Value Co-creation in Online Healthcare Communities

Abstract

The extant research sheds light on the vital role of co-creation in online healthcare communities (OHCs) as nascent peer-to-peer co-creation platforms in public health and wellbeing. However, more investigation of the underlying factors affecting patient value co-creation in OHCs is required. This study relies on the socio-technical theory to identify the social and technical factors that impact healthcare users' intention to co-create value. Analysis of survey data gathered from users of Top 10 healthcare-based pages on Facebook indicated that both social and technical factors are salient in the prediction of value co-creation in OHCs. More specifically, social support and its antecedents (i.e., perceived privacy risk and social media interactivity), as well as government IT infrastructures and perceived control of information, are found to be the critical antecedents of value co-creation intention. However, social support emerged as the most potent predictor of value co-creation relative to government IT infrastructures and control of information. The theoretical and practical contributions of the findings are discussed.

Keywords: Value co-creation; Online healthcare communities; Government IT support; Social support; Perceived privacy risk; Socio-technical theory.

1. Introduction

Online healthcare communities (OHCs) are valuable resources for patients and healthcare organizations as they open new communication channels that aim to facilitate transparency and public participation and, more importantly, collaborate in ways to create new value with patients, such as promoting individuals' welfare and safety (Andersen et al. 2012). Recent investigation has revealed that more than 23% of US patients suffering from chronic diseases participate in OHCs to seek peers' experience and to explore potential treatment options (Centola and Van de Rijt 2015). Patients who participate in OHCs can benefit from the opportunity to interact with other community members and, even more, receive support concerning coping with their illness. Yet, engaging patients in the OHCs continues to pose challenges to healthcare organizations because of ideological controversies on patient information privacy and confidentiality (Andersen et al. 2012).

Privacy concerns in computer-mediated settings are an essential variable in both social media and health communication research. An earlier work by Demiris (2006) identified the privacy issues, such as the identity, deception, confidentiality, and technical challenges, when patients participate in a health-related virtual community. Numerous studies have examined the factors regarding privacy concerns that motivate patients to participate actively in OHCs. For example, Bansal et al. (2010) argue that personality traits, trust in a health website, privacy concerns, and information sensitivity determine users' intention to disclose health information. Likewise, a case study of Danish public health care suggests that patients' engagement in public health care through social media is mainly influenced by their concerns about information privacy (Andersen et al. 2012). These studies have emphasized that the privacy and security of healthcare information in OHCs are mostly related to the people (e.g., users' personality traits and the ways they

process information) and technology problems (e.g., design features and new technology adoption). However, the extant research provides limited clues as to how privacy factors interplay with the social and technical aspects of OHCs to determine user engagement in value co-creation (Bélanger and Crossler. 2011; Smith et al. 2011).

This research relies on the socio-technical theory and puts together a framework to examine how the social, technical, and privacy aspects of OHCs impact patients' intention to co-create value in OHCs. Our contribution to the literature on social media is twofold. First, the theoretical framework presented herein takes into account different aspects of online healthcare communities, namely social, technical, and privacy, to enhance the current understanding of patient co-creation in OHCs. This extends the current understanding of value co-creation determinants in online healthcare communities. Second, we also investigate the relationships between privacy, social, and technical aspects of social media. As a result, this study highlights the importance of each technical and social subsystem in patients' value co-creation intention and provides recommendations for healthcare providers and OHC managers.

In the following sections, first, we review the OHC literature and contextualize value co-creation. Secondly, we explain the socio-technical theory and its subsystems and privacy factors to conceptualize the antecedents of value co-creation intention. Lastly, the research method and results are presented. The paper concludes by discussing the findings, implications, and limitations.

2. Theoretical Foundation and Research Model

2.1. Value Co-creation

The service-dominant (SD) logic argues that actors (customers/users) co-create value via dialogue and interaction with other actors of the value network (Vargo and Lusch 2004). Firms are able to maximize the value-in-use and value-in-exchange by

understanding the underlying process of value co-creation and supporting these processes by providing full transparency concerning the product and firm information (Taylor et al. 2020). SD logic considers actors to be integral parts of the value co-creation process; they integrate their resources and constitute value-in-exchange through the interactions and value-in-use at the time of usage (Lusch et al. 2010; Pires et al. 2015; Vargo and Lusch 2008). It is well-known that the operant resources (i.e., nonphysical resources, such as knowledge, skills, and ideas) can be developed in the co-creation process where the customers shift from being a passive audience to active partners working with the suppliers (Vargo and Lusch 2004). Recently, Vargo and Lusch (2016) modified the fundamental premises of SD logic, including the 6th premise, from "the customer is always a co-creator of value" (Vargo and Lusch 2008) to "value is co-created by multiple actors, always including the beneficiary" (p. 9). This novel premise emphasizes the network of interactions and co-creation among the multiple actors rather than the dyadic or monadic value co-creation (i.e., customer or customer-firm co-creations).

Drawing on the SD logic, co-creation is defended as "the benefit realized from integration of resources through activities and interactions with collaborators in the customer's service network" (McColl-Kennedy et al. 2012, p. 375). Prahalad and Ramaswamy (2004) highlight the critical role of the environment in promoting high-quality dialogue and interactions among the actors of the value network. In this vein, the expansion of Web 2.0 and social media have revolutionized the nature of interactions from monadic/dyadic to a network of relationships in which value is co-created among multiple actors (Hennig-Thurau et al. 2013; Storbacka et al. 2016; Zadeh, Zolfagharian, and Hofacker 2019; Wang and Yu. 2017). However, the SD logic perspective on the potentiality of technology in the institutionalization of co-creation and human wellbeing requires more explanation and attention (Vargo and Lusch 2016).

2.2. Value Co-creation in Online Healthcare Communities

A developing stream of research has investigated aspects of value co-creation in online platforms through various topics, such as product innovation (Gebauer et al. 2013; Sawhney et al. 2005); sharing and collaboration (Belk, 2014; Zadeh, Zolfagharian, and Hofacker 2019; Taylor et al. 2020); brand, its aspects and communities (Brodie et al. 2011; Brodie et al. 2013; Healy and McDonagh 2013; Laroche et al. 2012); and word of mouth and purchase intention (King et al. 2014; See-To and Ho 2014). Online platforms have empowered people in the creation of their content and facilitate their access to information (Hennig-Thurau et al. 2010).

Given the context of health care, OHCs are novel communication avenues established by healthcare providers or people who suffer from health issues (Zhao et al. 2015). Recent studies reported that patients have more tendencies to seek peer-to-peer healthcare assistance on OHCs than to consult medical professionals (Centola and van de Rijt 2015). OHCs provide a fertile platform for resource integration by connecting patients with one another, service providers/healthcare professionals, and government agencies (Hajli et al. 2015b). The abundant knowledge and medical facts on OHCs represent a "value-dense environment for value co-creation" (Zhao et al. 2015, p. 76) which assists: 1) patients with managing their conditions; 2) healthcare professionals with contributing to the pool of information and also enhancing their knowledge; 3) managers/providers with understanding patients' opinions and enhancing service quality.

