FROM OFFLINE HEALTHCARE TO ONLINE HEALTH SERVICES: THE ROLE OF OFFLINE HEALTHCARE SATISFACTION AND HABITS

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ABSTRACT

With the rapidly growing popularity of the delivery of health services through the Internet, it is timely to examine online health service (OHS) diffusion from the human decision process perspective for its development and diffusion. The health service possesses an offline-to-online nature; that is, its online service is an extension of its offline service. Therefore, we develop a research model to bridge offline healthcare and the OHS-decision, which is contingent on different levels of offline healthcare habits, drawing on user satisfaction literature, the Innovation Diffusion Theory, and the habit literature. Data were collected from 323 Internet users, and our empirical results show that high satisfaction on offline healthcare hinders the awareness of OHS and subsequently influences adoption intention. On the other hand, offline healthcare habits weaken the effects of offline health satisfaction on the OHS awareness. Discussions and implications are also proposed in the concluding sections of this research.

Keywords: Online health service; Offline healthcare; User satisfaction; Awareness; Habits.

1. Introduction

Due to the rapid development of information technologies and the huge demand for medical services, it is increasingly popular to deliver health services through the Internet [Hardey 2001; Kvedar et al. 2014]. Many Internet-based platforms, such as online communities, forums, and websites are built to deliver online health service (OHS), from which patients can get both informational and emotional support [Berkman et al. 2000; Yan et al. 2014]. However, a case study of a famous OHS website in China, namely "Hao Daifu Zaixian"[1], indicated that only a small percentage of its visitors used the online service (less than 1%), which was far below that of E-commerce

[1] http://www.haodf.com/

[Moe et al. 2004]. Thus, it is a critical issue for online health service suppliers to uncover the underlying reasons behind the low usage rate and then to improve the diffusion of the OHSs.

The physicians on the OHS websites provide health services online in their spare time [Lagu et al. 2010], whereby the OHS can enable them to meet the medical demands that offline healthcare providers cannot fulfill [Schramm-Klein et al. 2005]. In this regard, for instance, if the patients are located in remote areas from a hospital or might feel an urgent need to visit a hospital personally, the OHS can provide a more convenient and easy approach for patients to access health services. Therefore, the OHS extends traditional offline health services and satisfies the unfulfilled medical demands that offline healthcare fails to accomplish. Accordingly, individuals' viewpoints towards OHS are closely associated with their previous experiences with offline healthcare [Hou et al. 2010; Ye 2010], which are always manifested by user satisfaction as an overall evaluation [Chiu et al. 2012; Fang et al. 2014; Kim et al. 2007]. Although it has long been considered as a key predictor to service acceptance, user satisfaction has thus far only been studied in the same context, i.e., online (offline) satisfaction influences online (offline) service acceptance or repurchase.

According to the Expectation Confirmation Theory, when individuals are satisfied with their current conditions, they are less likely to switch to a new situation; in fact it is only when they are less satisfied with their current conditions that they are willing to upgrade from their current conditions [Bhattacherjee 2001; Tseng et al. 2011]. Thus, the previous conditions can play a significant role in determining individuals' acceptance of an innovation [Zhang et al. 2017]. Even though the theoretical recognition by the Innovation Diffusion Theory has exposed the influence of previous conditions (without the innovation) on innovation diffusion [Rogers 2010], limited research has been conducted to explore this impact in the technology acceptance literature [Sun et al. 2016]. Specifically, in this context, it remains unclear whether offline conditions (i.e., user satisfaction on the offline healthcare) can exert effects on online healthcare acceptance. Identifying this relationship will provide insights for the practitioners (i.e. online service providers) into how to promote their online service according to offline conditions. There is also knowledge advancement on the underlying mechanism of the transition from offline service to online service. Hence, the first objective of our study is to answer the following question: *How is the user satisfaction on offline healthcare related to OHS use intention?*

Moreover, the role of habit in IT use and human behavior has attracted increasing scholars' attention in recent years [Chiu et al. 2012; Chiu et al. 2014; Khalifa et al. 2007]. Many studies have proposed that usage habits can shape the human decision process. A habit, as an unconcious process, can influence the impacts of concious processes on decision outcomes [Chiu et al. 2014]. Individuals with strong behavioral habits will rely more on their past behavior rather than their cognitive evaluation and vice versa [Chiu et al. 2012; Honkanen et al. 2005]. This moderation role has been studied on the relationship between satisfaction and repurchase intention in the context of E-commerce [Chiu et al. 2012; Khalifa et al. 2007]. As we previously noted, the OHS is an extention of offline healthcare; hence in this case, individuals' offline healthcare habits may play a role on the decision process of OHS acceptance. Limited research exists on investigating the direct impacts of previous condition habits on the intention to use a new system [Polites et al. 2012]. However, whether the previous habits play a moderating role in the transition from the offline to the online conditions and shape the innovation diffusion process remains unexplored. By doing so, our research sheds light on the importance of previous habits for the transition from offline service to online service. It can also help the service providers to identify their potential user groups. Thus, to verify the influence of previous habits from an indirect perspective, our second research objective is to address the following question: *To what extent is the OHS diffusion process contingent on users' offline healthcare habits?*

To address the first research question, we draw on user satisfaction and Rogers [2010]'s Innovation Diffusion Theory (IDT), and posit that awareness is critical in understanding the relationship between offline healthcare and the OHS. Individuals will experience an innovation-decision process to decide adopt or not adopt it before performing acceptance behavior on an innovation. Awareness is the initial stage of this process. It is central to users' satisfaction on incumbent situations, which influences their awareness of a new situation [Dinev et al. 2007]. Therefore, we theorize that user overall satisfaction on offline healthcare influences the awareness of the OHS firstly, which in turn affects the OHS use intention. To achieve the second research objective, we propose that offline healthcare habits, as unconscious factors, can shape the conscious decision making process. Therefore, offline healthcare habits arguably moderate the whole OHS use decision process.

Addressing these two objectives, this study provides several key theoretical implications. First, although online service diffusion has been a popular research topic, extant research mainly examines user decision from the interaction with the service, lacking attention on the offline foctors. Our research is one of the first that empirically explores online service acceptacne by bridging the relationship between offline service and online serivce, and as such, offer an alternative perspective to understanding online healthcare acceptance. In so doing, we acknowledge the role of user satisfaction in the offline context as a prior condition influencing the innovation-decision process.

Second, although the direct effects of habit on human behaviors have been extensively investigated, few studies have explored whether the transition of two service conditions is contingent on individuals' habit. This study adds to extant literature by showing that the innovation-decision process is contingent on individuals' unconscious process, namely, offline healthcare habits.

The rest of this study is organized as follows. In Section 2, we elaborate on the theoretical foundations, after which the research model and hypotheses are proposed. We then present the methodology and results in Section 4, followed by concluding with a discussion of the results and implications.

