

Continuance Intention of Online Healthcare Communities: The Mediation Mechanism of Social Interaction Ties

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ABSTRACT

The purpose of this research is to evaluate the continuance usage intention on online healthcare community (OHC) platform for patients and examine the “doctor-OHC-patient” relationship. The proposed model attempted to integrate social interaction ties, shared value, trust with the indirect effects on the relationship between the determinants and continuous usage intention of the OHC platform. The empirical results showed that perceived critical mass, social identity, and para-social interaction would strengthen continuance intention via the social interaction ties. In addition, this study found that the shared values and trust increase users’ willingness to continue usage of OHC. This study provides OHC platform managers with an in-depth understanding of the “doctor-OHC-patient” online social interaction. The results of this study may also help hospitals, health policy makers, and related healthcare practitioners to improve the way they use the web for advocacy and guidance, and provide insight into the intent of promoting the ongoing use of OHC platforms.

KEYWORDS

Online Healthcare Community, Para-Social Interaction, Perceived Critical Mass, Shared Value, Social Capital, Social Identity, Trust

1. INTRODUCTION

The worldwide occurrence of the coronavirus pandemic (COVID-19) has triggered the move to distant employment in several industries to avert the increase of this contagious disease. As immediate person-to-person communication is being avoided, users’ engagement conduct has promptly shifted to online channels. Consequently, COVID-19 has aided in the enhancement of digital structure in various activities (Kim, 2020). For instance, corporations have established cloud-centered information technology structures to follow novel prospects in contribution to contactless facilities comprising developed telemedicine, electronic education, cell phone dealings, cell phone software, and video conferencing. Contemplating the substantial worldwide revival and variations of COVID-19 and its effect on user conduct, along with the path of innovations in digital structures, it is acceptable to speculate that the “contactless” era is now. Furthermore, it has been discovered that, as the spread of COVID-19 continues, contactless facilities utilizing innovative technologies are prone to penetrate individuals’ everyday lives (Lee & Lee, 2021).

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Online healthcare community (OHC) is a type of healthcare-oriented online social network. Users interact on the OHC platform to share knowledge and support each other to solve health-related problems (e.g., treatment, disease, exercise, diet) (Josefsson, 2005; Van der Eijk et al., 2013; Zhao & Widdows, 2016; Zhao et al., 2015). It has a mitigating effect on the tight and uneven distribution of health care resources, on the other hand, they save users' time and money costs for medical visits and provide better privacy protection, thus becoming one of the main channels for people to obtain health information (Xiao et al., 2014). Unlike the traditional doctor-centered one-way medical model, OHC provide an open online platform for users to exchange information, ask questions, and share experiences on healthcare-related issues (Maloney-Krichmar & Preece, 2005). Josefsson (2005) argues that OHC are often initiated by patients, information services, or health care delivery organizations to provide communication opportunities that are not possible in traditional health care delivery systems. The powerful "doctor-patient" interaction of OHC can help patients effectively manage their health daily, especially for patients with chronic diseases (Van der Eijk et al., 2013). It follows that OHC are usually platforms for activities such as information sharing, expert consultation, and user exchange on health or treatment-related issues using the internet.

Besides, OHC users shared a common identity, often share treatment experiences, provide solutions to common health problems (Adams, 2010; Chuang & Yang, 2012), and meet the health information needs of users. Conversely, users also engage in seemingly off-topic discussions, which can help them get to know each other better in the process, bringing them closer together and weakening the sense of isolation. Some studies have pointed out that emotional and social communication can be effective in providing and obtaining peer support (Hoey et al., 2008; Nath et al., 2016). Therefore, as a high social value online community, "patient-patient" communication is also one of the key factors for the success of OHC, and the active participation of patients is related to the increase of OHC user satisfaction and user stickiness (Iriberri & Leroy, 2009).

Social media is heavily used and people develop new behaviors and habits (Boughzala, 2016). When users are able to obtain satisfaction from online communities (e.g., self-identification, sharing information, problem solving), they have a strong dependence on it. Moreover, as mentioned earlier, OHC users share health information (Adams, 2010; Chuang & Yang, 2012; Maloney-Krichmar & Preece, 2005), seek emotional communication (Hoey et al., 2008; Nath et al., 2016), and conduct medical consultations (Van der Eijk et al., 2016) on the platform. These characteristics of OHC lead to increased dependence of users (Iriberri & Leroy, 2009). On the other hand, since the end of 2019, when COVID-19 is rapidly spreading and people may not be able to go outside and fear the threat of the virus, the importance of OHC is even more prominent. However, many studies have emphasized user participation as an important factor in the development of OHC (Atanasova et al., 2018; Mengqing & Qinghua, 2020; Zhao et al., 2014; Zhou, 2021). The "doctor-patient interaction" function of OHC has not received much attention from researchers. The health care industry is a quasi-public service, and the doctor-patient relationship and doctor-patient interaction are very important. There are still few studies exploring the factors that influence the continued involvement of "doctor-OHC-patient". Hence, the research purpose is to understand what factors influence the continued usage intention of OHC users. Because it is important to understand the factors that influence the continued usage intention of OHC users for the sustainable development of OHC and the improvement of health information. It is expected that the research findings will serve as a reference for OHC managers to develop strategies.