Research in the area of OHCs indicates psychological and physical benefits of patient co-creation in OHCs on an international scale, such as reducing depression and stress, enhancing confidence, treatment effectiveness, disease acceptance, control, optimism, self-esteem and wellbeing (Bartlett and Coulson 2011; Setoyama, Yamazaki and Namayama 2011; Van Uden-Kraan et al., 2008). From a macro-level perspective,

OHCs have considerably reduced rural-urban health disparities (Mein Goh, Gao, and Agarwal 2016). However, lurking behavior (i.e., non-public participation) and non-sustainable co-creation in OHCs are still a primary challenge for care providers (Nonnecke et al. 2006). On the one hand, recent studies highlighted the importance of social support in patient value co-creation in OHCs (Loane et al. 2015). On the other hand, studies have highlighted the role of technical infrastructures in users' participation in online communities (Valdez et al. 2015). However, an investigation of both social and technical aspects of OHCs and their influence on patients' value co-creation is missing.

2.3. Socio-Technical Theory: Technical and Social Subsystems

Trist (1981) established the term "socio-technical" to demonstrate the inter-relationship between social and technological factors of a system/organization. According to social-technical theory, a system contains both a technical and a social subsystem (Bostrom and Heinen 1977). On the one hand, the technical subsystem focuses on the technical bases, such as processes, tools, and technologies. This system empowers users to transform inputs to outputs and complete specific tasks within the system (Bostrom and Heinen 1977). On the other hand, the social subsystem takes into account the relationships among people as well as their values, attitudes, and skills. The two subsystems need to work mutually to produce optimized outputs (Bostrom and Heinen 1977).

Previous studies argue that online communities consist of both technical and social subsystems; these subsystems elevate users' interactions and enhance the quality of relationships (Chai and Kim 2012; Lin et al. 2016). From the technical perspective, online communities should be built upon a well-grounded Information Technology (IT) infrastructure to improve user control over the information exchange process (Zhu 2004). From the social perspective, OHCs should also provide social support, since they usually

serve patients who seek backing from their peers. Despite this, system creators usually focus only on the technical infrastructure, since it is considered the most salient factor for a successful system (Davenport and Prusak 1998). However, users' intentions towards social media exist in a social process, which entails the consideration of other social factors when investigating actors' intention to co-create via social technologies (Bostrom and Heinen, 1977; Zadeh, Zolfagharian, and Hofacker 2019). Therefore, we employ the socio-technical theory as our overarching theoretical perspective; it will serve as the theoretical lens when we develop our research model.

3. Hypothesis Development

The conceptualization of our model is illustrated in Figure 1. The first solid box in Figure 1 focuses on social media interactivity and social support to integrate the social subsystem's lens when predicting value co-creation behavior. The second solid box represents the privacy factors that may influence the social and technical aspects of OHCs. The third solid box represents the technical subsystem of OHCs. We argue that the government IT support will affect patients' intention to value co-creation with other peers within OHCs. The following sections discuss the constructs used in our research model and formulate the associated hypotheses guiding this research.

------Insert Figure 1 here------

3.1. *Social Subsystem*

Social Support

In the social subsystem, two factors are identified via the literature. The first factor is social support. Social support is rooted in the field of sociology and used to measure individuals' experience if they have been cared for or received help when needed, and how their requests are responded to in their social group (Cobb 1976). Cobb (1976) defined it as "information leading the subject to believe that he is cared for and loved,

esteemed, and a member of a network of mutual obligations" (p. 300). In fact, with the rise of social and interactional technologies, content generation and communication have been made much more comfortable and faster to engage users in the network of relationships (Palmer et al. 2009), thereby enhancing the provision of online social support (Chen and Shen 2015). The closeness and warmth of the support provided by the social group can reduce stress and improve the individual's wellbeing (Bhattacherjee 2001; Cobb 1976; Coulson 2005). Social support is a salience value that individuals gain from their membership in communities (Obst and Stafurik 2010). The social support that individuals receive increases their willingness to share their personal experiences (Hajli, 2014; Lin, Wang, & Hajli, 2019; Nadeem, Juntunen, Hajli, & Tajvidi, 2019; Nadeem, Juntunen, Shirazi, & Hajli, 2020).

Social support consists of emotional and informational resources. Emotional support involves "providing warmth and nurturance to another individual and reassuring the person that he or she is a valuable person who is cared about" (Taylor et al. 2004, p. 355). Through engagement in online communities, users expect to gain emotional supports, including empathy, affection, trust, intimacy, encouragement, acceptance, and caring from other peers (Langford et al. 1997). Informational support refers to "providing messages, in the form of recommendations or advice. Advice, guidance, suggestions, and useful information are some forms of informational support in virtual communities (Krause 1986). Social supports enhance interactions and commerce intention. Seeking social support, users actively participate in online communities (Dholakia et al. 2004), and doing so, in turn, enhances the embedded emotional ties and quality/quantity of engagement (Brodie et al. 2013). Thus, we assume that:

H1: Social support has a positive effect on value co-creation intention.

Social Media Interactivity

The second factor we included in the social subsystem is social media interactivity. Previous research (Bazi, Hajli, Hajli, Shanmugam, & Lin, 2019; Hajli, 2015; Tajvidi, Richard, Wang, & Hajli, 2018; Tajvidi, Wang, Hajli, & Love, 2017) show interaction of users in social media platforms influence behavior of other peers. Value co-creation through social media interactivity requires user participation, trust, and commitment. Social media interactivity provides an interactive communication channel for organizations to take opportunities to enrich public engagement and interaction (Bannister and Connolly 2014; Zadeh, Zolfagharian, and Hofacker 2019). It is clear that social media, on the one hand, cater to a wide range of audiences and maintain the richness of information; on the other hand, many opportunities for collaboration are created. Kotler et al. (2010) have identified two different approaches to the use of social media: these are expressive social media and collaborative social media. Social media such as Facebook, Twitter, and YouTube are platforms that provide a virtual environment through which users share their resources (i.e., information, experiences, etc.) with other users (Zadeh, Zolfagharian, and Hofacker 2019). Thus, the social media act as collaborative tools of users for obtaining a shared goal (Kotler et al. 2010; Taylor et al. 2020). Because social media interactivity establishes a basis of social support for patients (Hajli et al., 2015a) and enables them to actively participate in their health care and wellbeing through co-creation of support measures (Anderson et al. 2013). Thus, it is plausible that an increase in patients' social media interactivity would lead to an increase in the social support received from OHCs. Thus, we assume that:

H2: Social media interactivity has a positive effect on *social support*.

3.2. *Privacy Factors*

Perceived Control of Information

Two privacy factors that influence the social and technical aspects of OHCs are found through literature: perceived control of information and perceived privacy risk. The first one reflects individuals' evaluation of their ability to protect the information, and the latter one reflects individuals' evaluation of the OHC's ability to protect the information. Control over information sharing has been interpreted through two different approaches. First, perceived control is considered an actual behavior when users rely on their ability to behave in a certain way (Ajzen 1991; Pavlou and Fygenson, 2006). The second approach defines perceived control as users' ability to influence their lives (Folkman 1984; Skinner 1996). Both approaches rely on individuals' ability to predict and modify a situation (Burger 1989) and control over the environment (Skinner 1996). In this vein, previous studies demonstrate that increasing users' control over the online environment results in the augmentation of information sharing (Hoadley et al. 2010; Krasnova et al. 2010) and the value co-creation intention (Wang, Tajvidi, Lin, & Hajli, 2019). Thus, we argue that a higher perception of information control generates a more positive intention to co-create value with other members in OHCs, as they will be less worried about data collection when they share their personal information on OHCs.