2. Literature Review

2.1. Online Health service (OHS)

In recent years, the Internet has become an important way to acquire healthcare information and medical consultations [Ziebland et al. 2012]. The online health service (OHS) is thus defined as a delivery of health services, such as providing healthcare information and medical consultations, through the Internet [Castrén et al. 2008]. Considering the limitations of Internet connectivity and technological constraints, the OHS can only provide a limited scope regarding information based health services [Hadwich et al. 2010], such as patient education, online consultations, and appointments. Despite the limited scope, the OHS can also serve most patients with different diseases as they need informative or emotional support before and during treatment as well as during the recovery period [Nettleton et al. 2005].

Offline healthcare is involved within a comprehensive healthcare system, including hospitals or clinics, insurance companies, medical companies, and so on. Patients need to receive health services in person in certain physical locations. A more common way to receive offline healthcare is to visit a doctor in the hospital for medical treatment. This mode of service plays a dominant role in the healthcare system of China. Due to the increasing medical demands, patients need to obtain different kinds of health services besides the medical treatment. However, the insufficient and unbalanced medical resources in the offline healthcare system render it difficult for the provision of patients with different needs, such as health consultations and patient education. The large demand for healthcare, as well as the insufficient supply and unbalanced resources in traditional healthcare make the OHS increasingly popular. Online healthcare websites, such as healthcare communities and public forums (e.g., HaoDaifuZaixian, ZocDoc), are the major platforms for individuals to access the OHS. These providers access physicians from hospitals and help them to deliver medical consultations, healthcare information, and other services to recipients. Patients with access to the OHS can gain more knowledge about diseases, have a second opinion on treatment, become more active in the medical process, seek emotional support, and thus enjoy a heathy lifestyle [Fisher et al. 2008; Yan et al. 2014]. An increasing number of people are searching healthcare information online, thus resulting in a quicker development of OHS platforms [Fox et al. 2010].

Although delivering health services through the Internet is gaining popularity [Sun et al. 2013], limited empirical research has focused on this phenomenon. Among the limited studies, Gummerus et al. (2004) explored that trust is critical in enhancing users' loyalty on OHS websites and further indicated that user interface, responsiveness, security, and need fulfillment were enablers of trust [Gummerus et al. 2004]. Mou and Cohen (2014) examined how trust interacted with other cognitive factors to influence acceptance intention and actual behavior of customers towards eHealth services [Mou et al. 2014], while Koo and Wati (2010) studied eHealth user satisfaction from an expectation confirmation perspective [Koo et al. 2010]. Chen et al. (2014) found that patients could get physical and online social support from the online healthcare community, which would increase their health status [Chen et al. 2014]. Regarding the outcomes on the online healthcare community, Yan and Tan (2014) found that engaging in an online healthcare community can benefit patients by enhancing their health status and health management [Yan et al. 2014]. Yet, relatively few studies have focused on the acceptance decision process concerning the OHS. In fact, the OHS is an extension of traditional offline healthcare and a substitution of the previous health care mode. According to the innovation diffusion perspective, the diffusion of OHS will be influenced by the previous healthcare conditions [Rogers 2010]. However, the effects of offline healthcare on the diffusion of OHS have received relatively little research attention. Therefore, it is highly desirable to specify and theorize the effects of offline healthcare experiences on OHS adoption.

2.2. Innovation Diffusion Theory

To explore the influence of offline healthcare on online health diffusion and achieve the first research objective, we apply the Innovation Diffusion Theory to explain the path from offline healthcare to online healthcare. The Innovation Diffusion Theory, which is a well-known theory proposed by Rogers (2010) and has been widely used in the IS research, is utilized as the theoretical underpinning in this study to examine the innovation diffusion process [Karahanna et al. 1999; Rogers 2010; Xue et al. 2011]. It suggests that an innovation, such as a new technology, service, or idea, can be communicated through a certain process among individuals. Once individuals accept the

innovation, the diffusion process is achieved. This theory can help us understand the human decision process in accepting an innovation; that is, how and why individuals decide to adopt an innovation. The Innovation Diffusion Theory indicates that the innovation-decision process consists of five steps: 1) knowledge—awareness that the innovation exists and an initial understanding of how it works; 2) persuasion—forming a positive or negative attitude towards it; 3) decision—deciding to accept the innovation or reject it; 4) implementation—putting the innovation into practice, and 5) confirmation—evaluating the decision process and reversing the decision if needed [Rogers 2010].

Awareness is the first and critical step of the innovation-decision process, because it motivates individuals into learning more about the innovation [Rogers 2010]. According to Rogers (2010), there are four prior conditions of individuals' awareness of an innovation: previous practices, felt needs/problems, innovativeness, and social norms. Quaddus and Hofmeyer (2007) found that external factors, such as trading partners, competition, and government, prompted awareness of small businesses on modern technologies [Quaddus et al. 2007]. However, limited studies have explored the enablers of awareness in the technology acceptance context, and even fewer of them studied how the prior conditions influence the diffusion of an innovation. The limited studies have researched the effects of previous conditions (offline satisfaction) on online satisfaction [Jin et al. 2010], trust in the online presence [Yunjie et al. 2006], and usefulness as well as risk perceptions on new services [Falk et al. 2007]. However, the roles of previous conditions in the move from offline to online modes remain under-explored.

The use of different channels to obtain health information may facilitate patients to compare benefits among different channels [Verhagen et al. 2009], such as which channel can better satisfy their medical demands. When their medical demands are met, they can feel both economic and psychological benefits. The unfulfilled demands resulting from the previous conditions will enhance the development and diffusion of an innovation. Thus the unfulfilled demands are the preconditions of an innovation diffusion [Rogers 2010]. Therefore, user satisfaction on the offline channel is used to manifest the overall benefits from traditional healthcare. Accordingly, we apply the Innovation Diffusion Theory to explore the link between the offline healthcare service and the diffusion of OHS, and theorize that offline healthcare satisfaction will influence users' awareness of the OHS and then influence their acceptance of the OHS. For consistency, we also control for three other prior conditions of awareness in our research model.

2.3. Offline Healthcare Habits

In addition to prior experiences on offline healthcare services, prior habits formed on offline healthcare interactions are also critical in affecting the innovation-decision process. Habits can be defined as "learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end-states" [Verplanken et al. 1999, P. 104]. Habits have been studied to predict human behavior in both offline context [Honkanen et al. 2005; Ji et al. 2007] and online context [Chiu et al. 2012; Khalifa et al. 2007; Liao et al. 2006]. These studies draw the conclusion that incumbent habits can contribute to continuous behavior, because the subjects studied the habits to perform the same behavior. Previous research also focused on exploring the moderating role of online habits in online situations [Chiu et al. 2012; Chiu et al. 2014; Khalifa et al. 2007].