2. RESEARCH BACKGROUND AND LITERATURE REVIEW

Due to the spread of the COVID-19 epidemic in 2020, offline clinics were once restricted, and people's demand for healthcare gradually shifted to online, which also led to a booming OHC market. The OHC in China, including Ali Health, Pingan Good Doctor, Good Doctor Online, Ding Xiang Yuan, Spring Rain Doctor, and many other professional platforms have launched special pages for fighting

the epidemic, providing people with free online consultation, medical supplies, knowledge about epidemic prevention and announcement of the progress of the epidemic.

2.1 Social Capital Perspective of OHC

Social capital differs from other forms of capital in that it is a collection of resources, real or virtual, that need to be gradually accumulated in a social environment, formed or institutionalized in some way by agreement. Putnam (Putnam, 2000b), on the other hand, defines social capital as resources that enhance social efficiencies, such as trust, norms, and networks. Additionally, Lin & Lu (2011) applied social capital to the context of social networks and proposed three dimensions including social interaction ties, shared value, and trust.

A growing number of scholars have linked social capital theory to health outcomes (Murayama et al., 2012; Musalia, 2016; Rodgers et al., 2019; Tomita & Burns, 2013). Borges (Borges et al., 2021) concluded that vulnerability measures were strongly associated with obesity, diabetes, and life expectancy by testing U.S. population health data from 2015-2018 and that social capital had a significant effect on life expectancy. Cronin et al. (2021) noted the significant impact of social capital on hospitals in establishing population health partnerships to address health disparities and reduce preventable mortality. Pan et al. (2017) used the theoretical foundation of social capital as a framework for constructing the network relationships of patients seeking and providing help in online health forums. Baptista et al. (2021) pointed to social capital theory as a basis for analyzing peer-to-peer social support interactions with doctors in the context of treatment uncertainty faced by patients in the OHC forum. The findings suggest that OHC could be a platform to expand for patients facing treatment uncertainty. Zhao et al. (2016) used the social capital theory as a basis to identify the motivational factors that promote patients' knowledge creation in OHC and further investigated how motivational factors and knowledge creation determine patients' continued membership in OHC. Zhou (2020) examined the impact of social capital theory on OHC users' health knowledge acquisition and contributor engagement behaviors.

2.2 Social Identity

The concept of social identity theory is derived from group identity, which is seen as a perceived cognitive structure, a perception of sameness or belonging to a group, including direct or indirect experiences of its successes and failures (Tajfel & Turner, 1986). Social identity theory suggests that individuals in society categorize themselves into different groups and constantly assess the value of their group and groups outside of themselves through self-categorization and comparison. Positive social identity leads to positive self-esteem, whereas negative social identity leads to ongoing competition, social mobility behaviors, or cognitive strategies that create a more positive image of the in-group (Ashforth & Mael, 1989). Overall, people desire to view self-definition positively, and positive social identities enable individuals to achieve positive self-definition in terms of a better self-image and higher self-esteem (Tajfel & Turner, 1986).

Social identity is an important source of psychosocial resources. Social identity theory has been confirmed through a range of social, organizational, and clinical examinations (Haslam et al., 2018; Jetten et al., 2012; Jetten et al., 2017).

2.3 Perceived Critical Mass

Oliver (Oliver et al., 1985) pointed out that critical mass is the number of users who adopt new technology after reaching a certain number, and if this number is not reached, the diffusion of the technology may fail, in other words, it will affect the collective behavioral actions of the platform users. Metcalfe (1995) argues that the usefulness and added value of a network are proportional to the square of the number of users. Because of the perceived resistance to cumulative sites during COVID-19 and the popularity of the Internet, the online health care community spreads widely, and the more people use OHC, the higher its value and the more users it attracts.

Lynne Markus & Connolly (1990) found that it was difficult to define the critical mass of the actual system, and proposed the concept of perceived critical mass, which suggests that when the number of participants in a system reaches the perceived majority of a user, that user will be inclined to use it. Swiss et al. (2012) explores from critical mass theory combined with panel data that promoting women's and children's health can influence and improve the development process in developing countries. García-Herrera & García-Meneses (2020) explain how mobile apps can facilitate the development of bicycle socialization through critical mass theory. Hsu & Lu (2004) found that perceived critical mass was an important factor influencing users' participation in community behavior in a study related to online game behavior.

2.4 Para-Social Interaction (PSI)

Horton & Richard Wohl (1956) introduced the concept of para-social interaction, describing it as a situation in which media personalities disseminate information to audiences through the media, and audiences respond to the media personalities as if they were real people in the context of exposure to the media, and they seem to be engaged in a "face-to-face" interaction, forming a virtual social interaction. Brown & Basil (2010) explained through para-social interaction theory what factors influence people's approach to celebrity health issues. Sakib et al. (2020) explains how health vloggers influence consumer adherence to healthy eating and weight loss through PSI theory. Tian & Yoo (2015) extended PSI theory to examine consumer responses to healthy eating and weight loss reality shows, and the effect of PSI on self-efficacy was significant. Jarzyna (2020) used PSI theory to investigate the causes of people's isolation during COVID-19 and to propose solutions to the isolation phenomenon. Hoffner & Cohen (2018) confirmed that PSI has emotional significance and value and that public confrontation with mental health issues such as depression has a significant impact on media stigma. Folkvord et al. (2020) investigated that PSI theory mediates the relationship between consumer type and health product attitudes and health product purchase intentions and that real health influencers have higher para-social interaction than virtual health influencers. Bradshaw et al. (2020) explains how the population can move from endorsing vaccines to opposing vaccine cognitive dissonance by applying PSI theory to vaccine-related domains. Sokolova & Perez (2021) focused on the motivation of fitness influencers to use social networking sites through PSI theory, with a strong influence on healthy followers and no influence on exercise intention for those who do not work out.

