**Exploring Doctor-Patient Interaction Dynamics in an Online Healthcare Community**

**Abstract:** With the increasing dilemma of the rapid demand for healthcare services but limited resources in China, how to creatively allocate and use healthcare resources across a broad population has become a salient issue. Online healthcare communities are regarded as a potential ICT-based partial solution. In contrast to traditional healthcare, doctor patient interaction is free of time and space limitation and is exposed to awhole community. These characteristics are key to achieving synergistic doctor-patient interaction and community development in the longer term. This paper explores three research issues in an online healthcare community (OHC) context: 1) the impact of doctors’ reputation (and associated mechanisms) on patients’ choice of doctor services; 2) the mechanisms of motivating doctors to interact with patients; and 3) the reasoning and means that doctors use to balance their effort and service price to maximize their online value. Employing a qualitative-quantitative mixed methods approach, we systematically investigate doctor patient interaction dynamics from multiple perspectives using multiple data resources. The research contributes to the OHC literature by exploring theory and methods related to mechanisms of patient’s choice for trustworthy products (services) based on doctor’s online-offline information as well as the impact of doctors’ social capital investment process to their knowledge sharing behavior in publicly visibilty contexts. These theories and methods help communication and interaction between doctors and patients (hence improving doctor patient relationships), ultimately providing implications for effectively and efficiently allocating scarce healthcare resources to a broader population.

**Keywords:** Online Healthcare Community;Doctor-Patient Interaction; Knowledge Sharing; Incentive Mechanisms

**INTRODUCTION**

Healthcare is one of the most important aspects in people’s lives. With the rapid development of Internet technology, online healthcare communities (OHCs) have come into vogue. According to Health Online 2013, the number of adults who use the Internet to search online health information has increased to 59% in the U.S. ([Fox et al. 2013](#_ENREF_35)). The Chinese government hasalsoopened the medical market further byencouraging doctors to serve patients through multiple channels ([Wang 2014.04.09](#_ENREF_68)).

With the rapid development of Web 2.0, the use of social media and its ability to promote the connection between patients and relevant stakeholdershas been noted as “Health 2.0” ([Ba et al. 2013](#_ENREF_7)). Thus, OHCsare becoming an important channel to promote medical service, such as providing doctors with many functions to help themprovide better services. For example, through these communities, a registered doctor can publish medical articles and notes to help patients get more medical information. Further, a Q&A function can be opened by the doctor to solve patients’ problems. Doctors use these functions with varying effort to achieve their goals. For patients, an OHC is a platform through whichthey can search for health information, e.g., suggestions to help them recuperate.

Research has examinedthe benefits of OHCs from different perspectives ([Ba et al. 2013](#_ENREF_7)). [McGeady et al. (2008](#_ENREF_50))have studied information delivery between patients and doctors,discovering that an online community can increase quality of care due to the increase in communication between patients and doctors. [Sillence et al. (2007](#_ENREF_64)) analyze whether or not patients trust online consultations,reporting that the Internet can affect people’s decisions andthat experience can change the level of trust. [Yang et al. (2010](#_ENREF_73)) believe that emotional support can help patients move to a healthier state, and [Kucukyazici et al. (2011](#_ENREF_46)) argue that online healthcare communities can provide information support for patients.However, research on online health communities is still in a preliminary phase, and research is warranted to contribute to both theory and practice.

Our motivation for research on doctor-patient interaction mechanisms in an online health community comes from the following three considerations.

* Deterioration of the doctor-patient relationship has become a major problem in China and around the world. Doctor-patient conflict can easily occur from lack of communication and poor quality transparency in healthcare. OHCs, as a new platform, provide reasonable and convenient ways of interaction between doctors and patients. However, because of the perceived Internet risk, doctor-patient interaction is restricted and constricted. Therefore, analysis of doctor-patient interaction patterns in an online health community becomes a key to understanding (and ultimately solving) the problem.
* Information asymmetry between patients and physicians has become a major challenge of modern medicine. As healthcare relates to patients’ life and death, research on health service becomes increasingly important(Arrow 1963). Selection of online healthcare service is different from a traditional face-to-face setting because patients face risk and uncertainty emanating from Internet-based identity of online service provision. In online healthcare, patients face particular uncertainty in ascertaining service expertise. Therefore, how to select a physician becomes a critical issue.
* Sustained development of online health communities depends on continued interaction between doctors and patients. Online health communities provide convenience to patients, and prompt doctors to actively use online health communities for economic and social return. Research on interaction mechanisms between doctors and patients in online health communities benefits both doctors and patients, in addition to promoting sustained online health community development.

In short, online health communities change traditional models of interaction between doctors and patients, and provide opportunities to establish new doctor-patient relationships. However, research on incentives, trust, and privacy in online healthcare is scant. The main research questions in this study are:(Q1)What is the nature of doctor-patient interaction dynamics in an Online Healthcare Community (OHC)?and(Q2)What mechanisms should be designed to support sustainabledoctor-patient interaction in OHCs?

Our research employs a mixed-methods approach to systematically investigate doctor patient interaction dynamics from multiple perspectives using multiple data resources. The research contributes to the online healthcare community literature by exploring theory and methods related to mechanisms of patient’s choice for trustworthy products (services) based on doctor’s online-offline information as well as the impact of doctors’ social capital investment process to their knowledge sharing behavior in publicly visibilty contexts. The objective is to help communication and interaction between doctors and patients (hence improving doctor patient relationships) and thus ultimately provide implications for effectively and efficiently allocating scarce healthcare resources to a broader population.

**BACKGROUND AND CONCEPTUAL FOUNDATIONS**

**Online Communities**

Web 2.0 technologies provide a new platform for social interaction([Ren et al. 2012](#_ENREF_60)). Online communities have become a hot topic in management research ([Kucukyazici et al. 2011](#_ENREF_46); [Miller et al. 2013](#_ENREF_52); [Ransbotham et al. 2011](#_ENREF_59); [Tsai et al. 2014](#_ENREF_65)). The growth of online communities has brought about knowledge sharing and collaboration among multiple stakeholders with special attention to user motivation and individual behavior([Faraj et al. 2011b](#_ENREF_32); [Zhu et al. 2012](#_ENREF_75)). The Internet, accordingly, is changing the way people access health knowledge, e.g., how online communitiesprovide information and emotional support([Yan et al. 2010](#_ENREF_72)). Patients can also share health information and treatment experience via the Internet.

There is only sparce research on online healthcare interaction and resultant doctor-patient relationships. To compensate for this research gap, this studyselects online health communities as the research context, reveals interaction mechanisms between doctors and patients, and adds to relevant online medical community research, as summarized in Table 1.

