



## Service provision, pricing, and patient satisfaction in online health communities

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### ABSTRACT

**Background** The emergence of online health communities (OHCs) broadens and diversifies channels for patient-doctor interaction. In recent times, patient satisfaction has gained new attention within the context of OHCs where unique patterns are provided: a variety of services with unique attributes are available in OHCs for patients and doctors have the options of providing and pricing for different services. OHCs are given high hopes on improving medical efficiency and patient satisfaction. Knowing how these patterns in OHCs affect patient satisfaction is crucial for the development of OHCs and medical practices.

**Methods:** An empirical research is conducted to examine the effects of provision and pricing of online services on patient satisfaction by analyzing data from 2309 doctors in a Chinese OHC.

**Results:** The results from this study provided empirical support, suggesting that service quantity positively influenced patient satisfaction. A non-linear correlation between service price and satisfaction was explored and results suggested an inverted U-shaped relationship. At the low price level, service price led to an increase in patient satisfaction, whereas the high price level (over 330 CNY/US\$49) could have just the opposite effect. Importantly, we found that price difference between a doctor's different services significantly decreased patient satisfaction. A mediating effect was tested in post-hoc analyses, and results revealed that the impact of price difference on patient satisfaction was partially mediated by flexibility of service selection, and the mediating effect accounted for 28.6% of the total effect.

**Conclusions:** Our results indicate that patient satisfaction can be improved by effectively providing and pricing services in OHCs. Specifically, doctors can offer different type services and charge within a reasonable range.

### 1. Introduction

The development of economics and the growth of health awareness have promoted demands for high-quality medical care which is related to the life quality of patients. Despite being of universal importance, the healthcare industry is facing medical resource shortage and improper utilization, and increasingly intensified doctor-patient conflict problems. The improvement of patient satisfaction is key to reducing doctor-patient conflicts, enhancing trust [1], and eventually increasing health care utilization [2,3]. How to increase patient satisfaction has become the major concern of governments and medical organizations [4].

Providing a new channel for patients to seek health information [5], emotional support [6] and OHCs has been the focus of widely used all over the world. With the development of the Internet, service patterns

of OHCs have changed drastically. Traditional service patterns (i.e. question & answer) only provide online consultation. With the advance of IT technology, multiple methods such as voice call, video call and online-upload electronic files now assist doctors to diagnose and treat diseases [7]. As service patterns change, service prices follow. Most online services that were used to be free now all charge a premium.

OHCs encourage doctors to make full use of their fragmented time to serve patients and use these services to achieve their goals more efficiently. Doctors get a higher reputation in OHCs can also bring benefits for their hospitals, such as patient flow improved which helps them with career advancement and is necessary in China. Comparing with hospitals, there are two different advantages for doctors in OHCs. First, doctors in OHCs have more options to choose service provision at their convenience than those in physical hospitals. Second, doctors have the pricing power for online services. The free choices of the

*Abbreviations:* OHC (s), online health community (s); OWTS, online written treatment service; OTTS, online telephone treatment service; OOCAS, offline outpatient care appointment service; OLS, ordinary least squares; 2SLS, two-stage least squares

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provision and pricing do not exist in physical hospitals. OHCs also benefit patients in many ways. Patients can search for health information and medical treatment to help them recover more effectively. Moreover, OHCs help patients by decreasing transaction cost brought by geographic restrictions and time limitation.

With these advantages and conveniences, OHCs are given high hopes on improving patient satisfaction. The relationship between pricing and satisfaction has been widely studied in product fields [8]; however, there remind some gaps in knowledge in service field, especially in healthcare. Product/service quality<sup>1</sup> and monetary sacrifice should be incorporated into forming price and are fundamental to understanding the formation of consumer satisfaction [9]. Moreover, prior studies rarely investigate the impact of price difference of one seller's different products/services on consumer satisfaction. On one hand, medical service is often continuous and long-term, especially for chronic diseases. Patients often need to buy services repeatedly with the progress of disease. On the other hand, different services have their unique attributes, which could meet patients' different demands. The price difference may affect the flexibility of service selection for patients and influence their satisfaction. The purpose of this study is to empirically investigate the effects of service provision, pricing and price difference on patient satisfaction. The specific research questions addressed in this paper are:

**Q1.** How the provision and pricing of online services affect patient satisfaction in OHCs?

**Q2.** How price difference of one doctor's different services influence patient satisfaction in OHCs, and its possible mechanism?