2.5 Hypotheses Development

Nahapiet & Ghoshal (1998) defined social capital as the sum of actual and potential resources embedded in the network of relationships held by individuals or social units. They advocated that social capital includes three dimensions, including structural, relational, and cognitive capital, which is the most widely applied. The structural dimension of social capital describes the overall structural pattern of social ties among network users, and social interaction ties are the most important variable in the structural dimension (Scott & Carrington, 2011; Tichy et al., 1979). The social capital relationship dimension refers to the type of interpersonal relationships that develop over time as a result of communicative interactions between individuals and includes three key elements of trust, reciprocity, and identity (Putnam, 2000a). Higher levels of trust maintain order in organizations, promote the willingness of individuals to exchange knowledge, and facilitate organizations to become more fair, open, and transparent (Burt, 1992; Leonardi et al., 2001; Snehota & Hakansson, 1995). The cognitive dimension of social capital refers to the shared perceptions of things, shared values, and shared language that individuals develop (Arrow, 1974; Inkpen & Tsang, 2005; Nahapiet & Ghoshal, 1998; Orr, 1990).

The dimensions of social capital, through the linkage and exchange of resources, can facilitate the network of interpersonal relationships formed by the relationships or interactions of OHC users. OHC is an online medical platform where doctors can quickly post scientific articles, and patients can continuously write posts such as experiences and feelings about online and offline treatment.

Liang et al. (2011) proposed that the social support of virtual communities includes information and emotion. OHC does have both types of social support. Furthermore, these activities enable users of the OHC to engage in interactive social activities among themselves, to interact or communicate with other patients and doctors, and to build and maintain social capital to maintain and expand relational networks (Zhou, 2020). Huang et al. (2009) studied that social interaction ties are one of the main factors that influence users' continuous use of community websites. In response to the above discussion, this study proposes research hypothesis 1a:

H1a: Social interaction ties positively influence continuous usage intention of OHC users.

OHC provides a forum for doctors or patients to post content, news, or events on specific topics so that people with a variety of common interests and ideas are drawn to the OHC forum for interaction. This type of interaction strengthens the relationship between forum users and helps forum users and users understand and accept to promote common goals and similar values (Lin & Lu, 2011). The way users interact and communicate in the OHC forum area allows users to exchange information and opinions and share their emotions. Cheikh-Amman & Barki (2016) studied the continuous use behavior of social networking sites and found that the frequency of people giving/receiving feedback from others on social networking sites significantly and positively influenced their perception of social presence; the frequency of people receiving feedback from others on social networking sites was positively related to the frequency of feedback they gave to others. In other words, the interaction of users with others on social networking sites enhance social presence and further develop shared values. On the other hand, since OHC users have real social identities instead of anonymous virtual identities, the social network in the OHC website is an extension of users' real lives. Therefore, when social interaction ties create a stronger bond between users, the trust relationship between users becomes more intimate and authentic, and they trust the process of interaction, the way they share and discuss with each other (Hajli et al., 2017). The trust relationship is through OHC community interaction thus increasing trust and reliability (Zhou, 2020). Research has found that social support significantly positively affects trust when people seek health information on social media (Li & Wang, 2018). In response to the above discussion, this study proposes research hypotheses 1b and 1c:

H1b: Social interaction ties positively influence shared value of OHC users.

H1c: Social interaction ties positively influence trust of OHC users.

In OHC, cognitive facets include shared values, having their opinions, and different viewpoints. As a result of discussions on the web make users have common goals or value standards. Once community users together have common goals and values that will influence their continuous usage intention (Li & Bernoff, 2011). In the modern digital age, the core resource of a website is the user, and community platforms treat users as co-creators of value and actively integrate them (Kalaigianam & Varadarajan, 2006). If users of the OHC community share the same values, this will encourage users to intend to continue using such pages. In response to the above discussion, this study proposes research hypothesis 2:

H2: Shared value positively influence continuous usage intention of OHC users.

The establishment of user trust relationships is an important factor in the development of e-commerce transactions and business relationships (Featherman & Pavlou, 2003; Gefen et al., 2003). Relevant empirical studies by OHC also confirmed the relationship between trust and continued use intentions (Boon-itt, 2019; Meng et al., 2021; Wu et al., 2018). Thus, trust can effectively motivate users' intention to use e-health services (Akter et al., 2011; Zhao et al., 2018). Akter et al. (2011)

found that trust in e-Healthcare services directly affects consumers' willingness to use them. In other words, if the extent to which OHC users trust the platform is enhanced, it enables users to interact and communicate with others in OHC (Zhao et al., 2016). In response to the above discussion, this study proposes research hypothesis 3:

H3: Trust positively influence continuous usage intention of OHC users.

Rugel (1987) noted that when individuals identify themselves as belonging happily to a community, that community is more attractive to them, and individuals who identify more with the community they live in also become more involved. On the OHC platform, social identity establishes psychological connections with other users by building (or breaking) trust and support, self-worth realization, and control (Cruwys et al., 2014; Greenaway et al., 2015; Jetten et al., 2012). Zhao et al., (2013) and Zhao et al. (2015) investigated how social identity theory influences the knowledge contributions of medical forum users in OHC and confirmed that social identity is an important factor in the continued use of OHC. In response to the above discussion, this study proposes the research hypothesis 4:

H4: Social identity of OHC users positively influence social interaction ties.