**Table 1. Online Community Research**

|  |  |  |
| --- | --- | --- |
| **Research Issue** | **Research Content** | **Literature** |
| Motivation and individual behavior | Researching the causes of contribution behavior in online communities | [Tsai et al. (2014](#_ENREF_65)) |
| Exploring how to build an online community between interrelated users | [Ren et al. (2012](#_ENREF_60)) |
| Analyzing users’ behavior in online communities | [Bateman et al. (2011](#_ENREF_9)); [Faraj et al. (2011b](#_ENREF_32)) |
| The effects of online community | Cooperation among participants | [Ransbotham et al. (2011](#_ENREF_59)) |
| Users’ behavior and decision-making | [Katona et al. (2011](#_ENREF_44)); [Zhu et al. (2012](#_ENREF_75)) |
| Knowledge sharing  | [Faraj et al. (2011a](#_ENREF_31)) |
| Contribution of online community to healthcare | Online communities helping health management | [Miller et al. (2013](#_ENREF_52)) |
| The rehabilitation of patients with chronic diseases | [Kucukyazici et al. (2011](#_ENREF_46)) |
| Emotional support helps patients’ rehabilitation in online communities | [Yang et al. (2010](#_ENREF_73)) |

**Online Community Interaction Behavior**

According to the OHC summary by [Schiavo (2013](#_ENREF_63)), the main types of interaction between doctors and patients in OHCs are: (1)patients search and select doctors;(2)doctors share knowledge with patients; and (3)patients respond to doctors through online comments, appreciation letters, etc. We define the process of (1) and (3) as belonging to the interaction driven by patients, and (2) as the interaction driven by doctors. The literature is organized by the two kinds of doctor-patient interaction.

***Studies about Online Feedback and Credence Goods(Patient Driven)***

This research draws on two streams of previous literature: 1) online word-of-mouth and 2)expert service and credence goods. Studies in the former stream are in information systems, while the latter literature exists primarily in economics.

Numerous studies have investigated the role of online feedback, e.g., ([Chen et al. 2013](#_ENREF_13); [Chen et al. 2011](#_ENREF_14); [Chen et al. 2004](#_ENREF_15); [Chen et al. 2008](#_ENREF_16); [Dellarocas 2003](#_ENREF_24); [Dellarocas et al. 2010](#_ENREF_25); [Dellarocas et al. 2006](#_ENREF_26); [Dellarocas et al. 2007](#_ENREF_27)). Electronic commerce is different from traditional face-to-face business models, where transaction parties may never meet; thus, there is serious information asymmetry between them, which can lead to opportunistic behavior and then raise mistrust ([Akerlof 1970](#_ENREF_1); [Ba et al. 2002](#_ENREF_6)). Feedback mechanisms can help consumers and businesses to conduct bilateral communication in order to enhance trust and cooperation, as well asto establish a good reputation.

Credence goods and expert service refer to the provider of services and goods havingmore information about quality than the consumer himself, such as physicians, lawyers, plumbers, and car mechanics, because the consumer lacks professional knowledge about service, and needs to be dependent on the service provider to determine the type of service and goods ([Darby et al. 1973](#_ENREF_23); [Dranove 1988](#_ENREF_29)). Quality of expert service can only be estimated after consumption, and there is significant information asymmetry between the service provider and consumer.

Healthcare is an example of what is known as expert service in the economic literature ([Dranove 1988](#_ENREF_29)). Because health service relates to patients’ life and death, selection of a physician is an important topic in expert service([Gao et al. 2011](#_ENREF_36)). Physicians provide expert knowledge, diagnosis and treatment([Dranove 1988](#_ENREF_29)), andphysician selection is thus vitally important to patients. However, physician service quality is difficult to be estimated by patientsnot only because the outcomes of health service are uncertain but also becausepatients lack specialized professional knowledge ([Arrow 1963](#_ENREF_5); [Gao et al. 2011](#_ENREF_36)).

Although there are plentiful studies that have previously investigated the selection of expert service and the method of decreasing information asymmetry between physicians and patients, most studies are focused on the offline environment. In this paper, we study the effects of physicians’ offline information and online feedback information on patients’ online selection. The summary of the literatureononline feedback and credence goods is shown in Table 2.

**Table 2. Summary of Literature on Online Feedback and Credence Goods**

|  |  |  |
| --- | --- | --- |
| **Research Issue** | **Research Content** | **Literature** |
| Online feedback mechanism | Feedback mechanism can help consumers and businesses to conduct bilateral communication to enhance trust and affect consumer decision-making and choice | [Archak et al. (2011](#_ENREF_3)); [Ba et al. (2002](#_ENREF_6)); [Chevalier et al. (2006](#_ENREF_17)); [Dellarocas (2003](#_ENREF_24)); [Forman et al. (2008](#_ENREF_34)); [Ghose et al. (2006](#_ENREF_37)); [Pavlou et al. (2004](#_ENREF_56)) |
| Feedback mechanisms to face the challenges. There is a subjective bias in feedback information | [Dellarocas (2003](#_ENREF_24)); [Levina et al. (2008](#_ENREF_47)) |
| Exploring the effect of consumer-created information and seller-created information | [Chen et al. (2008](#_ENREF_16)); [Dellarocas (2003](#_ENREF_24)) |
| Credence goods | Explaining why credence goods are produced | [Darby et al. (1973](#_ENREF_23)) |
| Combiningcredence goods with game theory to explain howthe signal in the short and long term will affect physician reputation and patient selection | [Dranove (1988](#_ENREF_29)) |
| through the punishment mechanism to get market equilibrium | [Alger et al. (2006](#_ENREF_2)); [Emons (1997](#_ENREF_30)) |

***Online Community Social Capital and Knowledge Sharing (Doctor Driven)***

In OHCs, the behavior of doctors is presented through knowledge sharing. Nahapiet and Ghoshal claim that social capital is a framework for explaining knowledge sharing behavior ([Nahapiet et al. 1998](#_ENREF_54)). Therefore, the study of knowledge sharing and social capital provides an explanation for the interaction between doctors and patients, especially that driven by doctors.

Knowledge sharing as a phase of organizational knowledge management has received scholarly attention. Some research focuses on the motivation and incentive mechanisms of knowledge sharing([Bartol et al. 2002](#_ENREF_8)). Bock, Kankanhalli and Malhotra demonstrate that knowledge sharing motivation in enterprise can be divided into external and internal incentives ([Bock et al. 2005](#_ENREF_11); [Kankanhalli et al. 2005](#_ENREF_43); [Malhotra et al. 2008](#_ENREF_49)). Knowledge shared among employees can be classified as either tacit or explicit ([Dhanaraj et al. 2004](#_ENREF_28); [Nonaka 1995](#_ENREF_55); [Reychav et al. 2009](#_ENREF_61)). Tacit knowledge is more difficult to share among employees than is explicit knowledge, since sharing it requiressignificantly more time and effort ([Ipe 2003](#_ENREF_42)).