H3: Perceived control of information positively influences value co-creation intention.

Perceived Privacy Risk

Given the nature of online communities, the privacy issue is identified as one of the main concerns influencing user participation (Grabner-Kräuter and Kaluscha 2003; Yadav et al. 2013). To be able to assess and control the risk, the reasons and origin of risk should be identified. Privacy risk is defined as a negative outcome or possible damage to a subject due to personal information disclosure (Malhotra et al. 2004; Xu et al. 2011).

Several studies show that there should be a balance between what an individual gains compared to what it costs him/her to disclose his/her personal information (Dinev and Hart 2006). However, the personal calculus for this disclosure is context-specific and depends on the relationship between different parties involved in this information sharing (Hajli et al. 2017). The disclosure of personal information to an institution as the data recipient creates a co-ownership of this data (Petronio 2002). Though individuals may have decided to disclose their personal information, knowing a degree of risk is inevitable, they should maintain some control over this information (Metzger 2007).

Users' willingness to disclose information has been negatively affected by their perception of privacy risks (Malhotra et al. 2004; McKnight et al. 2002). Krasnova et al. (2010) have confirmed that this perceived privacy risk decreases the amount and depth of information shared by users. This decrease in information will gradually result in a loss of interest, leading to less active users. In this way, the lack of information security and high-perceived privacy risk obstruct users' engagement in activities and diminish the amount/depth of shared information (Vijayasarathy 2004). The decline in the quality/quantity of interactions and information exchange lowers the level of informational and emotional support within a community. Consequently, since the presence or absence of informational and psychological resources is interwoven with social support (Thoits 1982), we assume that:

H4: Perceived privacy risk has a negative effect on social support.

3.3. *Technical Subsystem-Government IT support*

IT support is defined as "those services and products provided by IT groups" (Blanton et al. 1992, p. 536). Gupta et al. (2008) have reported that facilitating conditions, such as supportive organizational and technical infrastructures, technical training and support, and appropriate hardware and software, enhance users' intention to use an IT. In

the context of e-Government, Lee et al. (2005) have demonstrated the positive effect of government IT support on levels of service acceptance and adoption (Lee et al. 2005).

Accordingly, IT support provided by governments offers a broad range of improvements to their services, such as enhancement in time efficiency, price/outcome ratio (Gilbert et al. 2004), accessibility, accountability, transparency, and patient empowerment (Tung and Rieck 2005). Besides, the clear instructions and user-friendly settings of websites would increase the perceived control of information and reduced the concern of privacy risk. As a result, users' trust and intension to share information (Hajli and Lin 2016; Krasnova et al. 2010). Thus, we argue that IT support provided by the government could be a technical facilitator of value co-creation, and provides a higher perception of information control.

H5: Government IT support has a positive effect on value co-creation intention.

H6: Government IT support positively influences the perceived control of information.

4. Research Method

4.1. Data Collection

This study employed an online survey to collect primary data from Top 10 healthcare-based pages on Facebook. This list was inspired by the Centers for Disease Control (CDC) and Prevention website and includes: 1) the CDC; 2) Act Against AIDS; 3) CDC Tobacco Free; 4) Million Hearts; 5) NIOSH; 6) CDC *en Español*; 7) Weight of the Nation; 8) CDC Emergency; 9) Veto Violence; 10) Start Talking Stop HIV. These pages are OHCs where users are able to interact with other peers with similar interests and provide immediate and personal responses to deliver programs, products, and information to individuals.

The sample population for this study was Facebook members who had been involved in at least one of the aforementioned Top 10 healthcare-based pages. The data collection

process took three months. Using the Facebook message system, 1000 questionnaires were distributed randomly among the users of the Top 10 healthcare-based pages. A total of 241 useable responses were received, giving a 24.1% response rate. The useable responses are the complete responses. Table 1 shows the respondents' demographical information.

------Insert Table 1 here-----

4.2. Measurement

All measures were adapted from previous literature and anchored on a seven-point Likert scale (ranging from 1 = "strongly disagree" to 7 = "strongly agree"). A few changes were made to the existing scale to make it more appropriate for our research context. The measurement items, as well as their psychometric properties, are exhibited in Table 2. A pre-test with five doctoral students and five researchers familiar with the research in co-creation and online healthcare communities was conducted in the US to ensure that the respondents clearly understood the questions and phrasing.

The dependent variable, intention to co-create value, was measured by capturing individuals' tendencies to co-construct unique experiences through the integration of resources with other peers on healthcare Facebook pages. We asked participants to consider their behaviors and activities on the pages while answering the questions.

Items related to social support were adopted from (Hajli, 2014) and measured by the two key concepts of emotional support and informational support, as drawn from social support theory. Government IT support was assessed using Gupta et al. 's (2008), and Neumann and Fink's (2007) modified the five-item scale. We asked participants to evaluate the technical assistance or support from government agencies during their participation in the healthcare pages. Assessing two risk-control factors, perceived privacy risk, and perceived control of information, items were adopted respectively from

Pavlou and Fygenson (2006) and Krasnova et al. (2010). Participants were asked to rate their perception of information control and privacy risk assessment. Social media interactivity was measured using (Hajli, 2015; Tajvidi et al., 2017) three-item scale, which asks participants to rate their social media experiences, such as their recommendation and information sharing behavior. We checked the reliability of all these measurements with Cronbach's Alpha (Table 2), and all the values are above 0.7, indicating the items are reliable on measuring the variables.

-----Insert Table 2 here-----

4.3. Measurement Validation

We prepared the data for analysis through a screening process that contained, handling the missing data, and ruling out the possibility of non-response bias and common method bias.

Missing completely at random (MCAR). We tested MCAR to examine the missing data. We used Little's MCAR test to determine if our dataset meets the assumption of MCAR. The result indicated that data were missing completely at random. To maintain the maximum number of cases, we substituted a simple mean for any missing data (Little and Rubin 1987).

Non-response bias. Non-response bias was examined via conducting a t-test of age and education for early (those who responded to the first mailing) and late respondents (those who responded after the reminder). The results showed no statistically significant difference among the groups. Thus, we determined that non-response bias does not present a problem for this study.

Common method bias. We followed Podsakoff and colleagues' (2003) suggestions to reduce common method bias throughout the study design and data collection processes. First, the survey was anonymous, and the independent and dependent variables were

distanced (Podsakoff et al. 2003). Secondly, we conducted Harman's single factor test (Greene and Organ 1973) to determine if the common method bias was a threat to the validity of this study's results. The unrotated factor solution indicates that the maximum variance is 11.513%, no factor accounting for 50% or more of the variance, which suggests that common method bias is not a significant threat to the validity of our study. Thirdly, we followed Pavlou et al. (2007) and used the marker variable technique to separate the influence of common method bias. The correlations among the constructs were below 0.75, which is lower than the common threshold of .90, suggesting that the common method bias is not a major concern in this study.

5. Data Analysis and Results

To test the validity and reliability of constructs, we used factor analysis by estimating the measurement model. Following the measurement model, the structural model was tested by using the partial least square (PLS).