Metcalf (1995) noted the phenomenon that network users have a large impact on the increase of network value. With the continuous addition of OHC users, the value of all OHC platform users can be significantly increased. The influx of users of the OHC platform as a medical communication medium during COVID-19 affected the utility of OHC and, in turn, the collective action of OHC doctor-patient and patient-patient. Byrd et al. (2021) applied perceived critical mass theory for the interaction between the needs of users accessing mobile applications (OHC) in the social environment of inpatient care teams. Therefore, this study suggests that the social interaction ties of OHC users are influenced by the variable of perceived critical mass. When most of the relatives and friends around are OHC users and have the habit of using the OHC platform to see doctors for themselves and increase their medical knowledge, individuals are likely to have further contact with OHC, thus reaching the perceived critical mass. In response to the above discussion, this study proposes the research hypothesis 5:

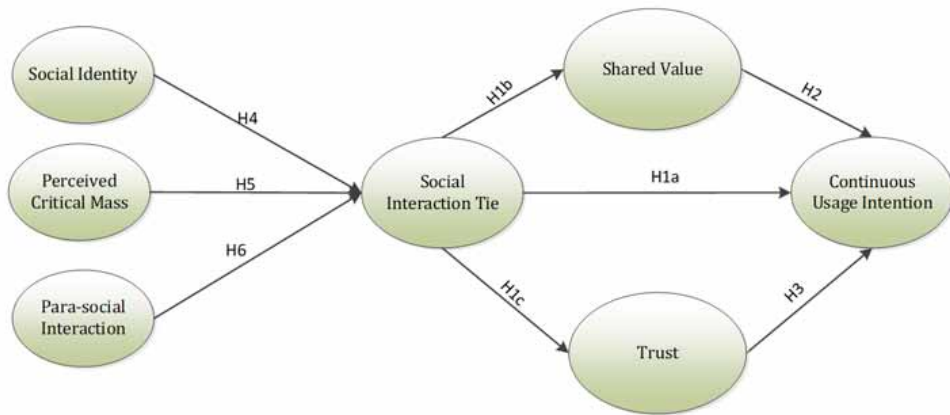
H5: Perceived critical mass of OHC users positively influence social interaction ties.

With the rise of virtual communities with various functions, Hoerner (1999) examined websites through para-social interaction, where tasks and signals are constructed that can be used to stimulate computer-mediated para-social interaction. Wu (2010) used PSI theory to understand how online interactions affect health information assessment on OHC websites and to address the cognitive processes by which online interactions facilitate users' assessment of health information quality. In response to the above discussion, this study proposes research hypothesis 6:

H6: Para-social interaction of OHC users positively influence social interaction ties.

Combining the above research hypotheses, the architecture of this study is integrated as Figure 1.

Figure 1. Research framework



3. RESEARCH METHOD

This research mainly takes patients as the representative for the sample of this study. Patients in this study are defined as individuals utilizing OHC . The data in this questionnaire survey was collected by using the method of snowballing convenience sampling to distribute to OHC users in China.

The questionnaire included the assessment of the underlying participants' background information and their opinions of the dimensions. The background information, including education, gender, and age was analyzed in the initial section of the questionnaire. In the next section of the questionnaire, the latent variables were calculated by a Likert seven-point scale ranging from "strongly disagree" (1) to "strongly agree" (7). The respondents were 119 males and 189 females. The age of the participants ranged from 18 to 65, years with an average age of 36 years and a mode age of 30 years. Categorized by status, the sample of 308 respondents included 245 staff and faculty members and 46 Bachelors with 17 Masters students.

The measurement elements were primarily modified from the earlier experiments. All items were initially written in Chinese and adjusted for the survey participants. The questionnaire items used in the study are provided in the appendix.

4. DATA ANALYSIS

Partial least squares (PLS) were measured using two methods. In the initial phase, the validity and reliability assessment were performed, however, in the subsequent stage, the path coefficients and the structural framework's descriptive power were evaluated and analyzed. The objective of the two stages mentioned was to validate the reliability and validity of the dimension, involving examining the relationships among the dimensions (Anderson & Gerbing, 1988; Hulland, 1999). PLS has been utilized and regarded as the finest tool for demonstrating the causal collaboration among dimensions and consequently can handle model measurement items and variables simultaneously (Petter et al., 2007). Furthermore, since PLS utilizes simpler factors to gauge the randomness and normality of the variables, it is found to be perfect for reviewing the association among dimensions in the distribution of the irregular results. It also reveals the benefits of evaluating prediction frameworks having dynamic qualities (Chin & Newsted, 1999). PLS was therefore believed to be more applicable for this research

as linked to other SEM evaluation methodologies to calculate the relationships between variables, eliminate measurement errors, and avoid collinearity.

4.1 Convergent and Discriminant Validity

The related external model measurements comprised the internal reliability of every measurement element, the convergent validity, reliability, and differentiating validity of each layout. Utilizing a relevant loading of queries, the reliability of the findings was analyzed. Regarding the factor loading the threshold value of 0.6 was considered to be reliable (Hair Jr et al., 2010). Individual reliabilities were based on this threshold value. Each of the studied variables in the research followed the criteria and went through the elimination process. Table 1 reveals the composite reliability of every dimension. The composite reliability (CR) values of each variable were higher than 0.7 (Chin, 1998) and indicated that the dimension was sufficient.