The rise of virtual communities (VCs) has been considered an important stimulus for knowledge management interest ([Bieber et al. 2002](#_ENREF_10); [McLure Wasko et al. 2000](#_ENREF_51)). The Internet makes knowledge sharing visible, and such visibility can reduce the intention of social loafing for rational employees([Zhang et al. 2013](#_ENREF_74)). [Moon et al. (2002](#_ENREF_53)) have found reward to be positive to individual knowledge sharing in an environment where individual performance can be evaluated (i.e., high visibility). The most representative two kinds of online communities are: user-generated websites (e.g., wikipedia), which is sharing knowledge for free and by volunteers([Ardichvili et al. 2003](#_ENREF_4))and knowledge crowd sourcing,which has attracted more scholarly attention in recent years([Haas et al. 2007](#_ENREF_38)) as a platform for monetary knowledge sharing based on online communities.Although numerous existing studies have investigated knowledge sharing in multiple environments, incentive factors, barriers, etc, there is a lack of empirical studies employing the decisions made between monetary and volunteer knowledge sharing in a visible condition([Hara et al. 2007](#_ENREF_39)).

Employee social capital has been shown to play a major role in forming knowledge sharing intentions ([Daniel et al. 2003](#_ENREF_22)). Social capital is a useful construct for thinking about collaborative virtual learning environments and distributed communities of practice ([Chang et al. 2011](#_ENREF_12); [Chow et al. 2008](#_ENREF_19); [Hoffman et al. 2005](#_ENREF_41); [Nahapiet et al. 1998](#_ENREF_54); [Tsai et al. 1998](#_ENREF_66);[Kawachi et al. 2008](#_ENREF_45)). Searching “social capital and health” on Google scholar generates over 2,730,000 hits, mostly research on individual social capital having a positive influence on one’s physical and mental health. Our research interest involves social capital in healthcare related networks and the impact on health stakeholders.

Social Capital can be defined as resources embedded in a social structure that isaccessed and/or mobilized in purposive actions ([Lin 1999](#_ENREF_48)). From a micro perspective, social capital belongs to the individual in society ([Flap et al. 2003](#_ENREF_33); [Lin 1999](#_ENREF_48)); From a macro point of view, social capital should be contained in a collective organization or network ([Coleman et al. 1994](#_ENREF_21); [Putnam 1995a](#_ENREF_57); [Putnam 1995b](#_ENREF_58)). Thethree dimensions of social capital (structure, relational, and cognitive ) ([Nahapiet et al. 1998](#_ENREF_54)) have become hot topics in the study of knowledge sharing behavior in virtual communities ([Chiu et al. 2006](#_ENREF_18); [Wasko et al. 2005a](#_ENREF_69)).[Lin (1999](#_ENREF_48))has raised a process model for social capital investment and returns, and considers social capital as resources to which people have access and of which they purposelytake advantage. An online community converts the process of knowledge sharing from implicit (only visible by participants) into public (visible for all members)([Zhang et al. 2013](#_ENREF_74)). In recent years, there has been some research using social capital theory for explaining knowledge sharing behavior in virtual communities (shown in Table 3).

**Table 3. Research on Social Capital and Knowledge Sharing in Online Communities**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Research content** | **real-namVC** | **Owners of SC** | **Content of SC** | **Measurement of SC** | **Returns of KS** | **Literature** |
| Access to social capital and establishment social cognition is promotion for voluntary employee knowledge sharing in organization | Yes | Individual | Three dimensions | Survey with scale | volunteer | [Chiu et al. (2006](#_ENREF_18)) |
| Knowledge sharing in Online communitiesis affected by the user to gain social recognition in the community | No | individual | Three dimensions | Survey with scale | volunteer | [Wang et al. (2010](#_ENREF_67)) |
| Personal social capital and social cognitive impact knowledge contribution in the virtual community | No | Individual | Three dimensions | Survey with scale | volunteer | [Wasko et al. (2005b](#_ENREF_70)) |
| Collective social capital affects reward knowledge sharing behavior | Yes | Collective | Three dimensions | Social Network Analysis | monetary | [Hau et al. (2013](#_ENREF_40)) |

**Research Gap**

There is a research gap in the study of the interaction between doctors and patientsin medical fields. Drawing on the literature of online community and credence goods, we find the following: (1) previous studies on patient selection are confined to the offline environment, and are not combined with online health information; (2) compared to the traditional physical environment, there is higher perceived risk on the Internet. Although online feedback mechanisms can help consumers reduce perceived risk and to enhance confidence, online feedback mechanisms alone are not sufficient to influence consumer choice; and (3) service providers canreasonably allocate their involvement (work energy and time) and pricing to achieve maximum personal value, using feedback information and offline information.

Drawing on the literature on social capital and knowledge sharing, we summarize as follows: (1) although there is a plethora of research targeting social capital, on knowledge sharing and online communities individually, few studies have examinedacombination of the three fields; (2) there is a lack of research considering both voluntary and monetary knowledge sharing in a single online community, especially under a visible and public content setting; and (3) a plethora of studies underlines the three dimensions of social capital; however,applying social capital investment modelsinempirical research remains little studied.

**RESEARCH APPROACH**

Pointing to a lack of theoretical studies, our study make a contribution by: (1) investigating the effect of physicians’ offline personal information and online feedback on patients’ selection to study the effect of doctors’ information on patients’ choice using an interaction mechanism model; (2) examining knowledge sharing behavior with different kinds of knowledge by synthesizing social capital investment models; and (3) exploring how doctors allocate work energy and time, pricing reasonably to achieve maximum value. Consequently, the positions of our research in the existing literature are shown in Figure 1.



**Figure 1.Positions of Our Research in the Literature**

According to the interaction driven by different participants (doctors and patients), we conducted three inter-related research studies built on a double-cycle model for the interaction between doctors and patients in the OHC,shown in Figure 2.

* Study1 investigates the effect of physicians’ offline personal information and online feedback on patients’ selection. This research studies the effect of doctors’ information on patients’choice in the interaction mechanism model. The results of this studyassist in developingthe theory related tosearch cost in OHCs and reducing information asymmetry between doctors and patients.
* Study 2examinesthe incentive mechanism for doctors using OHCs. This study targets the process of expected doctor’sbenefits, the decisions made by doctors’ knowledge sharing behavior and the returns paid by patients. As a contribution, a social capital investment-return model is built to help explain doctors’ knowledge sharing behavior. The results can be applied toencourage doctors’ continuance intention in using OHCs.
* Study 3 examinesregulatory mechanisms of doctors’ involvement and pricing with a focus on interaction in studies 1 and 2, and analyses how doctors allocate and balance their online/offline information and effort to attract patients effectively by constructing an allocation and pricing model. This study provides guidance to help doctors achieve their personal valueand makes a contribution to improving the shortage of medical resources.