5.1. *Measurement Model Analysis*

We tested the measurement model by establishing the convergent and discriminant validity among the constructs. The reliability and validity of measures were assessed using the PLS approach (Brown and Venkatesh 2005; Hair et al. 2006). Table 3 reports the average variance extracted (AVE), composite reliability (CR), the square root of AVE, and correlations among constructs. We tested the convergent validity of all items based on three criteria. First, the loadings of the entire items were greater than 0.7, indicating that items are significantly loaded on the relevant construct (see Table 2). Secondly, as shown in Table 3, all the CRs were above the threshold of 0.7. Finally, the AVE for each construct was more than 0.5, indicating that the latent factors can explain at least 50% of the measured variance. We investigated the discriminant validity by

comparing AVE to the squared inter-construct correlation. All the AVEs were found to be greater than the corresponding squared inter-construct correlation estimates, which established the discriminant validity of our constructs.

5.2. *Structural Model Analysis*

Path analysis among constructs was conducted using structural equation modeling (SEM) and the partial least square (PLS) method. PLS is based upon the amalgamation of regressions and principal components, explaining the variance of each construct (Fornell and Bookstein 1982; Hulland 1999). PLS has relatively high statistical power (Reinartz et al. 2009), indicating that this as an appropriate method for theory development (Joireman et al. 2013). Thus, we drew on PLS power to assess the influence of variables and develop our theoretical framework. Table 2 exhibits the results of hypotheses testing.

-----Insert Table 3 here-----

The resultant R^2s indicate that the relevant antecedents explain 24% of the variance in social support, 29% variance in perceived control of information, and 25% of the variance in intention to co-create value. Detailed information regarding the standardized path coefficients for all the paths is shown in Table 4 and Figure 2. The results of the path analysis indicated that all hypotheses are supported.

-----Insert Table 4 here-----

6. Discussion

This study incorporates the technical and social features of OHCs as well as privacy factors into the model of value co-creation in the context of health care. Specifically, we investigate the impact of potential antecedents, including social support, social media interactivity, government IT support and perceived control of information on users' intention to co-create value with others in OHCs. Analyzing the data gathered from Top

10 OHCs on Facebook, we found empirical support for all hypotheses. As a result, this study identifies privacy issues and security barriers that interfere with the process of value co-creation in OHCs. Moreover, the effect of government IT support on value co-creation intention is established directly and indirectly through users' perception of control over the information. These findings provide not only new insights for future social media research but also generate critical practical implications for care providers who wish to approach their customers using OHCs as a strategy. The two following sections explain both the theoretical and practical contributions of this study.

6.1. *Theoretical Contributions*

Previous studies have highlighted the importance of peer-to-peer interaction and resource integration within the value network (Laud et al. 2015; Lusch and Vargo 2006). However, more coherent empirical research is required to explore a deeper understanding of the resource exchange in service ecosystems (Heinonen et al. 2013; Kuppelwieser et al. 2013), particularly in OHCs (Loane et al. 2015; Zhao et al. 2015). Previous research adopted the components of MOA (i.e., motivation, opportunity, and ability) and customer readiness notions of predicting value co-creation in online platforms (Gruen et al. 2006; Gruen et al. 2007; Yoo et al. 2012). In the healthcare context, the extant research demonstrates that social identity and its antecedents, peers' characters in relationships, do influence patient co-creation in OHCs (Centola and Van de Rijt 2015). This study expands the current base of knowledge by capturing both social and technical antecedents of value co-creation in OHCs and, most importantly, by considering the impact of privacy factors on the social and technical aspects of OHCs.

The extant literature on online platforms shows that people engage in virtual communities, such as e-commerce websites, in the pursuit of social support (Hajli and Lin 2016). Our research extends this understanding and indicates that social support

encourages patients to co-create in OHCs, even more so than the provision of technical support such as IT support and information control. High perceived privacy risk was found to mitigate social support, which in turn reduces patients' intention to co-create value. However, social media interactivity enhances the sense of social support, which subsequently increases patients' intention to co-create value.

Grounded in the information technology literature (e.g., Lee et al. 2005; Neumann and Fink 2007; Tung and Rieck 2005), this study indicates how government IT support directly influence patients' intention to co-create value. Effective government IT support provides appropriate conditions for patient value co-creation. The positive effect of government IT support on value co-creation is partly accounted for by patients' perception of control over information. In this regard, the data analysis determined the positive relationship between government IT support and perceived control of information. In line with the findings of previous studies regarding the importance of control in the information sharing process (Hoadley et al. 2010; Krasnova et al. 2010), our results indicate that patients' perceptions of information control increase their intention to co-create value with their peers.

6.2. *Practical Contributions*

Integrating health care by using online technology is an essential area of research, and this study suggests some important implications for practice. Before all else, this research draws attention to OHCs, peer-to-peer resource integration, and its importance for people's wellbeing. In OHCs, value for parties, including patients, service providers, and caregivers, is mainly created through interactions among users with their peers (Gruen et al. 2007). Patients can seek/share health-related information and concerns with other patients and healthcare professionals to identify solutions for their health problems without the limitations of time and place. Patients' engagement in such communities can

improve their treatment-related decision making and enhance their quality of life (Sweeney et al. 2015).

The conceptual framework used to gather the empirical evidence demonstrated that emotional and informational support, as the dimensions of social support, increase patients' tendencies to participate in the integration of resources. However, online service providers should bear in mind that users are a vital part of the social support establishment in online communities (Hajli and Lin, 2016); reducing privacy risk augments social support in OHCs. The invasion of privacy by other users or organizations is one of the salient issues of the online environment in our era. Moreover, the Health Insurance Portability and Accountability Act (HIPAA) has imposed greater restrictions on the privacy and security of health data (Solove 2013). If patients perceive a high level of privacy risk in the disclosure of information, they are less likely to experience high levels of social support on the online pages. Therefore, providers may implement specific privacy-related strategies to enhance the sense of trust; effective settings and new security policies can help to reduce users' perceived privacy risk.

Consistent with prior findings regarding the importance of organizational and technical infrastructures in the IT context (Neumann and Fink 2007), this study explicitly indicates that an effective government IT infrastructure boosts patients' intention to co-create value. Providing online technical support and training, such as online chat with agents and social media help desk software, can facilitate the co-creation process. Patients with different conditions, of a range of ages and differing technological skills all engage in OHCs. IT infrastructures, including educational programs, connectivity, system integration, data storage, and security technologies should be designed according to patients' familiarity with and ability to use web-related technology. Thus, per users' conditions, various types of support, such as live chat, remote PC, and personal technical

support software, may be offered.

Equipping OHCs with adequate IT infrastructures, including channel management, security, and information risk management, builds trust, and heightens users' perceived control of information. OHC providers may offer patients different electronics channels, such as websites, mobile applications, and call centers, giving them more freedom in choosing a tool for sharing information with their peers. Providers may put in place a robust security and risk system, such as firewalls, and effective security policies to enhance users' control over information. Subsequently, perceiving a high level of control, patients will have a greater tendency to share information and engage in the value co-creation process.