Contributing to the continuity of the previous behavior means that the incumbent habits will hinder the diffusion of an innovation [Polites et al. 2012]. Very few studies have examined the role of incumbent habits on the diffusion of a new system/service. Polites and Karahanna (2012) proposed that an incumbent system habit can indirectly interfere with the acceptance of a new system [Polites et al. 2012], suggesting that incumbent habits can directly influence the acceptance of an innovation. Compared with the research attention on online habits, which includes the direct and moderating effects on behavior intention, current research on the offline habits (incumbent habit) have largely neglected their indirect effects, especially when predicting online related behaviors. As offline healthcare is and will always be in the dominant position and the OHS can only be an extension of it, hence the offline healthcare habits may also play a significant role in shaping the OHS diffusion. Thus, exploring the moderating role of offline healthcare habits in the OHS decision process will not only enrich the existing literature on habits but also enable a better understanding of the OHS decision process.

2.4. User Satisfaction

To explore the prior conditions of the OHS-decision process from the offline healthcare, this study focuses on users' offline healthcare experiences. User satisfaction on offline healthcare services refers to whether the medical needs and expectations are initially met by the traditional offline healthcare system. It is a complex concept and has been formed with multiple sub-dimensions [Xu et al. 2013]. Based on user satisfaction and technology acceptance literature, Wixom and Tadd (2005) used information satisfaction and system satisfaction to reflect user overall satisfaction [Wixom et al. 2005]. Later on, Xu, Benbasat (2013) incorporated service satisfaction into the model to measure user satisfaction in an e-service context [Xu et al. 2013]. Thus, user overall satisfaction can be influenced by three sub-dimensions, namely, service satisfaction, system satisfaction, and information satisfaction.

In the offline context, we argue that these three sub-dimension satisfactions can also be applicable to form user overall satisfaction with offline healthcare, because there are system, service, and information aspects in the offline context. First, service satisfaction can be used to measure user satisfaction on the quality of offline health service, such as the treatments [Xu et al. 2013]. Second, system satisfaction refers to the evaluation on the platform function of the system [Xu et al. 2013]. There is a comprehensive healthcare system in the offline healthcare, including hospitals or clinics, insurance companies, medical companies, and so on. In the delivery process, patients interact with the healthcare system through the platform, hospitals and clinics; we thus use system satisfaction to measure the satisfaction on the entire healthcare system in the offline context. Third, information satisfaction can be used to measure satisfaction on healthcare information obtained from the offline healthcare service. Patients can get healthcare information from an offline healthcare service to meet their information needs [Wilson 1997]. Overall, we argue that user overall satisfaction on offline healthcare is influenced by service satisfaction, system satisfaction, and information satisfaction.

3. Research Model and Hypotheses

Our conceptual model is depicted in Figure 1. We propose that service satisfaction, system satisfaction, and information satisfaction influence users' overall satisfaction on offline healthcare (Box B in Figure 1). Furthermore, offline healthcare satisfaction (Box B in Figure 1) can exert its effect on the OHS-decision process through the core construct i.e., awareness of the OHS (Box A in Figure 1). We also propose that offline healthcare habit will have a moderating role on the relationship between overall satisfaction and awareness and the relationship between awareness and behavior intention. According to Rogers (2010), in addition to felt needs/problems (i.e., offline healthcare satisfaction in the current study), awareness of an innovation is also affected by previous practice, innovativeness, and norms of the social system [Rogers 2010]. Following the previous studies, we also include other three other prior conditions as control variables, namely, previous Internet experience (previous practice, PEXT), personal innovativeness with a new service (innovativeness, PI), and social norms (norms of the social systems, SN) (Box C in Figure 1). As our model explores the effects of offline service satisfaction on online service decision, the respondents should have experiences about the offline service. Therefore, the boundary of our model is offline service users with awareness on the existence of the online service.

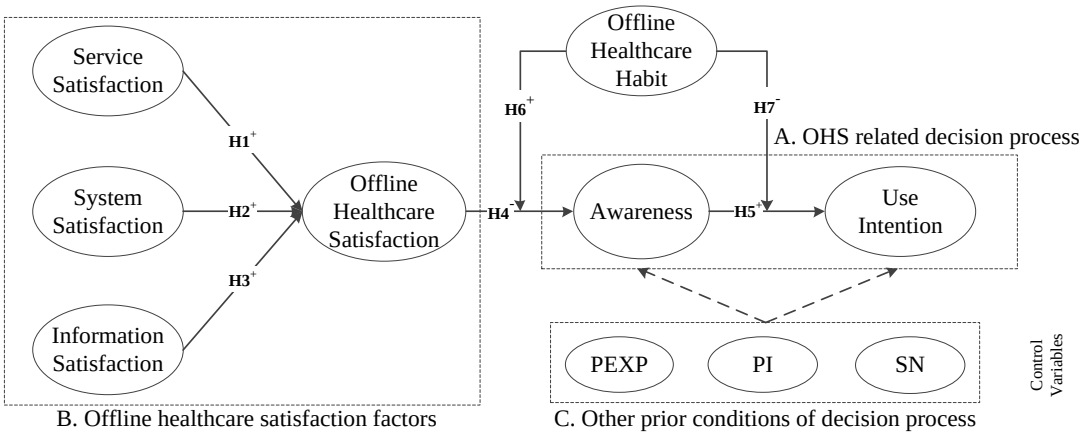

Figure 1. Research Model

3.1. Direct Effects Hypotheses

Service satisfaction is related to health service quality, which refers to interpersonal quality, technical quality, environment quality, and administrative quality in the traditional offline healthcare [Dagger et al. 2007]. System satisfaction is related to healthcare platform quality, which is attributed to reliability, efficiency, flexibility, accessibility, and the timeliness of the entire healthcare system [Xu et al. 2013]. Information satisfaction is related to the quality of health information, which is manifested by availability, accuracy, timeliness, and completeness of the information obtained from the offline healthcare.