The rest of this paper is organized as follows. In Section 2, we review relevant literatures on OHCs, multiple channel strategy, price-satisfaction and related theories, equity theory, then follow with our research hypotheses in Section 3. In Section 4, we describe the research context, data collection and variable measurement. We discuss our results, conclusions and implications in Section 5, 6 and 7.

## 2. Theoretical background

### 2.1. Multiple channel strategy

A review of the channel effect literature shows that OHCs that use multiple channels tend to be more successful [10]. The multiple channels adopted by sellers can influence the options available for transacting with consumers. Multiple channels interacting with consumers lead to enhanced efficiencies, accompanied with lower perceived risks and enhanced trust [11]. Combinations of channels can be used to target different kinds of consumers and offer different type services cost-effectively [12].

### 2.2. Price-satisfaction and related theories

In the marketing field, customer perceived quality and price are the main factors that influence customer satisfaction [2,13]. As perceived quality is more objective, decisions should be made mainly based on price [14]. Comparing with product industries, services have unique features: intangibility, inseparability, perishability and heterogeneity. With complex pricing structures in services, price in service marketing usually is more difficult to evaluate than tangible products [15], especially for health care.

#### 2.2.1. Price as signal of quality

Consumers are often unable to make clear quality comparisons

<sup>1</sup> In this paper, service quality in service field corresponds to product quality in product field; service process quality in service field corresponds to service quality in product field.

among sellers, one solution is to follow market signals of quality. Consumers often use price as a signal of product/service quality when facing uncertainty before making decisions [16–18], especially for one with high dispersion in quality. Consumers are willing to pay higher prices for sellers who are able to reduce their perceived risk and induce trust. Evidence shows that a big price-cut sometimes does not help preserve consumers, but may drive some potential consumers away since they may perceive the price-cut as a signal of poor quality [19]. From the economic perspective, price conveys both demand- and supply-related quality information. A higher price may reflect either high demands for high-quality or high-cost products/services [20]. As a signal of quality, higher price presents higher quality [21], which results in higher satisfaction [14].

#### 2.2.2. Transaction-cost economics theory

Based on transaction-cost economics theory [22], price is an indicator of the sacrifice made and affects satisfaction [23]. Customers have to pay costs for buying products/services [24] and they measure the cost before making decisions. Consumers select sellers in part to minimize transaction cost and uncertainty. Cost plays a vital role for consumers in deciding from whom to get the products/services. In most circumstances, higher cost decrease demand and increase switching [25]. Moreover, when the cost is high for buying the product/service, consumers are unwilling to pay time or money to evaluate or thank the seller.

### 2.3. Equity theory in social exchange

Equity theory [26] describes the psychology of people in social exchange relationships. They weigh up the ratios of their inputs and outcomes from the exchange and compare with others/referents. In an exchange relationship, when the ratios of perceived inputs and outcomes are psychologically inconsistent with the ratios of referents, consumers may feel inequitable and reduce inequity by decreasing inputs or leaving the exchange relationship. Equity theory is widely used in group decision and distribution of benefits research, and can be applied to a number of exchange situations and explain the consumer-seller relationships [27]. Consumers who feel being treated unfairly may take subsequent psychology or behaviors, such as dissatisfaction.

### 2.4. Online health communities

A number of OHCs have been developed by medical organizations and providers in recent years, making it easier for patients to find health information [28]. Such online communities are virtual forums for patients to discuss their health concerns, share information about treatments, and communicate with doctors. Most OHCs are characterized by two main functions: information search and social support [29]. Researchers have started to investigate the economic value [30] and social value [31]. Numerous studies have discussed the benefits of OHCs for patients. However, these studies mainly focus on information obtained and social support. Also, they study mostly patient's perspectives and their patient behaviors [32]. Great efforts need to be made to understand OHCs from doctors' perspectives and behaviors.

Online communities in China have emerged in recent years. China's large population generates a variety of unique needs for medical services, exhibiting unique behaviors in OHCs. OHCs in China help a great many patients by providing several services without the restriction of region. Different services have their unique attributes and help patients make accurate selections that suit their needs. These attributes reflects in length, timeliness and channels of services. This new interaction between doctors and patients is attracting an increasing amount of attention within psychological and health care researches, and calls for investigation of whether OHCs can improve patient satisfaction to alleviate doctor-patient conflicts.

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