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**Figure2. A Double-Cycle Model for the Interaction between Doctors and Patients in OHCs**

**Study 1- PhysicianInformation& Feedback Effect on Patient Selection**

In China, a physician’s status plays a significant role impacting a patient’s selection, and many physicians are not chosen. This is not because they are not qualified, but because of their status. A physician’s status (such as a physician’s title and hospital ranking)is very important information ina patient’s selection. Sometimes, patients need towait several months for an expert and famous physician because of his/her status. In the OHC, there is not only physician *offline* information, such as physician’s title and hospital ranking, but also *online* information, such as feedback. Online feedback can comprehensively reveal a physician’s capability as well as service quality, and help patients make a more confident decision. Therefore, based on the perspective of patient-driven interaction, this study explores the effect of physicians’ information on patients’ decision-making.

According to signal theory, signals (information) from a signaler (physician) will affect receivers’ (patients) choice and decision. However, signals have strength (weak or strong). In an online health community, a physicians’ information can be divided into two dimensions, i.e., online feedback (such as patient-generated content) and offline personal information (including a physician’s medical title, academic title, hospital rankingand city ranking). A patient’s decision is not affected by variouskinds of information. This studythus establishes an econometric model and laboratory experiment to investigate the effect of physicians’ information on patients’ decision.Figure 3 shows the model of patients’ selection.



**Figure 3. Model of Patient’s Selection**

This study uses a mixed method approach from multiple angles (doctor/patient) and multiple data sources (interview/experiment/online data) to explore the research questions. We develop a data collection platform to retrieve online healthcare community data. In addition, we adopt a survey, case interview and experiment (using an eye tracker) to analyze patient choice and doctor incentive mechanisms.Procedures are as follows.

* Determine the data type. Establish the research framework based on the literature.
* Data collection and emprical design. We develop a data collection platform, and we retrieve online information from HaoDF (<http://www.haodf.com/>).
* We conduct the research by using online data, experiment, and a survey based on theory-relatedOHC feedback, knowledge sharing and social capital.

**Study 2 - Incentive Mechanisms for Doctors Using OHCs**

From the perspective of doctors, this section explores the motivation of doctors’ knowledge sharing. The main content and critical questions of this section are: (1) Based on the model of social capital investment, a framework should be built for explaining the behavior of doctors knowledge sharing; (2) What are the different patterns of doctors gaining social capital returns among different kinds of doctors?

Lin (1999) declares that the processes of social capital are investment in social capital, access to, and mobilization of, social capital, and returns of social capital. In addition, the returns following investments in social capital can be classified as economic, political and social. Hence, from the perspective of social capital, doctors’ knowledge sharing through healthcare related websites is a form of investment, the motivation of which is to get the return of social capital.

In this study, we investigate a social capital investment model to explore the knowledge sharing behavior of doctors in OHCs. Moreover, the behavior pattern of doctors using OHCs points to thedoctor’s knowledge sharing motivation.Particularly on healthcare related websites, there are social capital returns (both economic and social) for doctors. However, doctors rarely obtain political returns. In this study, we examine the two dimensions of social capital returns based on doctors’ social capital investment in healthcare related websites, which are economic and social returns.

* The first dimension of social capital returns, economic returns, refers to the range of forms thatcan bring direct reality economic benefits([Chumbler et al. 2004](#_ENREF_20)). Here, we consider only the direct economic returns for the doctors from healthcare related websites, and do not address the indirect economic returns such as benefits brought by the increasednumberof offline clinic patients. These economic benefits mainly include the doctors' diagnosis and treatment online incomes and telephone therapeutic benefits ([Rumberger et al. 2006](#_ENREF_62)). In other words, on healthcare related websites, the doctor's economic returns are in the form of revenue from websites.
* The second dimension refers to social returns belonging to virtual returns. Social returns vary in aspects such as virtual thanks letter, online votes from patients and virtual gifts. These social returns for the doctor from healthcare related websites are a reflection of a form of personal gratification. Economic and social returns signify two different dimensions of social capital returns. As Figure 5 illustrates, these two dimensions capture four different scenarios of doctors in healthcare related websites.

The impact factors of doctors’ social capital investment span two domains:1) The online effort domain entails the actions and efforts of doctors on healthcare related websites,comprising a dynamic investment (such as sharing healthcare and treatment articles responding to patients’ questions and talking to patients frequently)and 2) The offline attributes entail the original attributes possessed by doctors comprising a static investment (manifested in clinical and academic titles, degrees of belonging hospitals, and locations of belonging hospitals). Although both domains are important, the nature of the factors is different and revolves around professionals with different efforts. The benefits brought by these two factors are also distinct and different between these two domains. In this research, we assess the impact of the online effort and offline attributes of doctors on the two dimensions of doctors’ online social capital returns.

We attribute the following names to different kinds of doctors, according to their social capital returns behavior: Group 1 is labeled*Double Winner*referring to great performance in both social and economic returns; Group 2 is labeled*Dedicator*indicating apreference of glory to wealth; Group 3 is labeled*Ordinary*pointing to those who are not outstanding in either social returns or economic returns; Group 4 is called *Mercenary*designating those who prefers wealth to glory in healthcare related websites. This categorization is presented in a two-dimensional quadrant form and shown in Figure 4. The front size roughly indicates the numberof observations in each category.



**Figure 4. Two-Dimensional Quadrant of Doctors**

According to the different categories of doctors, the empirical model of Study 2 is shown in Figure 5.

**Accessibility**

*Measured by Position Social Capital*

**Social Capital Returns**

*Economic Returns*

*Social Returns*

**Mobilization**

*Knowledge Sharing Behavior*

**Control Variables**

Departments

Longevity

Relations of Hypotheses 2

**Doctor Categories**

Relations of Hypotheses 1

H1a

H1b

H1c

H2a

H2b

H2c

**Figure 5.Research Model for Study 2**

**Study 3 - Regulatory Mechanism of Doctor Involvement and Pricing**

This study explores how doctors balance their involvement (work energy and time) and service price to achieve maximum personal value in online healthcare community.Recent OHC literature focuses on the internal mechanisms and effects of OHCs. Doctor-patient interaction, especially on how doctors balance their involvement and service price according to the feedback and offline information, has received little attention. Study 3 has the following attributes:

* Introduce effort to represent doctors’ involvement (work energy and time) as well as analysis of the impact of doctors’ online reputation, effort and service price on doctors’ consultation fees. The purpose is to analyze the online healthcare community feedback mechanisms’ effectiveness. The following contents, such as the classification of doctors, the allocation of doctors’ effort and pricing, are based on this.
* Divide doctors’ values into two dimensions: popularity and reputation. We classify doctors according to the dimensions of doctors’ value.
* Analyze the degree of doctors’ effort, and divide doctors’ efforts into several dimensions. Based on this, we analyze the impact of doctors’ efforts on service pricing and doctors’ personal values to answer how different types of doctors balance and allocate their online effort, and how they pricetheir fees to achieve their maximum personal value. Figure 6 shows the research model.