Spreng et al. (1996) found that user satisfaction not only results from feelings regarding a product or a service, but also from information provided by the marketers [Spreng et al. 1996]. As E-commerce emerges, the satisfaction on the platform providing service or product is also found to play a key role in forming overall satisfaction formation [Kang et al. 2010]. Thus, user overall satisfaction has been suggested to be a product of service satisfaction, system satisfaction, and information satisfaction [Kang et al. 2010; Kim 1989]. All these three types of

satisfaction will influence overall satisfaction on offline healthcare, such that an individual's satisfaction with the system/information/service in the offline healthcare will contribute to his/her overall satisfaction evaluation. In line with previous research, we therefore hypothesize that:

H1*: Service satisfaction is positively related to overall satisfaction on the offline healthcare.*

H2*: System satisfaction is positively related to overall satisfaction on the offline healthcare.*

H3*: Information satisfaction is positively related to overall satisfaction on the offline healthcare.*

According to the Innovation Diffusion Theory, user satisfaction on offline healthcare, as a prior condition, will influence individuals' awareness of OHS [Rogers 2010]. Offline healthcare satisfaction refers to the extent to which the patients perceive that their medical needs and expectations are met by offline medical organizations [Sixma et al. 1998]. In other words, patients who are satisfied with offline healthcare tend to perceive that most of their medical demands and expectations are fulfilled. In this regard, there would be less possibility for them to acquire extra medical solutions in their healthcare decision making process; instead, they would be likely to continue their previous medical decisions [Mittal et al. 2001; Rogers 2010].

Hassinger (1959) indicated that individuals seldom expose themselves to the knowledge of an innovation without a need for the innovation [Hassinger 1959]. Even if individuals were exposed to an innovation, such an exposure has minimal effect on individual decisions unless the innovation is relevant to their needs [Rogers 2010]. This process is called *selective perception* [Rogers 2010]. Thus, when individuals are satisfied with their previous experiences in the offline healthcare, they are less motivated to learn about the complement of offline healthcare, i.e., the OHS. Adversely, a need beyond offline healthcare and exposure to OHS will motivate individuals to learn more about the OHS, enhancing their awareness of the OHS. Accordingly, the sufficiency of needs makes individuals less aware of the benefits of the OHS even though they were exposed to it. We therefore hypothesize that:

H4*: An individual's satisfaction on offline healthcare negatively influences his/her awareness of the OHS.*

Awareness is the initial stage of the innovation-decision process and is defined as the extent to which an individual is conscious of the existence of an innovation and then develops a general perception of its functions [Dinev et al. 2007]. It plays a significant role in innovation diffusion as the basis of subsequent decision processes. There are three types of knowledge related to the awareness of an innovation [Rogers 2010], namely awareness knowledge—information about the existence of innovation; how-to knowledge—information about how to use the innovation; and principles knowledge—information about the essential principles on how the innovation works. Once an individual is aware of the existence of OHS and treats it as an innovation, he/she will be motivated to seek the second and third types of knowledge [Rogers 2010]. Accordingly, the individual will gain initial overall knowledge and evaluation about the OHS, which will reduce his/her uncertainty and risk perceptions [Peate et al. 2011]. Thus, individuals, who are aware of the OHS, will have stronger use intention of the OHS. Similarly, Howcroft et al. (2002) argued that unawareness of the service and its advantages explains the reluctance of new services adoption [Howcroft et al. 2002]. We therefore hypothesize that:

H5*: Individuals' awareness of OHS positively influences their use intentions.*

3.2. Moderation Effects Hypotheses

Offline healthcare habits are shaped by previously frequent offline health behaviors and are the unconscious effect from previous behavior. According to Ouellette and Wood (1998), once a behavior becomes a habit, it performs automatically and quickly without attention [Ouellette et al. 1998]. As an automatic process, the habitual behavior can be performed efficiently without a cognitive process [Bargh 1996]. Thus, the effect of habit on human behavior can be considered as a process with less cognitive efforts in information processing and decision making [Chiu et al. 2014; Verville 1988]. The innovation-decision process is also a conscious process [Rogers 2010] and can be influenced by the unconscious habitual process.

Offline healthcare habits lead an individual to enhance an automatic response to remain in the offline status. Hence, individuals' healthcare behavior depends more on the unconscious mind instead of the conscious mind [Chiu et al. 2014]. When individuals are involved in a high offline healthcare habit, they are inclined to stay in offline healthcare automatically and unconsciously, regardless of whether they are satisfied with the current healthcare status and resources. In other words, even if he/she is dissatisfied with the current offline healthcare service and has more extra medical needs, these needs are conscious and would be largely ignored by the unconscious process. As a result, an individual's awareness of the OHS is also less observed. Thus, the effect of user satisfaction on offline healthcare on awareness is minimized by offline healthcare habits. We therefore hypothesize that:

H6*: Offline healthcare habits weaken the negative relationship between offline healthcare satisfaction and awareness of OHS; so that the relationship is weaker when habit levels are high.*

As previously discussed, when an individual is aware of OHS and has an initial perception of it, he/she is motivated to learn more about the OHS until it is accepted [Rogers 2010]. However, when the individual has a high

offline habit, his/her healthcare decision process is affected by unconscious minds to stay in the offline condition [Chiu et al. 2014]. Thus, even when the individual has been aware of the OHS, the cognitive process from awareness to use intention will be minimized by the offline healthcare habits. Prior studies have indicated the negative moderating role of habits on the effects of cognitive factors on behavior intention [Chiu et al. 2012; Ouellette et al. 1998; Yu 2012]. We therefore hypothesize that:

H7*: Offline healthcare habits weaken the positive relationship between awareness and OHS use intention; so that the relationship is weaker when habits are at a high level.*

4. Methodology

4.1. Data Collection

An online self-reported survey was conducted for data collection to test the proposed research model and hypotheses. The major reason is that the OHS is a type of online services and its consumers are mainly Internet users. It is a convenient and efficient way to access them online. The questionnaire included three parts: in the first part, we asked respondents to evaluate their satisfaction perceptions on offline healthcare and their offline healthcare habits; in the second part, we briefly introduced OHS and gave respondents an initial knowledge and then asked them to report their responses to OHS; and in the third part, some demographic characteristics of respondents, such as age, gender, and education, were required.

All the measures were adopted from previous literature (please refer to Appendix A) and evaluated on a 7-point Likert scale. Particularly, habit is previously conceptualized as a formative construct with four sub-dimensions, namely intentionality, behavioral awareness, behavioral controllability, and mental efficiency [Polites 2009; Polites et al. 2012; Venkatesh et al. 2003]. Intentionality occurs when the habits are generated with some intentions in nature; behavioral awareness occurs when the habitual behaviors are conducted without any awareness of the individual; while behavioral controllability indicates that the habitual behaviors are difficult to control for the individual; and mental efficiency refers to the habitual behaviors that need fewer cognitive efforts [Polites et al. 2012]. In our context, offline healthcare habits refer to a person who will automatically choose an offline healthcare service to fulfill his/her medical goals in the presence of medical demands. The habitual behavior in this context is by nature goal-oriented, i.e., in its use of healthcare service; thus intentionality is captured in the automatic process. Therefore, consistent with prior literature, we conceptualized the offline healthcare habit as a second-order formative construct with three first-order reflective constructs: behavioral awareness, behavioral controllability, and mental efficiency [Polites 2009; Polites et al. 2012].

