen jakamisen käytäntöjä sosiaalisissa sähköisissä yhteisöissä tupakoinnin asiayhteydessä. Kysely sisältää kolme osiota: Ensimmäinen osio käsittelee demografisia perustietojanne. Toinen osio kyselee tupakointitottumuksianne. Kolmas osio käsittelee kokemustanne Stumppi.fi:stä. Tämän tutkimuksen täyttämiseen menee noin 20 minuuttia.

Osallistumisenne tähän tutkimukseen on täysin vapaaehtoista. Jos osallistutte, vastatkaa kysymyksiin totuudenmukaisesti siten että ne kuvaavat todellista tilannettanne ja todellisia mielipiteitänne. Tutkimus noudattaa Suomen lakia ja tutkimuksen eettisiä ohjeita, ja kaikki antamanne tieto käsitellään luottamuksellisesti. Turun yliopisto on antanut tutkimuksen tekemiselle eettisen luvan. Vain erikseen määritellyillä tutkijaryhmän jäsenillä on pääsy tietoon.

Teidän ei tarvitse vastata tähän kyselyyn mikäli ette tahdo. Voitte keskeyttää kyselyyn vastaamisen koska tahansa.

Paljon kiitoksia yhteistyöstänne!

○samaa mieltä
○eri mieltä

Osio 1: Demografiset tiedot

K1: Mikä on ikänne?

1. 15-24 vuotta
2. 25-44 vuotta
3. 45-64 vuotta
4. 65 vuotta tai enemmän

K2: Mikä on sukupuolenne? ***Voit jättää vastaamatta kysymyksiin koskien sukupuoltasi ja tulotasoasi niin halutessasi.***

1. Mies 2. Nainen

K3: Mikä on korkein suorittamanne tutkinto.

1. Peruskoulu
2. Lukio tai ammatillinen koulutus
3. Kandidaatin tutkinto
4. Maisterin tutkinto
5. Tohtorin tutkinto

K4: Mukaan lukien palkka- ja yrittäjätulo ja kaikki muut tulot, mikä on yhdistetty henkilökohtainen tulonne (ennen veroja) viimeisen 12 kuukauden aikana? *Voit jättää vastaamatta kysymyksiin koskien sukupuoltasi ja tulotasoasi niin halutessasi.*

1. Vähemmän kuin €15,000
2. €15,000 - €29,999
3. €30,000 - €44,999
4. €45,000 - €60,000
5. Enemmän kuin €60,000

Osio 2: Tupakointi

- **K5: Valitkaa vaihtoehto joka parhaiten kuvaa suhtautumistanne tupakoinnin lopettamiseen.**

1. En aio lopettaa tupakointia seuraavan 6 kuukauden aikana
2. Aion lopettaa tupakoinnin seuraavan 6 kuukauden aikana
3. Aion suorittaa toimenpiteitä tupakoinnin lopettamiseksi seuraavan kuukauden aikana
4. Olen suorittanut toimenpiteitä tupakoinnin lopettamiseksi viimeisen 6 kuukauden aikana
5. Työskentelen estääkseni tupakoinnin uudelleenaloittamisen
6. Olen onnistuneesti lopettanut tupakoinnin, ilman tupakointihaluja ja 100% varmuudella

- **K6: Montako tupakkaa tai vastaavaa käytätte keskimäärin päivittäin?**

1. Tupakoin mutta en päivittäin
2. Vähemmän kuin viisi savuketta päivittäin
3. 5-9 savuketta päivittäin
4. 10-14 savuketta päivittäin
5. 15- 24 savuketta päivittäin
6. 25 savuketta tai enemmän päivittäin

Osio 3: Stumppi.fi käyttö ja käyttökokemus

K7: Jos en, Kauanko olette käyttänyt Stumppi.fi -sivustoa?

1. Vähemmän kuin vuoden
2. 1-3 vuotta
3. 3-5 vuotta
4. 5-7 vuotta
5. Enemmän kuin 7 vuotta

K8: Kuinka usein käytte sivustolla Stumppi.fi?
1. En koskaan
2. Alle kerran viikossa
3. Kerran viikossa
4. Useita kertoja viikossa, mutta en päivittäin
5. Kerran päivässä
6. Useita kertoja päivässä

K9: Kuinka paljon käytätte aikaa Stumppi-fi -yhteisössä kerralla.
1. vähemmän kuin 10 minuuttia
2. 10 – 30 minuuttia
3. 30 – 60 minuuttia
4. enemmän kuin tunti

K10: Mitä teette kun käytätte palvelua stumppi.fi? *Voitte valita useamman vaihtoehdon.*
1. Luen viestejä
2. Kommentoin viestejä
3. Aloitan uuden keskustelun tai kysyn kysymyksiä

K11: Kuinka usein postititte viestejä tähän on-line yhteisöön?
1. en koskaan
2. vähemmän kuin yksi viesti viikossa
3. yksi viesti viikossa
4. useita viestejä viikossa, mutta ei samana päivänä
5. viesti päivässä
6. useita viestejä päivässä

Kysymykset 12-23 koskevat erilaisia kokemuksianne stumppi.fi- palvelusta. Olkaa hyvä ja vastatkaa kysymyksiin asteikolla 1-5 (Likert – asteikko) (1= vahvasti eri mieltä, 2= eri mieltä, 3= neutraali, 4= samaa mieltä, 5= vahvasti samaa mieltä)