**Figure 6.Research Model (⊗ is the interaction of effort breadth and effort depth)**

**RESULTS**

Data have been gathered and in-depth analysis is in process on all three studies. Detailed reporting in this paper draft is beyond the scope of time available for this submission, but preliminary results are reported here. By the time of the workshop, there will be considerablymore to report and discuss.

**Study 1**

To test our hypotheses H1 and H2 on the effectiveness of the physicians’ offline personal information and online feedback, we build the following empirical model. Due to the large variance in dependent variables, the distribution is not normal. Thus, we developed the following log-linear linear regression model.

The a1 to a6 are the parameters to be estimated,andui is associated with observation i. Dependent variable may be less than 1, leading to inability to calculate results, so we change 1 into a dependent variable. Feedback is the sum of gift and letter. We want to use an integrated independent variable to measure online feedback, but there is a high correlation between gift and letter. Therefore, we put the two variables together.

Table 4 presents the descriptive statistics and correlations of physicians’ information in theOHC. Table 5 shows the results of our model by ordinary least square. The adjusted R-square and F values were reasonable. No VIF (variance inflation factor) statistics for the variables were greater than 1.7, indicating absence of multicollinearity. Moreover, we accounted for heteroskedasticity and reported hereoskedasticty-consistent standard errors in all our models.

**Table 4 Descriptive Statistics and Correlations**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable**  | **M** | **SD** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **Title1** | **3.32** | **0.78** | **1** |  |  |  |  |  |  |  |  |
| **Title2** | **1.46** | **1.31** | **0.534\*\*** | **1** |  |  |  |  |  |  |  |
| **Hospital ranking** | **3.00** | **1.12** | **-0.019** | **0.047** | **1** |  |  |  |  |  |  |
| **City ranking** | **22.47** | **20.39** | **0.029** | **0.021** | **0.183\*\*** | **1** |  |  |  |  |  |
| **Letter**  | **4.69** | **12.23** | **0.168\*\*** | **0.225\*\*** | **0.036** | **-0.025** | **1** |  |  |  |  |
| **Gift**  | **16.69** | **59.93** | **0.095\*\*** | **0.158\*\*** | **0.006** | **-0.038** | **0.653\*\*** | **1** |  |  |  |
| **Contribution**  | **3138.23** | **12880.25** | **0.057\*** | **0.100\*\*** | **0.001** | **0.007** | **0.441\*\*** | **0.512\*\*** | **1** |  |  |
| **First patients** | **222.43** | **875.90** | **0.062\*** | **0.098\*\*** | **0.006** | **0.020** | **0.432\*\*** | **0.758\*\*** | **0.665\*\*** | **1** |  |
| **Second patients** | **239.90** | **902.34** | **0.068\*** | **0.105\*\*** | **0.008** | **0.021** | **0.464\*\*** | **0.758\*\*** | **0.659\*\*** | **.993\*\*** | **1** |

| \*\*. Correlation is significant at the 0.01 level (2-tailed). |
| --- |
| \*. Correlation is significant at the 0.05 level (2-tailed). |

**Table 5 Parameter Estimates**

|  |  |
| --- | --- |
| Independent variable |  |
| CONS | -0.391\*\* |
| Title1 | 0.104\*\* |
|  | (2.047) |
| Title2 | 0.052\*\* |
|  | (1.700) |
| City Ranking | 0.003\* |
|  | (1.893) |
| Hospital Ranking | 0.035 |
|  | (1.150) |
| Feedback | 0.008\*\*\* |
|  | (14.327) |
| Log contribution | 0.081\*\*\* |
|  | (1.687) |
| Observation | 1269 |
| Adjusted R Square | 0.290 |
| F | 86.078 |

t statistics in parentheses ，\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

Hypothesis 1a predicted that physicians’ medical title would affect patients’ selection. We found support for this hypothesis because the coefficient of physicians’ medical title (title1, B=0.104, T=2.047, P<0.05) is positive and statistically significant. Hypothesis 1b posited that physicians’ academic title would affect patients’ selection. Results also provide support for this hypothesis because the coefficient of academic title (title2, B=0.052, T=1.700, P<0.05) is positive and statistically significant.

Hypothesis 1c proposedthat the hospital ranking where physicians work would affect patients’ selection. However, result do not provide support for this hypothesis because the coefficient of hospital ranking (B=0.035, T=1.150, P>0.1) is not statistically significant. Although city ranking of physicians’ hospital is only significant at the 0.1 significance level (B=0.003, T=1.893, P<0.1), the result still providesweak support for hypothesis 1d, that city ranking affects patients’ selection.

Hypothesis 2 posited that physicians’ online feedback information would affect patients’ online selection. The result supports our hypothesis, because the coefficient of feedback (B=0.008, T=14.327, P<0.01) is positive and statistically significant.

**Study 2**

Least-squares regression was used to estimate the relationship between Accessibility, Mobilization and Social Capital Returns. Table 6 provides the results of the estimation for Model 1. Step 1 analyzes the effects of the control variables, whereas Step 2 contains the results with the control and predictor variables. The synergy between *Accessibility* and *Mobilization* is added in Step 3. In Step 1, most*Departments*are related to Economic Returns (ER) and Social Returns (SR), and Longevity has a small but significant relation toER and SR. The result of Step 1 shows control variables explaining 24.3% and 10% of the variance for ER and SR (△R2=0.243, △F=474.22; △R2=0.10, △F=164.992), respectively. The results for Step 2 indicate that the main effects, *Accessibility* and *Mobilization,* both have positive and significant coefficients on ER and SR (△R2=0.20, △F=6225.34; △R2=0.26, △F=7850.38). This result supports H1a that Accessibility is positively associated with returns of OHCs (βER=0.26, p<0.01; βSR=0.19, p<0.01). H1b predicted that Mobilizationwouldbe positively associated with returns of OHCs, and the results are consistent with H1b,indicating significant coefficients (βER=0.52, p<0.01; βSR=0.72, p<0.01) on ER and SR, respectively.