The questionnaire was first developed in English and then translated into Chinese. The face validity was checked by several patients with more than one year of online and offline experience. We showed them our items and subsequently revised those that made no sense for them. Then the content validity of the questionnaire was examined by five MIS PhD candidates. They provided comments and advices on the relevance and coverage of the items belonging to each theoretical construct. The final questionnaire was drawn up after these checks. The link (URL) of the questionnaire was delivered via e-mail and social networks. An incentive was provided for participants who completed the questionnaire. A total of 374 respondents completed the questionnaire, and 323 responses were found to be valid eventually. The respondents were from 27 provinces in China. About 54.5% of the respondents were male, and 55.1% of them were younger than 35 years of age. Most of them (87.3%) had a college education, and 86.4% had more than two years of experience in computer usage. Table 1 shows the demographic information of the respondents.

4.2. Measurement Model

Partial least squares (PLS) SEM was used to test our model because of its suitability for models with formative constructs [Andreev et al. 2009] and interaction terms [Chin et al. 2003], compared to CB-SEM. Following previous studies, we also conducted a two-step evaluation approach where we first assessed measurement model and followed this by evaluating the structural model.

The measurement model was aimed at assessing reliability, convergent validity, and discriminant validity. The reliability was assessed with the composite reliability (C.R.) and the average variance extracted (AVE). The recommended threshold was 0.7 and 0.5 respectively. The results in Table 2 show that these two criteria achieved the recommended cutoff, indicating the satisfactory reliability of the measurements. The convergent validity was assessed by checking whether the loadings of items within the same constructs were sufficiently large. The results in Table 2 indicate that all item loadings were satisfactory (except for PEXP2=0.505), showing good convergent validity. The discriminant validity was evaluated in two ways: (1) whether the items had greater loadings on their corresponding constructs than on other constructs; and (2) whether the root square of the AVE value of a construct was greater than the correlations with other constructs [Venkatesh et al. 2012]. Table 2 and Table 3 show that the scales satisfied the two criteria, suggesting the discriminant validity of the instruments.

Table 1. Demographic Information of Respondents

Demographic Factor		Frequency	Percentage
Gender	Female	176	54.5%
	Male	147	45.5%
Age	<=18	2	0.6%
	19-25	78	24.1%
	26-35	98	30.3%
	36-45	93	28.8%
	46-60	42	13.0%
	>=60	13	4.0%
Education	High school or below	41	12.7%
	Undergraduate	202	62.5%
	Postgraduate	80	24.8%
Computer usage experience	2 years or below	44	13.6%
	3-5 years	135	41.8%
	6 years or above	134	41.5%

Table 2. Factor Loadings and Cross Loadings

Construct	ITEM	AWRN	HBTA	HBTC	HBTM	InfS	PEXP	PI	SN	SAT	SerS	SysS	UI
Awareness (AWRN)	AWRN1	**.840**	-.244	-.235	-.288	-.166	.420	.524	.292	-.194	-.238	-.218	.589
	AWRN2	**.863**	-.111	-.132	-.125	-.189	.396	.448	.413	-.238	-.243	-.249	.564
	AWRN3	**.864**	-.081	-.164	-.219	-.243	.400	.466	.541	-.282	-.323	-.324	.619
Habit-Behavioral Awareness (HBTA)	HBTA1	-.102	**.733**	.507	.471	.182	-.056	-.184	.004	.164	.175	.217	-.139
	HBTA2	-.196	**.946**	.591	.557	.234	-.155	-.256	-.123	.234	.245	.269	-.203
	HBTA3	-.066	**.912**	.590	.463	.266	-.068	-.093	-.231	.256	.235	.230	-.089
Habit Behavioral Controllability (HBTC)	HBTC1	-.176	.610	**.940**	.505	.218	-.140	-.274	-.153	.270	.241	.273	-.218
	HBTC2	-.221	.635	**.955**	.535	.238	-.153	-.247	-.176	.262	.251	.294	-.244
	HBTC3	-.172	.568	**.897**	.493	.272	-.089	-.180	-.242	.297	.246	.310	-.178
Habit-Mental Efficiency (HBTM)	HBTM1	-.232	.579	.505	**.901**	.283	-.121	-.267	-.125	.321	.290	.311	-.233
	HBTM2	-.234	.570	.542	**.933**	.330	-.176	-.258	-.134	.353	.343	.364	-.219
	HBTM3	-.190	.416	.412	**.835**	.319	-.108	-.228	-.195	.373	.370	.378	-.213
Information Satisfaction (InfS)	InfS1	-.188	.212	.174	.258	**.904**	-.061	-.140	-.235	.601	.692	.656	-.215
	InfS2	-.211	.241	.229	.321	**.951**	-.085	-.155	-.330	.672	.749	.719	-.229
	InfS3	-.251	.264	.310	.379	**.931**	-.091	-.185	-.308	.710	.782	.774	-.266
Previous Internet Experience (PEXP)	PEXP1	.441	-.088	-.116	-.128	-.103	**.904**	.510	.262	-.093	-.134	-.134	.394
	PEXP2	.230	-.137	-.058	-.096	.075	**.505**	.289	-.062	.069	.010	.041	.188
	PEXP3	.395	-.099	-.135	-.131	-.111	**.852**	.491	.277	-.117	-.198	-.136	.379
Personal Innovativeness (PI)	PI1	.517	-.222	-.251	-.249	-.155	.515	**.913**	.248	-.155	-.199	-.176	.521
	PI2	.492	-.249	-.236	-.277	-.157	.520	**.910**	.253	-.173	-.191	-.194	.507
	PI3	.524	-.179	-.204	-.250	-.164	.528	**.918**	.311	-.193	-.188	-.208	.515
Social Norms (SN)	SN1	.468	-.093	-.186	-.166	-.314	.248	.280	**.958**	-.286	-.249	-.241	.453
	SN2	.471	-.143	-.202	-.152	-.289	.231	.287	**.956**	-.287	-.263	-.246	.422
Satisfaction on Offline health (SAT)	SAT1	-.315	.263	.280	.414	.709	-.112	-.210	-.235	**.938**	.836	.827	-.317
	SAT2	-.276	.236	.284	.379	.662	-.121	-.189	-.291	**.948**	.802	.800	-.295
	SAT3	-.158	.178	.241	.254	.578	.020	-.109	-.307	**.854**	.641	.665	-.228
Service Satisfaction (SerS)	SerS1	-.326	.268	.247	.344	.704	-.187	-.229	-.205	.709	**.898**	.749	-.254
	SerS2	-.262	.213	.201	.330	.765	-.109	-.167	-.246	.797	**.941**	.826	-.270
	SerS3	-.291	.235	.284	.357	.744	-.153	-.191	-.285	.810	**.930**	.843	-.307
System Satisfaction (SysS)	SysS1	-.322	.247	.279	.369	.778	-.133	-.193	-.272	.824	.863	**.929**	-.294
	SysS2	-.247	.255	.264	.337	.704	-.069	-.151	-.248	.788	.803	**.935**	-.310
	SysS3	-.268	.269	.310	.352	.589	-.135	-.236	-.152	.641	.679	**.829**	-.250
Use intention (UI)	UI1	.673	-.155	-.201	-.232	-.232	.396	.539	.441	-.295	-.285	-.301	**.920**
	UI2	.598	-.191	-.204	-.203	-.222	.407	.496	.376	-.261	-.263	-.264	**.912**
	UI3	.620	-.172	-.231	-.246	-.248	.379	.505	.433	-.291	-.276	-.304	**.908**