7. Conclusion

One of the limitations of this study is capturing users' intention to co-create value rather than their actual behavior. Even though the behavioral intention is recognized as the critical antecedent of actual behavior (Ajzen 1991; Fishbein 1980), there is an opportunity for future studies to measure users' actual behavior by using objective measurements. For the sake of parsimony, we drew on several social and technical factors to predict the intention of value co-creation. However, there are other potential antecedents, such as the strength of tie and relationship quality among peers, which may enhance the prediction of value co-creation. As an extension of the current study, future studies may wish to capture some of the potential consequences of value co-creation, such as satisfaction with the social networking sites, healthcare outcomes, and satisfaction with life. Those outcomes can be measured by collecting behavioral data from social media platforms (Wang et al., 2020).

As long as obtaining value for involved parties in an exchange matter, the issue of value co-creation prevails. In OHCs, patients can share resources with their peers and co-

create value for all involved parties. Our study systematically indicates the influence of social support, government IT support and perceived information control on patients' intention to co-create value. The theoretical model of this study also illustrates the influence of patients' social media interactivity and the ubiquitous privacy issues of information privacy on their intention to co-create value. However, the rapid development of technology and the emergence of new forms of online communities retain users' resource integration and value co-creation as essential notions.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.

Andersen, K. N., Medaglia, R., & Henriksen, H. Z. (2012). Social media in public health care: Impact domain propositions. *Government Information Quarterly*, 29(4), 462-469.

Anderson, L., Ostrom, A. L., Corus, C., Fisk, R. P., Gallan, A. S., Giraldo, M., et al. (2013). Transformative service research: An agenda for the future. *Journal of Business Research*, 66(8), 1203-1210.

Bannister, F., & Connolly, R. (2014). ICT, public values and transformative government: A framework and programme for research. *Government Information Quarterly*, 31(1), 119-128.

Bansal, G., & Gefen, D. (2010). The impact of personal dispositions on information sensitivity, privacy concern and trust in disclosing health information online. *Decision Support Systems*, 49(2), 138-150.

Bazi, S., Hajli, A., Hajli, N., Shanmugam, M., & Lin, X. (2019). Winning engaged consumers. *Information Technology & People*.

Bélanger, F., & Crossler, R. E. (2011). Privacy in the digital age: a review of information privacy research in information systems. *MIS Quarterly*, 35(4), 1017-1042.

Belk, R. (2014). You are what you can access: Sharing and collaborative consumption online. *Journal of Business Research*, 67(8), 1595-1600.

Bhattacherjee, A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32(2), 201-214.

Blanton, J. E., Watson, H. J., & Moody, J. (1992). Toward a better understanding of information technology organization: a comparative case study. *MIS Quarterly*, 16(4), 531-555.

Bostrom, R. P., & Heinen, J. S. (1977). MIS problems and failures: a socio-technical perspective, part II: the application of socio-technical theory. *MIS Quarterly*, 1(4), 11-28.

Brodie, R. J., Hollebeek, L. D., Juric, B., & Ilic, A. (2011). Customer engagement: conceptual domain, fundamental propositions, and implications for research. *Journal of Service Research*, 14(3), 252-271.

Brodie, R. J., Ilic, A., Juric, B., & Hollebeek, L. (2013). Consumer engagement in a virtual brand community: An exploratory analysis. *Journal of Business Research*, 66(1), 105-114.

Brown, S. A., & Venkatesh, V. (2005). Model of adoption of technology in households: A baseline model test and extension incorporating household life cycle. *MIS Quarterly*, 29(3), 399-426.

Burger, J. M. (1989). Negative reactions to increases in perceived personal control. *Journal of Personality and Social Psychology*, 56(2), 246-256.

Chai, S., & Kim, M. (2012). A socio-technical approach to knowledge contribution behavior: An empirical investigation of social networking sites users. *International Journal of Information Management*, 32(2), 118-126.

Centola, D., & van de Rijt, A. (2015). Choosing your network: Social preferences in an online health community. *Social Science & Medicine*, 125, 19-31.

Chen, J., & Shen, X. (2015). Consumers' decisions in social commerce context: An empirical investigation. *Decision Support Systems*, 79, 55-64.

Chun, S. A., & Reyes, L. F. L. (2012). Social media in government. *Government Information Quarterly*, 29(4), 441-445.

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, 38(5), 300-314.

Coulson, N. S. (2005). Receiving social support online: an analysis of a computer-mediated support group for individuals living with irritable bowel syndrome. *CyberPsychology & Behavior*, 8(6), 580-584.

Criado, J. I., Sandoval-Almazan, R., & Gil-Garcia, J. R. (2013). Government innovation through social media. *Government Information Quarterly*, 30(4), 319-326.

Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Harvard Business Press.

Demiris, G. (2006). The diffusion of virtual communities in health care: concepts and challenges. *Patient Education and Counseling*, 62(2), 178-188

Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004). A social influence model of consumer participation in network-and small-group-based virtual communities. *International Journal of Research in Marketing*, 21(3), 241-263.

Dinev, T., & Hart, P. (2006). An extended privacy calculus model for e-commerce transactions. *Information Systems Research*, 17(1), 61-80.

Fishbein, M. (1980). A theory of reasoned action: Some applications and implications. In H. Howe & M. Page (Eds.), Nebraska symposium on motivation (pp. 65-116). Lincoln, NB: University of Nebraska Press.

Folkman, S. (1984). Personal control and stress and coping processes: a theoretical analysis. *Journal of Personality and Social Psychology*, 46(4), 839- 852.

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 19(4), 440-452.

Gebauer, J., Füller, J., & Pezzei, R. (2013). The dark and the bright side of co-creation: Triggers of member behavior in online innovation communities. *Journal of Business Research*, 66(9), 1516-1527.

Gilbert, D., Balestrini, P., & Littleboy, D. (2004). Barriers and benefits in the adoption of e-government. *International Journal of Public Sector Management*, 17(4), 286-301.

Grabner-Kräuter, S., & Kaluscha, E. A. (2003). Empirical research in online trust: a review and critical assessment. *International Journal of Human-Computer Studies*, 58(6), 783-812.

Greene, C. N., & Organ, D. W. (1973). An evaluation of causal models linking the received role with job satisfaction. *Administrative Science Quarterly*, 18(1), 95-103.

Gruen, T. W., Osmonbekov, T., & Czaplewski, A. J. (2006). eWOM: The impact of customer-to-customer online know-how exchange on customer value and loyalty. *Journal of Business Research*, 59(4), 449-456.

Gruen, T. W., Osmonbekov, T., & Czaplewski, A. J. (2007). Customer-to-customer exchange: Its MOA antecedents and its impact on value creation and loyalty. *Journal of the Academy of Marketing Science*, 35(4), 537-549.

Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government organization in a developing country: An empirical study. *The Journal of Strategic Information Systems*, 17(2), 140-154.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis, Pearson Prentice Hall Upper Saddle River, NJ.

Hajli, N. (2014). The role of social support on relationship quality and social commerce. *Technological Forecasting and Social Change, 87*, 17-27.

Hajli, N. (2015). Social commerce constructs and consumer's intention to buy. *International Journal of Information Management, 35*(2), 183-191.

Hajli, N., & Lin, X. (2016). Exploring the security of information sharing on social networking sites: The role of perceived control of information. *Journal of Business Ethics*, 133(1), 111-123.