Step 3 suggests that synergy between Accessibility and Mobilization isnegatively associated with economic returns of OHCs (βER= -0.01), but it has a positive relation with social returns (βSR=0.10). The coefficients are both weakly significant at p<0.01 level; however, contrary to the prediction in H1c, the F change of interaction on ER is not significant (△F=12.876). Thus, H1c is partially confirmed. [The proposed explanation to the unsupported H1c is that there is a significant inner substitutive effect between Accessibility and Mobilization, but it is not a common relation for all the evidence (doctors) so that there is not enough additional variance. To examine the predicted explanation, the result of Model 2 may address some support.]

**Table 6Regression Results for Hypotheses 1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Model with control effects（Model 1）** | **Model added main effects****（Model 2）** | **Model added interaction effects（Model 3）** |
|  | EconomicReturn | SocialReturn | EconomicReturn | SocialReturn | EconomicReturn | SocialReturn |
| (Constant) | 0.445\*\*\* | -2.124 | -0.07 | -0.175\*\* | -0.049 | -0.464\*\*\* |
| Departments（28） | -- | -- | -- | -- | -- | -- |
| Longevity | 0.002\*\*\* | 0.002\*\*\* | 0.001\*\*\* | 0.000\*\*\* | 0.001\*\*\* | 0.000\*\*\* |
| ▽Access |  |  | 0.258\*\*\* | 0.193\*\*\* | 0.260\*\*\* | 0.162\*\*\* |
| ▽Mobili |  |  | 0.515\*\*\* | 0.717\*\*\* | 0.525\*\*\* | 0.572\*\*\* |
| SynAM |  |  |  |  | -0.007\*\*\* | 0.102\*\*\* |
| RSqAdj R SqF Change | 0.2430.243474.217\*\*\* | 0.1000.100164.992\*\*\* | 0.4230.4236225.342\*\*\* | 0.3550.3547850.381\*\*\* | 0.4230.42312.876 | 0.3890.3882236.373\*\*\* |

\*, \*\*,\*\*\*Coefficients significant at p<0.10, p<0.05 and p<0.01 level.

To obtain additional insights and evaluate our hypotheses 2, we examined our additional model with the different impacts of the doctors’categories. The results of Model 2are shown in Table 7. From the resultsin general, Accessibility has a positive relationship with ER and SR, which fits the results of Model 1. However, there are insignificant associations or even negative effects of the detailed Accessibility factors. To subdivide it, most detailed factors of Accessibility arepositively associated with economic returns for Group 1, 3 and 4. On the contrary, the coefficients of some sub factors are insignificant (*βAT*,*βCL*, and*βHL*), and even the doctor’s clinic title is negatively associated with ER (βCT = -0.05, p<0.01). That is to say, for the Dedicators who have much SR but little ER, there is no relation between the economic returns they received with their offline social capital. However, for Group 1 and 4, the coefficients of most Accessibility sub factors are positively significant, and of them, hospital level (βHL1 = 0.21; βHL4=0.21) isgreater than both the clinic level (βCT1 = 0.06; βCT4=0.12) and academic level (βAT1 = 0.07; βAT4=0.11) (Wald test, F=564.9, p<0.01).

After closely examining the data, the statisticsshow that the Accessibility of Group 1 and 4 is significant greater than that of Group 2 and 3. In China, we recognize doctors with high clinic titles, academic titles and hospital levels as celebrityPhysicians, sinceprofessional service providers know more than patients, and the quality of service is difficult to estimate before consumption([Dranove 1988](#_ENREF_16)). For this kind of experience and credenceservice, consumers rely on word-of-mouth and official organization certification([Jahn et al. 2005](#_ENREF_26)), such as clinic title, academic title and hospital level. This is also supported by the social capital theory of [Coleman and Coleman (1994](#_ENREF_13)), the high norms and trust of doctors representing more social capital may lead to the respect of patients and result in outcomes from patients ([Sandefur and Laumann 1998](#_ENREF_43)). The more trustworthy and knowledgeable doctors are, the more “credit slips” they would get and themore patients they would attract. Therefore, Hypotheses 2 is partially supported.

**Table 7.Regression Results for Hypotheses 2**

|  |  |  |  |
| --- | --- | --- | --- |
| Model |  | Impact on Economic Returns | Impact on Social Returns |
| Factors | Subfactor | Group1 | Group2 | Group3 | Group4 | Group1 | Group2 | Group3 | Group4 |
| *Accessibility* | ***clinic-title***  | .058\*\*\* | -.05\*\*\* | .078\*\*\* | .118\*\*\* | .061\*\*\* | .063\*\*\* | .278\*\*\* | .172\*\*\* |
| ***acd-title*** | .065\*\*\* | -.008 | .089\*\*\* | .112\*\* | .027 | .069\*\*\* | .195\*\*\* | .092\*\* |
| ***city-level***  | .016 | .003 | .066\*\*\* | -.006 | .004 | .012 | .100\*\*\* | -.033 |
| ***hsp-level*** | .208\*\*\* | -.002 | .075\*\*\* | .210\*\*\* | .067\*\*\* | .136\*\* | .172\*\*\* | .017 |
| *Mobilization* | ***volEKSQ*** | .112\*\*\* | .095\*\*\* | .129\*\*\* | .024 | .184\*\*\* | .039\*\* | .080\*\*\* | .027 |
| ***volTKSQ*** | .434\*\*\* | .473\*\*\* | .379\*\*\* | .126\*\*\* | .602\*\*\* | .493\*\*\* | .298\*\*\* | .181\*\*\* |
| ***monTKSQ*** | .638\*\*\* | .183\*\*\* | .218\*\*\* | .764\*\* | .496\*\*\* | -.019 | .114\*\*\* | .146\*\*\* |
| ***KSF*** | .117\*\*\* | .388\*\*\* | .284\*\*\* | -.019 | .113\*\*\* | .098\*\*\* | .225\*\*\* | .101\*\* |
| *Interaction* | ***synAM*** | .001 | .019\*\*\* | .014\*\*\* | -.022 | -.01\*\*\* | .024\*\*\* | .002 | -.002 |

1. Control variables: department; b. \*\*\* 0.01, \*\* 0.05, \* 0.10; c. R2 = 0.558, 0.390, 0.305, 0.637, 0.558, 0.303, 0.324, 0.252;

Note: vol&mon: Voluntary&Monetary; EKSQ: Explicit Knowledge Sharing Quantity; TKSQ: Tacit Knowledge Sharing Quantity; KSF: Knowledge Sharing Frequency

**Study 3**

We tested the results without the variable price; however, we will test price in future analysis. Tables 8 and 9 provide the results of the estimations. Model 1, Table 8 and Model 1, Table 9 analyze the effect of the control variables, whereas others contain the results with the control and predictor variables. The results for Model 2, Table 8, indicate a positive and significant coefficient on OCHFB and OCHFD, which represents the popularity gains from online effort (Breadth regression coeffi-cient=0.304, p<0.01 and depth regression coefficient=0.332, p<0.01) as hypothesized, and thus H1a and H1b are supported. This result indicates that for doctors’ popularity, breadth and depth of doctors’ online effort are associated with higher popularity. H2a and H2b predict that the breadth and depth of online effort will be associated with higher doctors’ reputations. The results for Model 2, Table 9, indicate that OCHFD has a positive and significant effect on reputation (Regression coefficient=0.443, p<0.01), as predicted by H2b. However, contrary to the predication in H2a, breadth of doctors’ effort has no significant effect on reputation (Model 2, Table 9, regression coefficient=-0.073, p>0.1). Thus, H2a is not supported.