Table 3. Correlation Matrix

	AVE	C.R	AWRN	HBTA	HBTC	HBTM	InfS	PEXP	PIIT	SN	Sati	SerS	SysS	UI
AWRN	.732	.891	**.856**											
HBTA	.699	.873	-.167	**.836**										
HBTC	.867	.951	-.206	.651	**.931**									
HBTM	.793	.920	-.247	.592	.550	**.891**								
InfS	.863	.950	-.235	.258	.259	.347	**.929**							
PEXP	.689	.810	.474	-.128	-.139	-.153	-.086	**.830**						
PIIT	.835	.938	.560	-.237	-.252	-.283	-.173	.570	**.914**					
SN	.915	.956	.491	-.123	-.202	-.166	-.316	.250	.296	**.957**				
Sati	.836	.938	-.280	.251	.295	.389	.714	-.085	-.190	-.299	**.914**			
SerS	.852	.945	-.316	.257	.264	.372	.800	-.161	-.211	-.267	.838	**.923**		
SysS	.808	.927	-.310	.284	.313	.391	.774	-.123	-.211	-.254	.841	.875	**.899**	
UI	.834	.938	.692	-.188	-.232	-.249	-.256	.431	.563	.458	-.310	-.301	-.318	**.913**

As the correlations of the satisfaction constructs were a little high, there may be potential issue of multicollinearity. We tested the variance inflation factors (VIFs) of these constructs for multicollinearity. Results show that all VIFs were less than 5, which were far lower than the recommended cutoff of 10 [Cohen et al. 2013; Kutner et al. 2004], indicating that multicollinearity was not an issue in this study.

4.3. Common Method Bias Testing

The common method biases may influence the validity of the results, as the data was collected from a self-reported survey [Podsakoff et al. 2003]. We first checked the bias following Harman's (1967) single factor approach [Harman 1967]. We found the first unrotated factor only explaining 37.4% of the covariance in this study, suggesting that no single factor accounted for the overall covariance of all the constructs. However, some researchers argue that Harmon's method is not sufficient for testing the existence of common method bias [Love et al. 2013; Podsakoff et al. 2003]. We then used a modified marker variable analysis [Rönkkö et al. 2011]. Following the guidelines of [Rönkkö et al. 2011], three items in our data set with low correlations with items were chosen as marker variable items. The marker variable was then included in the model with its effects on three endogenous latent variables (i.e., use intention, awareness, and offline healthcare satisfaction). The results of the new model showed that the marker variable had no significant impacts on use intention, awareness, and offline healthcare satisfaction. The hypothesized relationships are qualitatively equal to the results before the marker variable was incorporated, indicating that common method bias had little impact on the results [Xu et al. 2010].

4.4. Structural Model

To measure the second-order construct—offline healthcare habits we first ran the full model with the first-order constructs (behavioral awareness, behavioral controllability, and mental efficiency). The resulting factor scores were used as the formative measures of habit [Choudhury et al. 2008; Polites et al. 2012]. Figure 2 shows the results of the entire structural model.

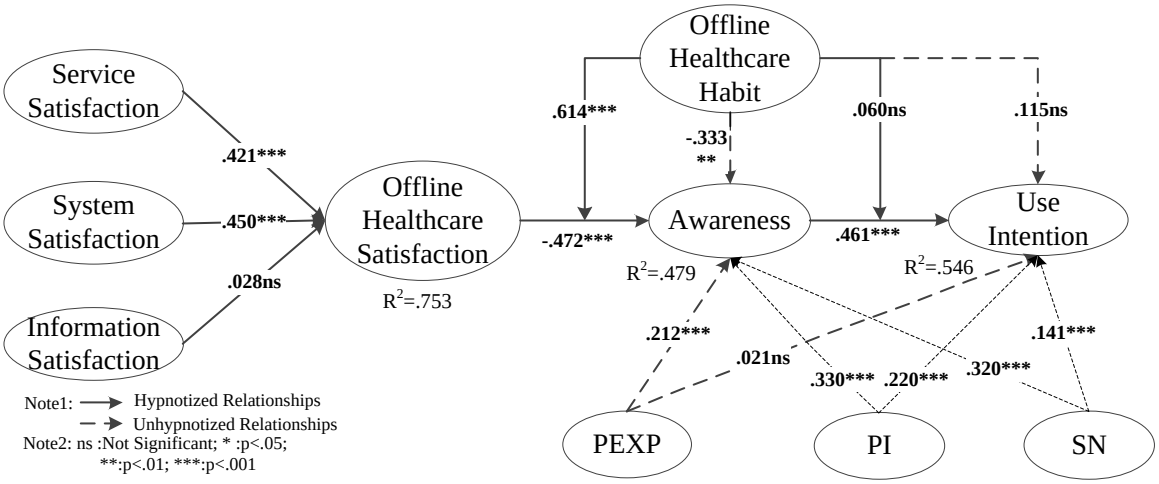

Figure 2. PLS Results for Research Model

First, the significant positive effects of service satisfaction and system satisfaction on offline healthcare satisfaction were observed; service satisfaction was positively related to user overall satisfaction (β=0.421, t=6.76, p<0.001), and system satisfaction was positively associated with user overall satisfaction (β=0.450, t=7.65, p<0.001). However, the effect of information satisfaction on user overall satisfaction was insignificant (β=0.028, t=.618, n.s.). Therefore, H1 and H2 are supported while H3 is not. All these three sub-dimension satisfactions together explained 75.3% of the variance of user overall satisfaction.

Second, the negative effect of offline healthcare satisfaction on awareness of the OHS was significantly confirmed (β=-0.472, t=4.01, p<0.001), thus indicating that user overall satisfaction on offline healthcare hinders their awareness of a new healthcare mode (i.e., OHS in this study). Therefore, H4 is supported. The moderating role of habits on this relationship was positively significant (β=0.461, t=6.74, p<0.001). Thus, the positive moderating role of habit was examined, thus supporting H6. The main effect of satisfaction on offline healthcare, the moderating effect of habit, and three control variables explained 47.9% of the variance in awareness totally.