As shown in Table 1, factor loading for each indicator, composite reliability, and average variance extracted (AVE) for all dimension variables were estimated concurrently. A dimension would be deemed to acquire an appropriate convergent validity if its associated indicators' factor loadings were having values greater than 0.7 (Fornell & Larcker, 1981), composite reliability greater than 0.7, and AVEs in this study is between 0.589 and 0.696 for each dimension greater than 0.5, implying that there is substantial convergent validity.

Table 1. Convergent validity

Dimension	Item	Factor Loading	CR	AVE
Social Interaction Ties	SIT1	0.867	0.853	0.660
	SIT2	0.784		
	SIT3	0.784		
Continuous Usage Intention	CI1	0.851	0.870	0.691
	CI2	0.832		
	CI3	0.810		
Shared Values	SV1	0.835	0.868	0.687
	SV2	0.836		
	SV3	0.815		
Trust	TR1	0.727	0.811	0.589
	TR2	0.750		
	TR3	0.822		
Social Identity	SID1	0.814	0.831	0.622
	SID2	0.772		
	SID3	0.778		
Perceived Critical Mass	PCM1	0.791	0.910	0.627
	PCM2	0.796		
	PCM3	0.765		
	PCM4	0.832		
	PCM5	0.773		
	PCM6	0.794		

Table 1 continued on next page

Table 1 continued

Dimension	Item	Factor Loading	CR	AVE
Para-social Interaction	PI1	0.796	0.893	0.625
	PI2	0.717		
	PI3	0.806		
	PI4	0.822		
	PI5	0.808		

This study applied the heterotrait-monotrait ratio of correlations (HTMT) to test the discriminant validity of the two-dimensions. When the HTMT was less than 0.90, it indicated that the two-structures had discriminant validity (Hair et al., 2021). The results showed that the values of all the two dimensions were less than 0.90 (see Table 2). Obviously, the dimensions in this study have discriminant validity.

Table 2. Discriminant validity - HTMT ratios

Dimension	SID	PCM	PI	SIT	SV	TR	CI
SID							
PCM	0.579						
PI	0.525	0.61					
SIT	0.697	0.753	0.729				
SV	0.434	0.506	0.576	0.742			
TR	0.318	0.410	0.546	0.606	0.645		
CI	0.322	0.409	0.446	0.605	0.673	0.664	

Note: SID = Social identity; PCM = Perceived critical mass; PI = Para-social interaction; SIT = Social interaction tie; SV = Shared value; TR = Trust; CI = Continuous usage intention.

Then, to make sure that the dataset of this study is not the possible threat from common method variance, an inspection of Harman's single-factor with 7 dimensions and 26 measurement items was conducted (Harman, 1976; Podsakoff et al., 2003). Harman's single factor test was estimated to determine if common method variance is a possible threat to the validity of this study's results. The unrotated factor evaluation indicated the largest factor accounts for 42.06% of the variance, which is below 50%. The result suggested that common method variance was not a significant threat to the validity of this research.

The quality estimation of the framework was accomplished by calculating the Goodness of Fit (GOF), which was examined utilizing Tenenhaus et al. (2005) proposed mathematical framework, computed as follows:

$$GOF = \sqrt{AVE} \times \sqrt{R^2} = \sqrt{0.649} \times 0.550 = 0.597$$

Corresponding to the above-mentioned formula the average variance extracted is denoted by AVE, while the coefficient of determination is denoted by R square. According to the findings, the GOF is 0.597, which achieves the 0.40 cut-off standards for a large impact size (Wetzels et al., 2009).

Furthermore, standardized root means square residual (SRMR) is described as the difference between the observed relation and the model indicated relation matrix. Consequently, it allows estimating the mean of the differences between anticipated and observed relations as an irrefutable measurement of model fit standard. Consequently, if the model has an SRMR value lesser than 0.08 it is considered to be a good model fit (Hu & Bentler, 1999). Henseler et al. (2014) suggest the standardized root mean square residual as a GOF measure for PLS-SEM that can be applied to avert model error.

4.2 Empirical Results

The hypothesis of this research was examined by utilizing the inner PLS model. The path coefficients are the path and strength of the relationships between the dimensions that imply cause and effect between the measured variables. Additionally, the model's analytic capacity can be determined by the values of R square. The significant level of all the path coefficients was estimated by applying the bootstrapping approach.

As the results of framework emphasized in Table 3 and Figure 2. Social interaction ties had an insignificant relationship with continuous usage intention ($\beta = 0.138$, $p\text{-value} = 0.160 > 0.05$). Hence, H1a is not supported. Social interaction ties had significant positive relationships with shared value ($\beta = 0.741$, $p\text{-value} = 0.000 < 0.001$) and trust ($\beta = 0.607$, $p\text{-value} = 0.000 < 0.001$). So, H1b and H1c were supported. Shared value and trust were also in significant positive relationships with continuous usage intention ($\beta = 0.336$, $p\text{-value} = 0.000 < 0.001$; $\beta = 0.363$, $p\text{-value} = 0.000 < 0.001$). Thus, H2 and H3 were supported. Moreover, social identity, perceived critical mass, and para-social interaction had significant positive relationships with social interaction ties ($\beta = 0.304$, $p\text{-value} = 0.000 < 0.001$; $\beta = 0.366$, $p\text{-value} = 0.000 < 0.001$; $\beta = 0.346$, $p\text{-value} = 0.000 < 0.001$). Consequently, H4, H5, and H6 were supported.