The negative and significant coefficient on lnOHCFB×OHCFDpop (Model 3, Table 8, Regression coefficient=-0.092, p<0.01) indicates that OCHFB and OCHFD are substitutive for popularity. Taken together, these results (Table 8) suggest that, for popularity, the breadth and depth of doctors’ online effort are sufficient by themselves for increasing popularity, and thus H1c is not supported. However, for reputation, the coefficient on lnOHCFB×OHCFDrep is positive and significant (Model 3, Table 8, Regression coefficient=0.083, p<0.1), and this is indicative of the presence of positive interaction between OHC functions’ breadth (OHCFB) and OHC functions’ depth (OCHFD), as predicted by H2c. Taken together, these results (Table 9) indicate that effort breadth affects the relationship between effort depth and reputation i.e., the higher the breadth, the stronger the relationship.coefficient=0.132, p>0.1). Thus, hypotheses 3c and 3d are not supported.

**Table 8. Regression Coefficients and Model Summary Statistics for the Test of Popularity**

|  |  |
| --- | --- |
| Control and Independent variables | Dependent variable is lnΔ*Pop* |
| Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| Hle | -0.053\*\* | -0.026 | -0.023 | -0.023 | -0.021 |
| lnEco | -0.075\*\*\* | 0.007 | 0.002 | 0.001 | 0.000 |
| Gender | 0.072\*\*\* | -0.007 | 0.000 | 0.000 | -0.004 |
| Etitdummy1 | -0.014 | 0.011 | 0.006 | 0.011 | 0.017 |
| Etitdummy2 | -0.067\*\*\* | -0.019 | -0.022 | -0.034 | -0.034 |
| Orep | 0.819\*\*\* | 0.445\*\*\* | 0.456\*\*\* | 0.459\*\*\* | 0.458\*\*\* |
| lnOHCFB |  | 0.304\*\*\* | 0.237\*\*\* | 0.237\*\*\* | 0.099\* |
| OHCFD |  | 0.332\*\*\* | 0.397\*\*\* | 0.395\*\*\* | 0.570\*\*\* |
| lnOHCFB×OHCFDpop |  |  | -0.092\*\*\* | -0.092\*\*\* | -0.087\*\*\* |
| Mtitdummy1 |  |  |  | -0.027 | -0.058\*\* |
| Mtitdummy2 |  |  |  | 0.002 | -0.016 |
| Mtitdumy1×lnOHCFB |  |  |  |  | 0.132\*\*\* |
| Mtitdumy2×lnOHCFB |  |  |  |  | 0.095\*\* |
| Mtitdummy1×OHCFD |  |  |  |  | -0.126\*\*\* |
| Mtitdummy2×OHCFD |  |  |  |  | -0.144\*\* |
| *R*-square | 0.633 | 0.831 | 0.835 | 0.836 | 0.839 |
| Adjusted *R*-Square | 0.630 | 0.829 | 0.833 | 0.833 | 0.836 |
| *F*-test (n=673) | 191.561\*\*\* | 406.836\*\*\* | 373.890\*\*\* | 306.309\*\*\* | 229.051\*\*\* |
| Δ*F*-test |  | 386.820\*\*\* | 19.524\*\*\* | 1.196 | 3.557\*\*\* |

\* indicates *p*<0.1\*\* Indicates *p*<0.05\*\*\* Indicates *p*<0.01

To test the moderating effect of medical title, we first define the medical title, Mtitdummyi, as a dummy variable. Mtitdummy1 takes the value of 1 if the title is associate chief physician, and Mtitdummy2 takes the value of 1 if the title is chief physician and the other is attending doctor. In model 4, Table 8, medical title has no relationship with popularity. Model 5, Table 8, gives the results of the interaction between Mtitdummy1 and OHCFB and the interaction between Mtitdummy2 and OHCFD. Results show that medical title is a pure moderator, indicating that the relationship between effort and popularity is contingent upon doctor title. Thus, hypotheses 3a and 3b are supported (lnOHCFB×Mtitdummy1 regression coefficient=0.132, p<0.01; lnOHCFB×Mtitdummy2 regression coefficient=0.095, p<0.05; OHCFD×Mtitdummy1 regression coefficient=-0.126, p<0.01; OHCFD×Mtitdummy2 regression coefficient=-0.144, p<0.05). The results reveal preliminarily that the popularity of doctors who have a high title will increase faster than will the popularlity of doctors who have a low title if they put their effort into breadth. However, doctorswith a low title will increase faster thanwill doctorswith a high title if they put their effort into depth. More research is needed to test the moderating effect.

Model 5, Table 9 shows that medical title is not a moderator (lnOHCFB×Mtitdummy1 regres-sion coefficient=0.026, p>0.1; lnOHCFB×Mtitdummy2 regression coefficient=-0.077, p>0.1; OHCFD×Mtitdummy1regression coefficient=0.031, p>0.1; OHCFD×Mtitdummy2 regression).Table 10 provides a summary of hypotheses support (or lack thereof).

**Table 9. Regression Coefficients and Model Summary Statistics for the Test of Reputation**

|  |  |
| --- | --- |
| Control and Independent variables | Dependent variable is Δ*Rep* |
| Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| Hle | 0.042 | 0.067\* | 0.063\* | 0.062\* | 0.066\* |
| lnEco | 0.219\*\*\* | 0.173\*\*\* | 0.174\*\*\* | 0.175\*\*\* | 0.177\*\*\* |
| Gender | 0.081\*\* | -0.017 | -0.022 | -0.021 | -0.021 |
| Etitdummy1 | 0.029 | -0.012 | -0.008 | -0.021 | -0.016 |
| Etitdummy2 | 0.065 | 0.029 | 0.031 | 0.027 | 0.025 |
| lnOHCFB |  | -0.073 | -0.014 | -0.013 | 0.032 |
| OHCFD |  | 0.443\*\*\* | 0.379\*\*\* | 0.377\*\*\* | 0.258\* |
| lnOHCFB×OHCFDrep |  |  | 0.083\* | 0.081\* | 0.086\* |
| Mtitdummy1 |  |  |  | 0.072 | 0.067 |
| Mtitdummy2 |  |  |  | 0.055 | 0.059 |
| Mtitdummy1×lnOHCFB |  |  |  |  | 0.026 |
| Mtitdummy2×lnOHCFB |  |  |  |  | -0.077 |
| Mtitdummy1×OHCFD |  |  |  |  | 0.031 |
| Mtitdummy2×OHCFD |  |  |  |  | 0.132 |
| *R*-square | 0.065 | 0.211 | 0.215 | 0.217 | 0.221 |
| Adjusted *R*-Square | 0.58 | 0.203 | 0.206 | 0.206 | 0.204 |
| *F*-test (n=673) | 9.252\*\*\* | 25.459\*\*\* | 22.779\*\*\* | 18.372\*\*\* | 13.318\*\*\* |
| Δ*F*-test |  | 61.762\*\*\* | 3.383\* | 0.800 | 0.751 |