Third, the effect of awareness on OHS use intention was also observed (β=-0.472, t=4.01, p<0.001), indicating that once an individual is aware of the existence of OHS and has an initial knowledge about it, he/she would be more likely to use it. Therefore, H5 is supported. However, the moderating role of habit on the relationship between awareness and use intention was insignificant (β=0.060, t=0.508, n.s.), and hence H7 is not supported. The main effect of awareness, the moderating role of habit, and three control variables explained 54.6% of the variance in use intention.

4.5. Post-hoc Analysis

Prior literature suggests that individuals' health conditions may influence their decision-making process [Anderson et al. 2011; Druckman et al. 2008]. We then conducted a post-hoc analysis to further verify our findings and test whether the relationships are contingent on individuals' health conditions. We first divided the respondents into two groups according to their health conditions (manifested as frequency of sickness each year). Group 1 included 54 respondents who have sickness more than 4 times each year, and Group 2 included 220 respondents who have sickness less than 4 times each year (each person visit hospital about 4-5 times each year in China). We tested the basic model with the two subgroups and compared the path coefficients. Table 4 shows the results.

Table 4. Results of Post-hoc Analysis

Path	Group 1		Group 2		Comparison of Paths		
	β	T-Statistics	β	T-Statistics	Path Coefficients Differences	T-Statistics	Coefficient
SerS->Sati	.476	2.376	.413	5.664	***	4.01	*p* <.001
SysS->Sati	.250	1.391	.449	6.873	***	-13.94	*p* <.001
InfS->Sati	.112	1.114	.054	1.219	***	5.66	*p* <.001
Sati->AWRN	-.485	4.829	-.223	5.207	***	-31.68	*p* <.001
AWRN->UI	.492	3.763	.505	8.721	n.s.	-1.17	*p* >.10

The results show two-fold conclusions. First, for both groups, the H1, H2, H4, and H5 were supported, and H3 was not supported, being consistent with our previous findings. This indicates that our findings regarding to the direct relationships in the model are robust. Second, the comparison results showed that individuals with severe health conditions paid more attention on service satisfaction and information satisfaction when forming overall satisfaction on offline healthcare. Furthermore, their overall satisfaction plays a more significant role in predicting the awareness of OHS. This is reasonable since their frequent sicknesses can result in more service experience in offline healthcare, and then they will rely more on their offline service experience in OHS decision-making process.

5. Discussion

5.1. Key findings

This study aims to explore how individuals' offline healthcare experiences and habits influence their use intention of the OHS. We found that users' overall satisfaction on offline healthcare influences their decision process on OHS by reducing the awareness of OHS. This finding links offline and online healthcare and emphasizes the fact that individuals, who are satisfied with offline healthcare, are less likely to use OHS, because it is less valuable for them to become aware of the OHS. This finding verifies the first research objective supporting our conjecture that offline healthcare can influence individuals' adoption of OHS.

Furthermore, we indicate that offline healthcare habits play a moderating role during an individual's decision process on OHS, including the relationship between user satisfaction on offline health services and awareness of OHS and between awareness and use intention of OHS. Our results propose that the moderating effect on the former relationship is positive and significant; that is, the effect of offline satisfaction on awareness of online service is weakened when the individual has a high sense of habit in the offline context. It indicates that an individual's unconscious process reduces the effect of the conscious process, which is consistent with arguments in prior literature [Chiu et al. 2014; Verville 1988]. However, the moderating role on the latter relationship was found to be insignificant, indicating that unconscious process formed in an offline context has a weaker effect on the decision process related to online channels. A plausible explanation is that both the conscious and unconscious processes cannot interact with each other when they occur in different contexts [Polites et al. 2012]. Offline healthcare habits lead individuals to choose offline healthcare automatically. While it does not influence their cognitive evaluation process of the alternative, the OHS. Thus, offline healthcare habits may have little effect on the cognitive process related to the diffusion of the OHS. Therefore, this finding achieves our second research objective that incumbent habits can moderate the path from offline healthcare evaluation to OHS awareness, but not the path from OHS awareness to use intention.

We also found out that service satisfaction and system satisfaction positively affects overall satisfaction on offline healthcare, consistent with findings in prior studies [McKinney et al. 2002; Vaezi 2013]. It infers that an individual, who is satisfied with the service or the platform of offline healthcare, tends to be more satisfied generally. However, information satisfaction was found to have no significant effect on overall satisfaction, contrary to the existing research [Vaezi 2013]. This may be due to the special information delivering mechanism in the offline healthcare system. In hospitals, health information is primarily delivered along with the service; such that the patients visit hospitals not just for accessing health information [Driscoll 2000]. Individual satisfaction on health information is given along with his/her evaluations of services. Thus, we infer that the effect of information satisfaction on user overall satisfaction may be mediated through service satisfaction.

We conducted another post-hoc analysis to test this mediation effect following the method proposed by Baron et al. [1986]. First, we tested the direct effect of information satisfaction on offline healthcare satisfaction without inclusion of service and system satisfaction and found that this relationship was positive and significant (β=0.714, t=26.47, p<0.001). Next, we included service and system satisfaction as well as the direct effect of information satisfaction on service satisfaction in the research model. The results show the effect of information satisfaction on user overall satisfaction became insignificant (β=0.029, t=0.622, n.s.); while its effect on service satisfaction became significant (β=0.799, t=31.39, p<0.001) and the effect of service satisfaction on user overall satisfaction was also significant (β=0.419, t=6.988, p<0.001). This suggests that information satisfaction exerts its effect on user overall satisfaction fully through service satisfaction.

5.2. Theoretical Implications

This study has several theoretical implications for the current literature. First, we contribute to the online service acceptance literature by examining the effects of offline service evaluation on the online service acceptance. The extant studies primarily examined how individual perceptions of online service affect the adoption intension and actual behavior [Chen et al. 2014; Gummerus et al. 2004]. The OHS is an extension of offline health services, indicating that evaluations of offline services may exert an effect on the diffusion of OHS [Polites et al. 2012]. However, this effect is understudied in the prior literature. Drawing on the Innovation Diffusion Theory, we proposed that offline healthcare satisfaction inhibits the diffusion of online service, because it acts as a prior condition that decreases individuals' awareness of OHS. This extends the current understanding of online service diffusion process through the consideration of the interplay between offline and online situations. Our findings prompt researchers to deeply think about the role of individual experiences on offline services when diffusing the equvalent online service.