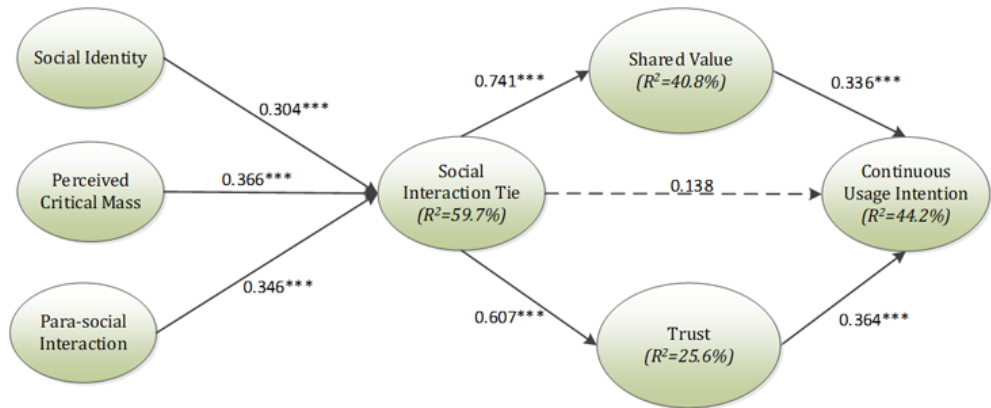
Table 3. Hypotheses results for research model

Hypothesis	Path Coefficient (β)	t-value	p-value	Results
H1a: SIT -> CI	0.138	1.419	0.160	Not supported
H1b: SIT -> SV	0.741	15.633	0.000	Supported
H1c: SIT -> TR	0.607	10.763	0.000	Supported
H2: SV -> CI	0.336	4.253	0.000	Supported
H3: TR -> CI	0.364	5.274	0.000	Supported
H4: SID -> SIT	0.304	4.786	0.000	Supported
H5: PCM -> SIT	0.366	6.571	0.000	Supported
H6: PI -> SIT	0.346	4.556	0.000	Supported

Note: SID = Social identity; PCM = Perceived critical mass; PI = Para-social interaction; SIT = Social interaction tie; SV = Shared value; TR = Trust; CI = Continuous usage intention.

This study adopts the explained variation (R-Square) to represent the percentage of variation explained by the exogenous variables to the endogenous variables. Figure 2 shows that the explanatory power of social identity is 59.7%, shared value is 40.8%, trust is 25.6% and continuous usage intention is 44.2%.

Figure 2. Results of the inner model



Note: * p -value < 0.05, ** p -value < 0.01, *** p -value < 0.001.

This study followed Shrout & Bolger's (2002) suggestion to adopt the bootstrapping method to test the indirect effect. In addition, if some coefficients in a whole path are insignificant, the indirect effect is not valid and not discussed. As a result, the p -value of all the path coefficients were less than 0.05 in Table 4. Therefore, social interaction tie, shared value, and trust have indirect effects in the relationship between social identity, perceived critical mass, para-social interaction, and continuous usage intention.

Table 4. Indirect effects

Dimension Relationship	Path Coefficient (β)	S.D.	t-value	p-value
SIT -> SV -> CI	0.249	0.065	3.837	0.000
SIT -> TR -> CI	0.221	0.044	4.970	0.000
SID -> SIT -> SV	0.226	0.049	4.570	0.000
SID -> SIT -> SV -> CI	0.076	0.027	2.849	0.004
SID -> SIT -> TR	0.185	0.041	4.479	0.000
SID -> SIT -> TR -> CI	0.067	0.018	3.678	0.000
PCM -> SIT -> SV	0.271	0.046	5.907	0.000
PCM -> SIT -> SV -> CI	0.091	0.027	3.393	0.001
PCM -> SIT -> TR	0.222	0.042	5.228	0.000
PCM -> SIT -> TR -> CI	0.081	0.022	3.660	0.000
PI -> SIT -> SV	0.257	0.058	4.415	0.000
PI -> SIT -> SV -> CI	0.087	0.030	2.842	0.005
PI -> SIT -> TR	0.210	0.049	4.255	0.000
PI -> SIT -> TR -> CI	0.076	0.023	3.373	0.001

Note 1: S.D. = Standard Deviation

Note 2: SID = Social identity; PCM = Perceived critical mass; PI = Para-social interaction; SIT = Social interaction tie; SV = Shared value; TR = Trust; CI = Continuous usage intention.

5. DISCUSSION

5.1 Theoretical Contribution

First, social interaction ties insignificantly influence continuous usage intention of OHC users. This result is different from previous research findings (e.g., Lin & Lu, 2011). The reason may be that previous research has discussed general social networking sites (e.g., Facebook), but OHC is a special and professional online community. Apart from the functions of other social networking sites, OHC also has other functions such as expert consultation. Moreover, the users of OHC include people with health or medical needs and related professionals (e.g., doctors). Hence, only social interaction tie may not directly affect the continued usage intention of OHC users, but must be influenced by other factors (e.g., shared value and trust).

Second, social interaction ties significantly and positively influence shared value of OHC users. OHC is a professional health care communication platform between users based on a combination of two dimensions: information support and emotional support, with common resource-seeking behaviors between doctors and patients for the same cause, while allowing a strong social interaction ties to unite users, interact or communicate through text, photos and videos, and build and maintain social capital (Zhou, 2020). Good and frequent online interactions between “doctor-OHC-patient”, including information sharing and emotional sharing, not only enhance the positive influence of users to trust other users, but also promote the development of OHC and make the relationship between users more intimate.