K12: Henkinen tuki
Kun kohtasin vaikeuksia tupakoinnin lopettamisessa, ihmiset Stumppi.fi -palvelussa olivat tukenani
Kun kohtasin vaikeuksia tupakoinnin lopettamisessa, ihmiset Stumppi.fi -palvelussa lohduttivat ja kannustivat minua
Kun kohtasin vaikeuksia tupakoinnin lopettamisessa, ihmiset Stumppi.fi -palvelussa kuuntelivat minua kun puhuin tunteistani

Kun kohtasin vaikeuksia tupakoinnin lopettamisessa, ihmiset Stumppi.fi -palvelussa osoittivat kiinnostusta ja välittämistä hyvinvointiani kohtaan

K13: Tiedollinen tuki
Jotkut ihmiset Stumppi.fi –palvelussa tarjosivat neuvoja kun tarvitsin apua tupakoinnin lopettamisessa
Kun kohtasin vaikeuksia tupakoinnin lopettamisessa, ihmiset Stumppi.fi -palvelussa tarjosivat minulle tietoa jonka avulla voin voittaa ongelman
Kun kohtasin vaikeuksia tupakoinnin lopettamisessa, ihmiset Stumppi.fi -palvelussa auttoivat minut löytämään perusongelman ja tarjosivat minulle neuvoja

K14: Arvostustuki
Stumppi.fi –palvelussa oli jäseniä jotka osoittivat luottamusta kykyyni käsitellä tupakointia.
Stumppi.fi –palvelussa oli jäseniä jotka saivat minut tuntemaan oloni hyväksi kun tein päätöksiä tupakoinnin lopettamiseksi.
Stumppi.fi –palvelussa oli jäseniä jotka saivat minut tuntemaan itseni kyvykkääksi lopettamaan tupakointi.

K15: Vastavuoroisuus
Tiesin että muut jäsenet auttaisivat minua, siksi oli reilua auttaa muita jäseniä.
Tiesin että joku auttaisi minua jos olisin samanlaisessa tilanteessa.

K16: Yhteinen näkemys
Stumppi.fi –jäsenet jakoivat vision auttaa muita tupakointiongelmissa.
Stumppi.fi –jäsenet jakoivat yhteisen tavoitteen auttaa toisiaan.
Stumppi.fi –jäsenet jakoivat saman arvon että muiden auttaminen on miellyttävää

K17: Yhteinen kieli
Stumppi.fi –jäsenet käyttivät yhteisiä käsitteitä
Stumppi.fi –jäsenet käyttivät ymmärrettäviä kommunikointitapoja keskusteluissa
Stumppi.fi –jäsenet käyttivät ymmärrettäviä kerrontatapoja postittaessaan viestejä tai artikkeleita
Stumppi.fi –jäsenet olivat aina samalla aallonpituudella kun he puhuivat tupakoinnin lopettamisesta

K18: Sosiaaliset siteet
Ylläpidin tiiviitä sosiaalisia suhteita joihinkin Stumppi.fi –jäseniin.
Käytin paljon aikaa ollessani kanssakäymisessä joihinkin Stumppi.fi –jäseniin.
Tunsin joitain Stumppi.fi –jäseniä henkilökohtaisesti.

Minulla oli säännöllistä kommunikaatiota joidenkin Stumppi.fi –jäsenien kanssa.

K19: Sitoutuneisuus
Olin ylpeä ollessani Stumppi.f -jäsen.
Tunsin kuuluvani Stumppi.fi -palveluun.
Välitin Stumppi.fi palvelun kestäväst menestyksestä.

K20: Tietämyksen jakaminen
Osallistuin usein tietämyksen jakamiseen Stumppi.fi-palvelussa.
Käytin yleensä paljon aikaa tietämyksen jakamiseen Stumppi.fi-palvelussa.
Jaoin yleensä aktiivisesti tietojani Stumppi.fi-palvelussa.
Yleensä osallistuin keskusteluihin useista teemoista Stumppi.fi-palvelussa.

K21: Koettu hyödyllisyys
Stumppi.fi:n käyttö teki tupakoinnin lopettamisestani nopeamman (tuottavuus).
Stumppi.fi:n käyttö teki tupakoinnin lopettamisestani sujuvan (suorituskykysy).
Stumppi.fi:n käyttö auttoi minua päätöksenteossa kohti tupakoinnin lopettamista (tehokkuus).
Kaiken kaikkiaan Stumppi.fi oli hyödyllinen tupakoinnin lopettamisessa.

K22: Halukkuus jatkokäyttöön
Aion jatkaa stumppi.fi –palvelun käyttöä pikemminkin kuin lopettaa sen käytön
Aion jatkaa stumppi.fi –palvelun käyttöä pikemminkin kuin vaihtoehtoisia online-foorumeita.
Jos voisin, jatkaisin stumppi.fi –palvelun käyttöä.

K23: Tyytyväisyys
Millaiseksi kuvaat Stumppi.fi –palvelun käyttökokemustasi kokonaisuudessaan?
Hyvin epätyydyttävä, epätyydyttävä, neutraali, tyydyttävä, hyvin tyydyttävä,
Hyvin epämiellyttävä, epämiellyttävä, neutraali, miellyttävä, hyvin miellyttävä
Hyvin masentava, masentava, neutraali, tyytyväinen, hyvin tyytyväinen
Hyvin kauhea, kauhea, neutraali, ilahduttava, hyvin ilahduttava

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