Hajli, M. N., Shanmugam, M., Hajli, A., Khani, A. H., & Wang, Y. (2015a). Health care development: integrating transaction cost theory with social support theory. *Informatics for Health and Social Care*, 40(4), 334-344.

Hajli, N., Shanmugam, M., Powell, P., & Love, P. E. (2015b). A study on the continuance participation in online communities with social commerce perspective. *Technological Forecasting and Social Change*, 96, 232-241.

Hajli, N., Sims, J., Zadeh, A. H., & Richard, M. O. (2017). A social commerce investigation of the role of trust in a social networking site on purchase intentions. *Journal of Business Research*, 71, 133-141.

Healy, J. C., & McDonagh, P. (2013). Consumer roles in brand culture and value co-creation in virtual communities. *Journal of Business Research*, 66(9), 1528-1540.

Heinonen, Maria Holmlund, Tore Strandvik, Kristina, Rihova, I., Buhalis, D., Moital, M., & Beth Gouthro, M. (2013). Social layers of customer-to-customer value co-creation. *Journal of Service Management*, 24(5), 553-566.

Hennig-Thurau, T., Malthouse, E. C., Friege, C., Gensler, S., Lobschat, L., Rangaswamy, A., et al. (2010). The impact of new media on customer relationships. *Journal of Service Research*, 13(3), 311-330.

Hoadley, C. M., Xu, H., Lee, J. J., & Rosson, M. B. (2010). Privacy as information access and illusory control: The case of the Facebook News Feed privacy outcry. *Electronic Commerce Research and Applications*, 9(1), 50-60.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, 20(2), 195-204.

Joireman, J., Grégoire, Y., Devezer, B., & Tripp, T. M. (2013). When do customers offer firms a "second chance" following a double deviation? The impact of inferred firm motives on customer revenge and reconciliation. *Journal of Retailing*, 89(3), 315-337.

King, R. A., Racherla, P., & Bush, V. D. (2014). What we know and don't know about online word-of-mouth: A review and synthesis of the literature. *Journal of Interactive Marketing*, 28(3), 167-183.

Kotler, P., Kartajaya, H., & Setiawan, I. (2010). *Marketing 3.0: From products to customers to the human spirit*, John Wiley & Sons.

Krasnova, H., Spiekermann, S., Koroleva, K., & Hildebrand, T. (2010). Online social networks: why we disclose. *Journal of Information Technology*, 25(2), 109-125.

Krause, N. (1986). Social support, stress, and wellbeing among older adults. *Journal of Gerontology*, 41(4), 512-519.

Kuppelwieser, V. G., Simpson, M. C., & Chiummo, G. (2013). 1+ 1 does not always equal value creation: The case of YouTube. *Marketing Letters*, 24(3), 311-321. Langford, C. P. H., Bowsher, J., Maloney, J. P., & Lillis, P. P. (1997). Social support: a c*onceptual analysis. Journal of Advanced Nursing*, 25(1), 95-100.

Laroche, M., Habibi, M. R., Richard, M., & Sankaranarayanan, R. (2012). The effects of social media based brand communities on brand community markers, value creation practices, brand trust and brand loyalty. *Computers in Human Behavior*, 28(5), 1755-1767.

Laud, G., Karpen, I. O., Mulye, R., & Rahman, K. (2015). The role of embeddedness for resource integration: Complementing SD logic research through a social capital perspective. *Marketing Theory*, 15(4), 509-543.

Lee, S. M., Tan, X., & Trimi, S. (2005). Current practices of leading e-government countries. *Communications of the ACM*, 48(10), 99-104.

Lin, X., Wang, X., & Hajli, N. (2019). Building E-Commerce Satisfaction and Boosting Sales: The Role of Social Commerce Trust and Its Antecedents. *International Journal of Electronic Commerce, 23*(3), 328-363. doi:10.1080/10864415.2019.1619907

Lin, X., Zhang, D., & Li, Y. (2016). Delineating the dimensions of social support on social networking sites and their effects: a comparative model. *Computers in Human Behavior*, 58, 421-430.

Little, R. J., & Rubin, D. B. (1987). *Statistical analysis with missing data*. New York: John Wiley & Sons.

Loane, S. S., Webster, C. M., & D'Alessandro, S. (2015). Identifying consumer value co-created through social support within online health communities. *Journal of Macromarketing*, 35(3), 353-367.

Lusch, R. F., & Vargo, S. L. (2006). Service-dominant logic: reactions, reflections and refinements. *Marketing Theory*, 6(3), 281-288.

Lusch, R. F., Vargo, S. L., & Tanniru, M. (2010). Service, value networks and learning. *Journal of the Academy of Marketing **S**cience*, 38(1), 19-31.

Malhotra, N. K., Kim, S. S., & Agarwal, J. (2004). Internet users' information privacy concerns (IUIPC): The construct, the scale, and a causal model. *Information Systems Research*, 15(4), 336-355.

Malinen, S. (2015). Understanding user participation in online communities: A systematic literature review of empirical studies. *Computers in Human Behavior*, 46, 228-238.

McColl-Kennedy, J. R., Vargo, S. L., Dagger, T. S., Sweeney, J. C., & Kasteren, Y. V. (2012). Health care customer value co-creation practice styles. *Journal of Service Research*, 15(4), 370-389.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). The impact of initial consumer trust on intentions to transact with a web site: A trust building model. *The Journal of Strategic Information Systems*, 11(3), 297-323.

Metzger, M. J. (2007). Communication privacy management in electronic commerce. *Journal of Computer-Mediated Communication*, 12(2), 335-361.

Nadeem, W., Juntunen, M., Hajli, N., & Tajvidi, M. (2019). The Role of Ethical Perceptions in Consumers' Participation and Value Co-creation on Sharing Economy Platforms. *Journal of Business Ethics*. doi:10.1007/s10551-019-04314-5

Nadeem, W., Juntunen, M., Shirazi, F., & Hajli, N. (2020). Consumers' value co-creation in sharing economy: The role of social support, consumers' ethical perceptions and relationship quality. *Technological Forecasting and Social Change, 151*, 119786.

Neumann, S., & Fink, L. (2007). Gaining agility through IT personnel capabilities: The mediating role of IT infrastructure capabilities. *Journal of the Association for Information Systems*, 8(8), 440-462.

Nonnecke, B., Andrews, D., & Preece, J. (2006). Non-public and public online community participation: Needs, attitudes and behavior. *Electronic Commerce Research*, 6(1), 7-20.