Third, shared value and trust significantly and positively influence continuous usage intention of OHC users. In the OHC platform, communication between patients and doctors is usually done through text, photo, or video, which includes an exchange of information and opinions, sharing of medical knowledge, problem-solving, and other interactions to obtain the needed resources. When users feel that their value has increased, that they are respected in the OHC platform, and that they are more willing to share and exchange with other users, users will strengthen their intention to continue using OHC. Until the trust relationship between users reaches a certain level, the more users trust each other, the more willing they are to share their knowledge and skills with others. Furthermore, when users consider themselves as indispensable users of OHC, they are more likely to develop a sense of responsibility and actively contribute to OHC.

Fourth, social identity of OHC users significantly and positively influence social interaction ties. When users identify with their values and happily belong to a community, the community becomes more attractive to the user, and the individual develops a higher level of identification with the group in which he or she lives and intensifies participation in its affairs (Rugel, 1987). When users are motivated to participate in OHC to attain a sense of identity to gain benefits or see themselves as a user of the OHC platform. For example, doctors are encouraged by patient rewards due to their patience and meticulousness, and they are often in OHC. Publish medical science popularization videos and articles, so that patients who pay attention to themselves have more channels and ways to participate in topic interaction, which can not only increase transaction opportunities but also make cooperation more frequent.

Fifth, perceived critical mass of OHC users significantly and positively influence social interaction ties. In this study, perceived critical mass refers to the behavior that affects the collective action of participants in a social activity when the number of participants in the social activity increases rapidly to a certain threshold. Since registration on the OHC website requires only a cell phone number and a corresponding verification code, the barrier to entry for users of the OHC website is so low that some users use different cell phone numbers to register on the website and change their online identity to interact with doctors and other patients, such as the small number phenomenon. This study can use two key concepts from the “spiral of silence” to explain why users use different numbers to log in and interact with OHC, namely, “quasi-sensory statistics” and fear of isolation (Miller, 2014). Everyone has a “quasi-sensory statistical” ability to make judgments about the current climate of opinion

and to determine what behaviors and opinions are shared or disagreed with by their environment. As herd animals, it is almost human nature to gain a sense of belonging in a group, and people are afraid of being isolated. After “counting” the behaviors and opinions of their environment, people may remain silent or appeal to the “majority” or “dominant” opinion in order not to be isolated. The privacy of OHC with different cell phone numbers reduces the risk of isolation to a certain extent, so the number of users is increasing.

Sixth, para-social interaction of OHC users significantly and positively influence social interaction ties. OHC is designed to simulate the intimacy of interpersonal communication by focusing on “doctor-OHC-patient” consultation and interaction, and to promote more direct and strong interaction with OHC through identity, connection and status. Para-social interaction has been “one-sided” in previous studies of computer-mediated communication (Rubin & McHugh, 1987). In the online world, para-social interaction is also related to the dimension of interaction (McMillan, 2002; Wohn et al., 2018), which is consistent with the findings of this study.

Finally, both shared value and trust had significant indirect effects on the relationship between social interaction tie and continuous usage intention of OHC users. This result is similar to the finding of Lin & Lu (2011). Obviously, on social networking sites, in addition to interaction, users must perceive shared value and trust, so that they can have the continued usage intentions. Moreover, social identity, perceived critical mass, and para-social interaction also significantly influence social interaction tie. This study further analyzed and found that social interaction tie, shared value, and trust also significantly influenced continued usage intention. In short, social interaction tie, shared value, and trust all have indirect effects. Many studies exploring the continued usage intention on social networking sites have considered social interaction tie as a main effect (e.g., Lin & Lu, 2011; Yin & Zhu, 2014). However, this study further analyzed it as an indirect effect. The results showed that social identity, perceived critical mass, para-social interaction through social interaction tie, shared value and trust have significant effects on the continued usage intention of OHC users. This is the theoretical contribution of this study.

5.2 Practical Implications

COVID-19 is found to be accountable for the creation of innovative prospects for the service business, as digitalization of operating procedures is accelerated (Bestsennyy et al., 2020; Diebner et al., 2020). The healthcare industry cannot be excluded by the effect of this pandemic. Amid the digital era, several hospitals and nursing sources have enthusiastically practiced revolutions for contactless facilities and operating procedures for enhanced efficiency and managerial dexterity (Lee & Lee, 2020). The contact-free facilities have been implemented with the help of innovative information and communication technologies (ICTs) including augmented reality, virtual reality, artificial intelligence, big data, the internet of things, etc. Telemedicine, which is also considered as contact-free healthcare facilities was commonly observed ever since the 1990s, before the COVID-19 era. Nevertheless, contact-free healthcare facilities in the digital era comprise considerably ahead of the conventional range of telemedicine (Lee & Lee, 2021). This study combines the theory of planned behavior, social identity, perceived critical mass, para-social interaction, and social capital in the context of “doctor-OHC-patient”. The study further explores the continuous usage of OHC in the context of “doctor-OHC-patient” interaction. This study provides the academic and online healthcare business community with a deeper perspective on how to think about running an OHC website. Synthesizing the results of the empirical analysis of this study, the following relevant recommendations are proposed.