\* Indicates *p*<0.1\*\* Indicates *p*<0.05\*\*\* Indicates *p*<0.01

**Table 10.Summary Hypotheses Test Results**

|  |  |
| --- | --- |
| Hypotheses | Supported? |
| **H1a.** Greater breadth of online healthcare community functions that doctors use will be positively associated with doctors’ popularity. | Yes |
| **H1b.** Greater depth of online healthcare community functions that doctors use will be positively associated with doctors’ popularity. | Yes |
| **H1c.** Interaction between breadth and depth of online healthcare community functions that doctors use will be positively associated with doctors’ popularity. | No |
| **H2a.** Greater breadth of online healthcare community functions that doctors use will be positively associated with doctors’ reputation. | No |
| **H2b.** Greater depth of online healthcare community functions that doctors use will be positively associated with doctors’ reputation. | Yes |
| **H2c.** Interaction between breadth and depth of online healthcare community functions that doctors use will be positively associated with doctors’ reputation. | Yes |
| **H3a:**The relationship between effort breadth and popularity is stronger for the doctor who has a high title than for those with a low title. | Yes |
| **H3b:** The relationship between effort depth and popularity is stronger for the doctor who has a low title than for those with a high title. | Yes |
| **H3c:** The relationship between effort breadth and reputation is stronger for the doctor who has a high title than for those with a low title. | No |
| **H3d:** The relationship between effort depth and reputation is stronger for the doctor who has a low title than for those with a high title. | No |

**DISCUSSION**
Preliminary results have confirmed the general appropriateness and usefulness of our research approach from patient and doctor perspectives.

* Patients appreciate the opportunity to have more information at their disposal and engage in exchanges with doctors accordingly. Interestingly, previous Internet experience seems not that influential. Patients tend to see online healthcare communities as significantly different than do other social communities and/or ecommerce sites. Issues such as information privacy and considerations of traditional doctor-patient interactions come to the fore. Disease severity is a likely moderator and especially influential with respect to patient willingness to provide information and expectations, e.g., response timeliness from doctors.
* Some doctors, especially those who are not that well established, grasp the opportunities associated with online healthcare communities and are willing participants albeit with different approaches. Doctors seeking more recognition tend to use a broader range of functions and more actively engaged, while more established doctors tend to stay more in-depth in particular functions, e.g., specialist advice. Overall, however, doctors are not nearly as enthusiastic as patients are in engaging and sharing information. Many doctors are wary of patient supplied information and reluctant to give up their historical position as omnipotent (and unchallenged) sources of knowledge.

Overall, OHCs open new avenues for interaction that can help ease patient uncertainty and frustrations with traditional medical systems while giving doctors an additional venue and avenue for career development and recognition. It seems reasonable to expect that these communities will continue to evolve to meet ever expanding interests of both doctors and patients.

**Research Significance**

Our research has several theoretical implications. Study 1 reveals how different dimensions of doctor information affect patient choice when patientsface the credence good uncertainly in a networked environment, thus enriching the study of online credence goods. Study 2 makes a contribution to the study of knowledge sharing motivation and incentive for participation, structures a research model based on the social capital investment return process, and puts forward suggestions to incentivize users to continue to use online healthcare communities. Study 3 structures the model of the allocation of doctors’ involvement and pricing, thus enriching relative research on the effect of service pricing in online healthcare communities.

Our research also has implications for practice through a morecomprehensive understanding of doctor-patient interaction mechanisms from which construction of online healthcare community platforms and the design of rules can proceed to incentivize users to continue to use OHCs. Thus, study 1 can help to break the phenomenon of doctor patient information asymmetry in the traditional medical. Study 2 can help to make it more convenient for patients to enjoy the service of doctors who have professional knowledge,and to improve the confidence of patients in selecting doctors. Study 3 can help doctors manage their work energy and time in achieving maximal professional medical resource value while: promoting doctor-patient interaction, improving doctor-patient relationships and reducing doctor- patient tension. Overall, our research puts forward suggestions to help solve social problems regarding the lack (and distribution) of scarce medical resources.

**Limitations**

This research is but the start of a much longer stream of research that is expected to progress over a number of years. The studies only begin to probe the issues and surface considerations. Further, the research is focused in China on a limited set of interactions. Cultural differences and historical experience with Internet-based applicatons can be expected to influence outcomes. There is certainly no sense of generalizability at this point in time, and much remains to be discovered and confirmed.

**Directions for Future Research**

Given that we have only scratched the surface of this domain, a myriad of opportunities exist for future research. Among these are extensions over time to track changes in behavior as doctors and patients become more familiar with use of Internet-based applications. Fuctionality and features are currently relatively primative and warrant extensive research to create interfaces that more effectively achieve desired outcomes. Systems thinking also needs to be brought into play as external organizational and governmental factors are taken into account. Doctors particularly have multiple professional and organizational allegiances that warrant consideration.

**CONCLUSIONS**

Healthcare is facing global challenges, given aging populations and lack of ability for traditional medical systems to cope with broader societal needs. Online healthcare communities provide a mechanism to help relieve some of the traditional congestion and open new avenues for doctor-patient interaction. Reflecting back on our research questions, we find that the nature of doctor-patient interaction in an Online Healthcare Community (OHC) is dynamic with numerous facets and considerations. This is reassuring in that a broad range of patient and doctor issues can be addressed, but this also demands more research to better understand why and how to better deal with circumstances that arise. In this regard, we are only at the beginning of being able to confidently prescribe what mechanisms should be designed to support sustainable doctor-patient interaction in OHCs. However, given the interest and engagement of both patients and doctors, as well as pressing societal needs, we feel that robust solutions are attainable. Additional research is warranted and accumulated experience is paramount to achieving ultimate success in this endeavor.

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