Second, we enrich the existing literature by considering the role of offline habits in the online context. Habit has been long considered as a critical unconscious factor in affecting individuals' conscious decision process in the online context [Chiu et al. 2012; Chiu et al. 2014; Khalifa et al. 2002; Khalifa et al. 2007]. However, little is known about whether an offline haibit can play a role during the transition from offline service to online service. On our part, we investigated and empirically tested the contingent role of offline healthcare habits on the decision process of OHS diffusion. The results confirm the effects of the unconscious process during the transition and encourage future studies to consider it as an important perspective when studying e-service acceptance.

Third, this study extends the literature of user satisfaction into the traditional offline healthcare context by examining the relationships among three sub-dimension satisfactions (i.e., service satisfaction, system satisfaction, and information satisfaction) and overall satisfaction. Our empirical results propose that information satisfaction does not directly contribute to overall satisfaction in this context, which is incongruent with findings in prior

literature [McKinney et al. 2002; Vaezi 2013]. This raises an updated understanding of the sub-dimensions of user satisfaction in the offline healthcare context, with respect to the particular nature that health information in the offline context (such as in the hospital) is generally delivered along with health service. Thus, the dimension of information satisfaction is closely related to the dimension of service satisfaction, which is quite different from other contexts. This provides novel insights into the future studies that tend to take user satisfaction into account when studying traditional healthcare.

5.3. Practical Implications

This study also offers some practical implications. First, our empirical findings indicate that offline healthcare satisfaction hinders potential users from the awareness of the OHS. This prompts the OHS providers to target on the unsatisfied healthcare needs in the offline context to attract more potential users by complementing these needs by offering online services. Second, the OHS providers should promote their products to increase social awareness of the service, because awareness can be a core factor influencing user acceptance intention. They should have a high priority to introduce the OHS to the public, as well as its functions and benefits. Third, the contingent role of offline healthcare habits promotes OHS providers' promotion strategies, in such a way that breaking the offline healthcare habit is efficient for those people with poor satisfaction of offline healthcare. Whereas, in the case of others with high offline healthcare satisfaction, the efficient promotion strategy is to focus on other measures to increase awareness of online services, such as social norms, advertisements, and among others. Finally, this study also suggests some policy level implications. The results show that once an individual is dissatisfied with traditional healthcare, he/she is more likely to turn to OHS. Due to the large imbalance between health supply and demands in China, policy makers should make greater efforts to support the development of OHS and promote its diffusion.

5.4. Limitations

There are several limitations in this research. First, we collected data through an online survey website. Although this website enables us to invite respondents from all over the country, the generalizability of the research and the results of the offline context require further research. Second, Rogers [2010] argues that the innovation decision process includes two processes before decision, namely knowledge and persuasion. However, we only measured the effect of knowledge process—awareness. Additional research is necessary to explore the role of knowledge and persuasion during the OHS diffusion process. Third, as a survey based empirical study, it just proposed and tested the moderating role of offline healthcare habits. It is useful to conduct a qualitative study to verify this contingent effect. Finally, our study was conducted in China, which lacks cultural diversity and limits the generalizability to other cultures.

6. Conclusion

This study aims to bridge the relationship between offline healthcare and online health service to understand the diffusion process of the OHS better by examining the two research questions (the path from offline healthcare to OHS and the moderating role of the offline habit). Drawing on the Innovation Diffusion Theory and the habit literature, we developed a research model and theorized that overall satisfaction on offline healthcare hinders the diffusion of the OHS, according to its decreasing effect on awareness of the OHS. Furthermore, the offline healthcare habit also plays a role during the diffusion process. Our empirical findings confirmed the proposed hypotheses. The current study extends our understanding of online service acceptance by investigating the role of incumbent situation experiences during online service diffusions, such as offline healthcare satisfaction and offline healthcare habits. We also provided some guidelines for the OHS providers to improve their services and to attract more consumers.

Acknowledgment

This study is a learning outcome of the Guided Study subject of the first author at The Hong Kong Polytechnic University. This study was also partially funded by the National Natural Science Foundation of China (71531007, 71622002, 71471048, 71471049, and 71490720).

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Appendix A

Constructs	Measurements
Information Satisfaction [Xu et al. 2013]	Overall, the information I got from [offline healthcare] was very satisfying for my medical demands.
	I am very satisfied with the information I received from [offline healthcare] for my medical demands.
	[Offline health services] provided very satisfactory information to my medical demands.
Service Satisfaction [Xu et al. 2013]	Overall, the service I received from [offline healthcare] was very satisfying for my medical demands.
	I am very satisfied with the service I received from [offline healthcare] for my medical demands.
	[Offline healthcare] provided very satisfactory service to my medical demands.
System Satisfaction [Xu et al. 2013]	All things considered, I am very satisfied with the hospitals/clinics providing me health service.
	Overall, my interaction with the hospitals/clinics for health service was very satisfying.
	The hospitals/clinics were very satisfying for me to get healthcare service.
Offline Healthcare Satisfaction [Fang et al. 2014]	Please choose the number that best describes how satisfied you are with previous experiences with offline healthcare experience.
	Overall, extremely satisfied.
	Overall, extremely pleased.
	My expectations were exceeded.
Habit– Behavioral Awareness [Polites 2009]	Whenever I need to see a doctor/have health consultations, I choose to use [offline healthcare] without even being aware of (making) the choice.
	Whenever I need to see a doctor/have health consultations, I unconsciously start using [offline healthcare].
	Choosing [offline healthcare] when I need to see a doctor/have health consultations is something I do unconsciously.
Habit –Behavioral Controllability [Polites 2009]	I (would) find it difficult to overrule my impulse to use [offline healthcare] when I need to see a doctor/have health consultations.
	I (would) find it difficult to overcome my tendency to use [offline healthcare] when I need to see a doctor/have health consultations
	It would be difficult to control my tendency to use [offline healthcare] when I need to see a doctor/have health consultations.
Habit –Mental Efficiency [Polites 2009]	I do not need to devote a lot of mental effort to decide that I will use [offline healthcare] when I need to see a doctor/have health consultations.
	Selecting [offline healthcare] when I need to see a doctor/have health consultations does not involve much thinking.
	Choosing [offline healthcare] when I need to see a doctor/have health consultations requires little mental energy.
Use Intention [Johnston et al. 2010]	I intend to transit to [online healthcare services] in the future when needed.
	I predict I will use [online healthcare services] in the future when needed.
	I plan to use [online healthcare services] in the future when needed.
Previous Internet Experience [Meuter et al. 2005]	I commonly use Internet-based services when dealing with daily business.
	I do not have much experience in using the Internet. [reverse coded item]
	I use a lot of technologically based products and services.
Personal Innovativeness [Lee 2013; Rogers 1995]	I am willing to take new things/services
	I think it is very interesting to try new things or services
	I enjoy trying on new things/services
Social Norms [Kim 2009]	People who influence my behavior think that I should use the [online healthcare services].
	People who are important to me think that I should use the [online healthcare services].