First, the service provider of OHC should understand the positioning and needs of users in OHC. Take the domestic “Dingxiang Doctor’s” “Ask the doctor” or “Watch the hotspot” service as an example, psychologists and medical consultants can target one-on-one health topics for interaction. OHC can use health topics initiated by authoritative doctors as hotspots to generate topics for patients and doctors to participate in discussions. OHC can also invite doctors of different specialties to live broadcast every night through the “Watch the live” section to meet patients’ social needs (Lowenthal

& Snelson, 2017). All of these are seen as important channels for users to interact with each other. The results of this study show that users do not just want to see textual descriptions of symptoms, causes, and diagnoses within the OHC website; doctors need patients to affirm their work and find value in the output of their work on the OHC, and patients need a friend to come and engage with them for information and emotional support. This study suggested that OHC operators consider preparing a huge database for doctors, which is equipped with highly vivid and affectionate pictures, an emotionally rich corpus of text to form a complete copywriting plan, warm and trendy expressions.

Second, the business model of OHC should build into a closed loop of “content + community + e-commerce”. The vertical users who download OHC have sufficient demand and awareness of disease and health, so it is important to create a way for users to participate together and attract the attention of friends and family through their spontaneous behavior. When “doctor-OHC-patient” interaction, OHC platform managers should not be afraid of negative words in the communication content and open the topic of negative health care talk, but get more users “information transparency” and praise negative information topics. Negative information topics, if guided by the positive psychological implication of the OHC operators, will be a motivation for users who are full of doubts.

Third, the majority of patients enrolled in OHC had offline hospital visits and most of them had the chronic conditions (Merolli et al., 2013). Therefore, while OHC patients suffer tremendous chronic disease pain, doctor engagement can influence patient participation in many forms, not only through text and image sharing but also by increasing the percentage of video use to share information and answer patients’ questions. According to the expectation-value model and social presence theory, patients observed that doctors engaged in patient responses with positive and full emotions by answering face-to-face with patients via video, increasing patients’ expectations of getting a response from doctors and the perceived value of participating in OHC, thus promoting patients’ willingness to continue using in OHC (Cheung et al., 2011; Choi, 2016; Ou et al., 2014; Shen et al., 2010).

Fourth, past research has demonstrated that user participation contributes to the growth of online communities. This study argues that allowing users to maintain continuous interaction on the platform can make OHC more sustainable. OHC’s interface is designed to discuss health topics based on “doctor-OHC-patient” interaction, which simulates the intimacy of interpersonal communication and promotes users’ stronger interaction with OHC through identity, connection, and status. This study suggests that OHC managers provide users with some stimuli and incentives to increase users’ willingness to interact with others in OHC. For example, building sustainable discussion topics and combining hot topics of current affairs and hot topics in the network, the content carried out should be as unified and fair as possible and attractive, and meet the effect of immediate interaction with users for the communication objects. Additionally, it should make users happy to share information to other users or potential participants, to achieve the effect of continuous operation through a positive cycle.

Final, the privacy of online communities has always been controversial. Now that many social networks are integrated with e-commerce, there are even more concerns about information security. Apart from that, there are more challenges for OHC. OHC is an online community for health and medical professionals. Healthcare is a fairly high-end profession. Each country has specific laws and regulations, such as the medical care law and the pharmaceutical law. In addition to the law, any behavior or affairs related to medicine must follow medical ethics. Especially in response to epidemics, some countries and regions are gradually opening up telemedicine. Telemedicine platforms may be combined with OHC. However, much misinformation about health and medicine has been published through social media. There is no way to avoid misinformation being posted on OHC. As a result, professional information, unproven experiences, and rumors are spread on OHC. When general users without medical expertise are confused by the information obtained from OHC, they will stop using it. The results of this study showed that social interaction ties were not significantly related to continuous usage intention of OHC users, which could explain this phenomenon. After all, no matter how much interaction, once users are confused about the information on OHC, they will use it less frequently or give up. Therefore, this study suggests that OHC managers should not only focus on

information security, but also strictly monitor the information in the community. At the same time, government agencies should also gather IT, medical and legal experts to develop relevant regulations and control mechanisms as soon as possible.

5.3 Limitations and Future Works

The process of this study, although striving for rigor, still has its limitations. This study only focuses on OHC users in China and does not consider the use of OHC by patients and users from other countries and regions. Researchers could consider extending its findings to other professional field websites, as well as whether data can be collected for the usage scenarios of community websites of different professions in the near future.

Because OHC websites involve much personal privacy, many users are deeply offended by the disclosure of personal information on these networks. Therefore, relevant variables such as negative user evaluations could be involved to the extended study in the future. In addition, the results of this study showed that social interaction tie had no significant effect on continuous usage intention, but it significantly affected continuous usage intention via shared value or trust. Yin & Zhu (2014) study the use behavior of social networking sites. They found that social interaction tie had a significant positive impact on usage habits; usage habits had a significant positive impact on continuous usage intention. Obviously, usage habits are an important factor in exploring the usage intentions of online communities. In addition, scholars have found that social capital (structural and cognitive) significantly and positively affects the senses of virtual communities (Chang et al., 2018). However, this study did not discuss “habits” and “senses”. Although OHC is a professional and special online community, there are still differences in the usage habits and senses of users. Researchers can further study the relationship between these two factors and OHC usage intentions. At last, scholars believe that trust affects the knowledge sharing (social exchange) of users in online communities (Liang et al., 2016). Although this study discussed the effect of shared value and trust on continuous usage intention but did not consider the effect of trust on shared value. Future research can explore the relationship between shared value and trust for OHC.

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