Obst, P., & Stafurik, J. (2010). Online we are all able bodied: online psychological sense of community and social support found through membership of disability-specific

websites promotes wellbeing for people living with a physical disability. *Journal of Community & Applied Social Psychology*, 20(6), 525-531.
Palmer, A., Palmer, A., & Koenig-Lewis, N. (2009). An experiential, social network-based approach to direct marketing. *Direct Marketing: An International Journal*, 3(3), 162-176.
Pavlou, P. A., & Fygenson, M. (2006). Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *MIS Quarterly*, 30(1), 115-143.
Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online environments: A principal-agent perspective. *MIS Quarterly*, 31(1), 105-136.
Petronio, S. (2002). *Boundaries of privacy*. Albany, NY: State University of New York Press.
Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. Journal of applied psychology, 88(5), 879.
Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5-14.
Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of Research in Marketing*, 26(4), 332-344.
Sawhney, M., Verona, G., & Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. Journal of interactive marketing, 19(4), 4-17.
See-To, E. W., & Ho, K. K. (2014). Value co-creation and purchase intention in social network sites: The role of electronic Word-of-Mouth and trust–A theoretical analysis. *Computers in Human Behavior*, 31, 182-189.
Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology*, 71(3), 549.
Smith, H. J., Dinev, T., & Xu, H. (2011). Information privacy research: an interdisciplinary review. *MIS Quarterly*, 35(4), 989-1016.
Solove, D. J. (2013). HIPAA Mighty and Flawed: Regulation has Wide-Reaching Impact on the Healthcare Industry. *Journal of AHIMA*, 84(4), 30-31.
Sweeney, J. C., Danaher, T. S., & McColl-Kennedy, J. R. (2015). Customer effort in value co-creation activities: Improving quality of life and behavioral intentions of health care customers. *Journal of Service Research*, 18(3), 318-335.
Tajvidi, M., Richard, M.-O., Wang, Y., & Hajli, N. (2018). Brand co-creation through social commerce information sharing: The role of social media. *Journal of Business Research*.
Tajvidi, M., Wang, Y., Hajli, N., & Love, P. E. (2017). Brand value Co-creation in social commerce: The role of interactivity, social support, and relationship quality. *Computers in Human Behavior*, 105238.
Taylor, S. E., Sherman, D. K., Kim, H. S., Jarcho, J., Takagi, K., & Dunagan, M. S. (2004). Culture and social support: who seeks it and why?. *Journal of Personality* and Social Psychology, 87(3), 354-362.
Taylor, S. A., Hunter, G. L., Zadeh, A. H., Delpechitre, D., & Lim, J. H. (2020). Value proposition in a digitally transformed world. *Industrial Marketing Management*, *87*, 256-263.
Thoits, P. A. (1982). Conceptual, methodological, and theoretical problems in studying social support as a buffer against life stress. *Journal of Health and Social Behavior*, 23(2), 145-159.

Trist, E. L. (1981). The evolution of socio-technical systems. Toronto, ON, Canada: Ontario Ministry of Labour.

Tung, L. L., & Rieck, O. (2005). Adoption of electronic government services among business organizations in Singapore. *The Journal of Strategic Information Systems*, 14(4), 417-440.

Valdez, R. S., Holden, R. J., Novak, L. L., & Veinot, T. C. (2015). Technical infrastructure implications of the patient work framework. *Journal of the American Medical Informatics Association*, 22(e1), e213–e215.

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1-17.

Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*, 36(1), 1-10.

Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5-23.

Vijayasarathy, L. R. (2004). Predicting consumer intentions to use online shopping: the case for an augmented technology acceptance model. *Information & Management*, 41(6), 747-762.

Wang, X., Tajvidi, M., Lin, X., & Hajli, N. (2019). Towards an ethical and trustworthy social commerce community for brand value co-creation: A trust-commitment perspective. *Journal of Business Ethics*, 1-16.

Wang, Y., & Yu, C. (2017). Social interaction-based consumer decision-making model in social commerce: the role of word of mouth and observational learning. *International Journal of Information Management*, 37(3), 179–189

Wang, Y., Zhang, M., Tse, Y. K., & Chan, H. K. (2020). Unpacking the impact of social media analytics on customer satisfaction: Do external stakeholder characteristics matter?. *International Journal of Operations and Production Management*. DOI: 10.1108/IJOPM-04-2019-0331.

Xu, H., Dinev, T., Smith, J., & Hart, P. (2011). Information privacy concerns: Linking individual perceptions with institutional privacy assurances. *Journal of the Association for Information Systems*, 12(12), 798-824.

Yadav, M. S., De Valck, K., Hennig-Thurau, T., Hoffman, D. L., & Spann, M. (2013). Social commerce: a contingency framework for assessing marketing potential. *Journal of Interactive Marketing*, 27(4), 311-323.

Yoo, J. J., Arnold, T. J., & Frankwick, G. L. (2012). Effects of positive customer-to-customer service interaction. *Journal of Business Research*, 65(9), 1313-1320.

Zadeh, A. H., Zolfagharian, M., & Hofacker, C. F. (2019). Customer–customer value co-creation in social media: conceptualization and antecedents. *Journal of Strategic Marketing*, *27*(4), 283-302.

Zhao, J., Wang, T., & Fan, X. (2015). Patient value co-creation in online health communities: Social identity effects on customer knowledge contributions and membership continuance intentions in online health communities. *Journal of Service Management*, 26(1), 72-96.

Zhu, K. (2004). The complementarity of information technology infrastructure and e-commerce capability: A resource-based assessment of their business value. *Journal of Management Information Systems*, 21(1), 167-202.

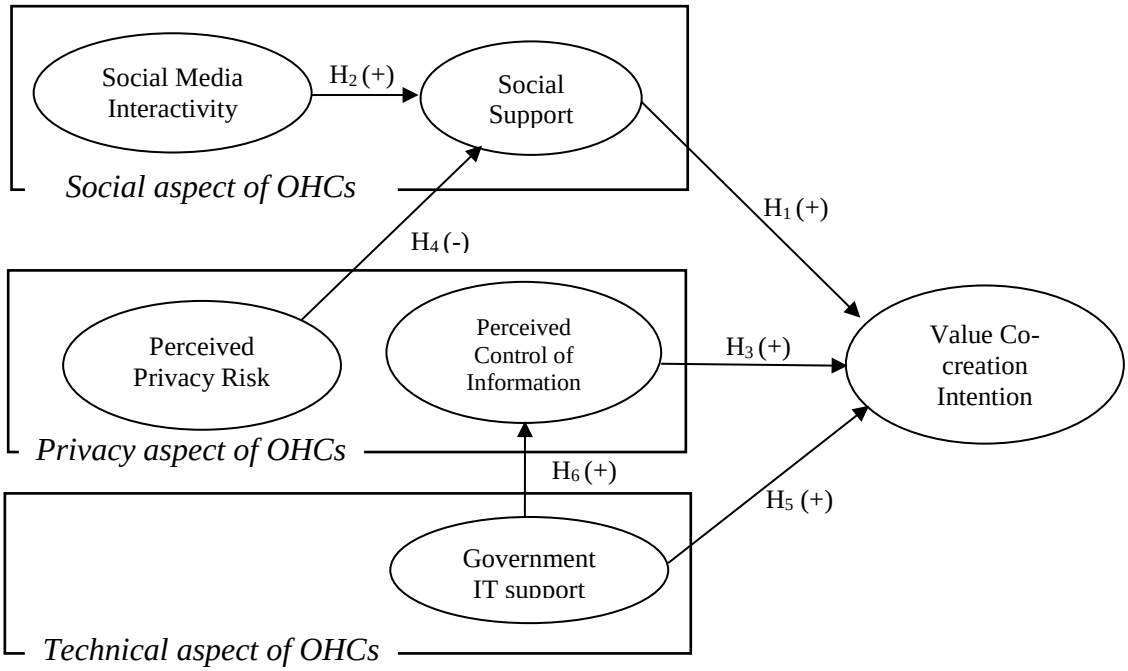

Fig. 1 Research Model

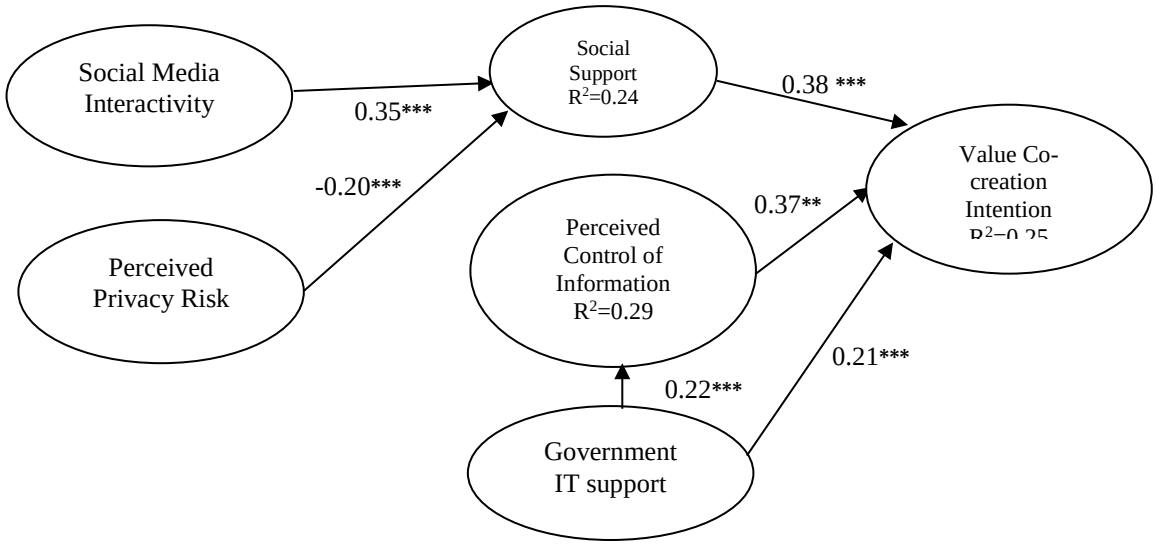

Fig. 2 Research results for the structural model testing

*p < 0.05; **p < 0.01; ***p < 0.001

Table 1 Demographics of respondents

Demographic	Range	Frequency	Percentage (%)
Age	18-21	9	3.70%
	22-25	55	22.80%
	26-30	61	25.30%
	31-40	83	34.40%
	41-50	27	11.20%
	51-60	4	1.70%
	Prefer not to answer	2	0.80%
Gender	Male	137	56.80%
	Female	103	42.70%
	Prefer not to answer	1	0.40%
Educational Level	High school	2	0.80%
	Some undergraduate work	57	23.70%
	Bachelor's degree	33	13.70%
	Some graduate work	108	44.80%
	Master's degree	36	14.90%
	Doctorate/professional degree	5	2.10%
Total Responses		241	100.00%

Table 2 Constructs, items with factor loadings and sources

Items	**Factor Loading**
Social Support	
***Emotional support* (α= 0.865)**	
SE1: When faced with difficulties, some people in my favourite OHC are on my side with me.	0.85
SE2: When faced with difficulties, some people in my favourite OHC comforted and encouraged me.	0.87
SE3: When faced with difficulties, some people in my favourite OHC listened to me talking about my private feelings.	0.83
SE4: When faced with difficulties, some people in my favourite OHC expressed interest and concern in my wellbeing.	0.80
***Informational Support* (α= 0.94)**	
SI1: In my favourite OHC, some people would offer suggestions when I needed help.	0.86
SI2: When I encountered a problem, some people in my favourite OHC would give me information to help me overcome the problem.	0.81
SI3: When faced with difficulties, some people in my favourite OHC would help me discover the cause and provide me with suggestions.	0.86
Government IT support (α= 0.84)	
GI1: A specific person (or group) is available for assistance with technical difficulties on this online community.	0.72
GI2: I have the resources necessary to use this online community.	0.78
GI3: The government provides a wide range of IT education services (training in the use of IT, management education for generating value from the online community)	0.81
GI4: The government provides a wide range of security and risk management services (security policies, firewalls)	0.79
GI5: The government provides a wide range of channel management services (electronic channel to the customer or partner to support multiple applications, such as Websites, call centers, mobile computing)	0.80

Value Co-creation Intention (α= 0.83)	
CB1: If my friends ask for advice about a health-related problem in my favourite OHC, I intent to share it with them.	0.83
CB2: If my friends offer information about their health care experience in my favourite OHC, I would act on them.	0.77
CB3: If I need health information, I would consider the experiences of my friends in my favourite OHC.	0.80
CB4: If a professional nurse offers advice based on his/her experience in my favourite OHC, I would act on them.	0.81
Social media interactivity (α= 0.74)	
SMU1: I will ask my friends in forums and communities to provide me with their health information and suggestions.	0.87
SMU2: I am willing to recommend an application or OHCs with multimedia functions that are worth trying to help my friends in my favourite OHC.	0.86
SMU3: I am willing to share my own information and experience of OHCs, applications, or websites with my friends in my favourite OHC through ratings and reviews.	0.72
Perceived Control of Information (α= 0.81)	
PCI1: I feel in control over the information I provide on OHCs.	0.81
PCI2: Privacy setting allows me to have full control over the information I provide on OHCs.	0.88
PCI3: I feel in control of who can view my information on OHCs.	0.85
Perceive Privacy Risk (α= 0.94)	
PPR1: I am concerned that OHCs are collecting too much personal information about me.	0.96
PPR2: I'm worried that unknown third parties will access my personal information on OHCs.	0.92
PPR3: I suspect that my privacy is not well protected by OHCs.	0.96

α: Cronbach's Alpha

Table 3 Correlations matrix with CRs and AVEs

	1	2	3	4	5	6	7	8
1. Value co-creation intention	**0.90**							
2. Emotional support	-0.29	**0.84**						
3. Government IT support	0.19	-0.41	**0.78**					
4. Informational Support	0.06	0.06	-0.09	**0.94**				
5. Perceived control of information	0.24	-0.40	0.37	-0.00	**0.85**			
6. Perceived privacy risk	-0.00	0.11	-0.11	0.43	0.01	**0.95**		
7. Social media interactivity	-0.15	0.14	-0.09	0.19	-0.01	0.26	**0.79**	
8. Social support	-0.14	0.70	-0.34	0.75	-0.27	0.39	0.23	**0.64**
AVE	0.81	0.72	0.62	0.90	0.74	0.90	0.64	0.52
CR	0.88	0.91	0.89	0.95	0.89	0.97	0.83	0.72

Note: Numbers on the diagonal (in boldface) are the square roots of the AVEs.

Table 4 The results of the hypotheses

	Hypothesis	β	Supported
H1	Social support → Co-creation of value intention	0.38***	Yes
H2	Perceived privacy risk → Social support	-0.20***	Yes
H3	Social media interactivity → Social support	0.35***	Yes
H4	Government IT support →Co-creation of value intention	0.22***	Yes
H5	Perceived control of information →Co-creation of value intention	0.21***	Yes
H6	Government IT support →Perceived control of information	0.37***	Yes

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$