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How Does the Overall Perceived Platform Quality Affect Consumers' Willingness to Pay for Online Health Platform? A Perspective of Updated IS Success Model

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How Does the Overall Perceived Platform Quality Affect Consumers' Willingness to Pay for Online Health Platform? A Perspective of Updated IS Success Model

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Abstract: How to motivate patients to purchase paid online health platform is important to the profitability of a platform operator. Based on updated IS success model, this paper establishes a research model to investigate the effects of perceived platform quality (including platform service quality, information quality and system quality) and consultation service quality (including consultation service benefit and consultation service risk) on consumers' willingness to pay (WTP). Using SPSS and Smart PLS, we analyzed 409 data from an online health service platform in China. The results showed that perceived platform quality and consultation service benefit were positively correlated with consumers' WTP. Conversely, consultation service risk affected consumers' WTP negatively. Our study promotes the research from consumers' using intention to consumers' willingness to pay, as well as provides a guideline to help operators of online health platforms improve user payment rates.

Keywords: perceived platform quality, online health platform, IS success model, willingness to pay

1. INTRODUCTION

With the improvement of living standards, people's demand for health care is also growing rapidly. Shortage of high-quality medical resources and unbalanced spatial distribution have led to the emergence of online health platform, which provides professional health care education and online consultation services [3]. In order to attract consumers' attention and use, in the initial stage, online health platforms mostly adopt the free mode. With the advent of the knowledge payment era in 2017, the platforms have tried to transform to the payment mode. "In the free mode, the user visits are very high, and the loss of users is serious after the transformation of payment mode." This phenomenon is obviously not conducive to the future profitability of the platform, so it is necessary to understand what factors will affect consumers' willingness to pay (WTP) for online health platform.

In the period when the online health platform adopts the free mode, the former scholars mainly studied the offline-to-online conversion, and the low utilization of online and other issues [12][18]. At present, online health platform adopts the payment model, and there is a lack of research on the situation of high access rate and low payment rate. Therefore, we plan to promote the research on the intention of using the online medical platform under the free mode to the research on the willingness to pay for the online medical platform under the paid mode.

In the payment model, we need to have a deep situational understanding of platform operators, health care providers and consumers. The extensive research in IS adoption, marketing, and online consumers' behaviours should provide us with useful implications. For example, the relationship between positive evaluation and IT or service adoption has been widely tested in both IS and marketing [15]. Simultaneously, consumers' quality perceptions have been widely accepted as a key driver for product or service adoption. This paper aims to study how specific types of quality assessment affect users' purchasing decisions, that is, to introduce users' quality

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assessment into the study of consumers' willingness to pay.

This article is based on the Updated IS Success Model. In research, we found that in the process of online health consultation, users mainly contact with online medical platform and doctors. So the quality evaluation of users can be divided into platform quality evaluation and doctor service quality evaluation. Based on the Updated IS Success Model, we divide the platform quality into platform service quality, system quality and information quality. At the same time, after reviewing the literature, we find that the research on service quality can be divided into two aspects: "consulting service benefit" (ie, positive evaluation of service) and "consulting service risk" (ie negative evaluation of service).Accordingly, we seek to answer the following question: *(1) How does the perceived platform quality affect consumers' willingness to pay? (2) How does the consultation service quality affect consumers' willingness to pay?*

Our research provides both theoretical and practical contributions. The theoretical contributions are as follows: Firstly, this paper introduces the dimension analysis of perceived platform quality and perceived service quality. Secondly, this paper analyses the impact of perceived platform quality and perceived service quality on consumers' willingness to pay, and this study deeply understands what factors will affect users' willingness to pay. Thirdly, this study promotes the research on the intention of using the online medical platform under the free mode to the research on the willingness to pay for the online medical platform under the paid mode. In practice, firstly, online health platform operators need to control platform quality and service quality from multiple dimensions. Secondly, the platform should strive to improve the quality of perceived platform and perceived service quality to enhance users' willingness to pay. Third, online health platform operators need to take a number of measures to reduce users' risk assessment of the quality of consulting services, and then enhance consumers' willingness to pay.

2.   THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

2.1 The updated IS success model

The D&M model proposed by DeLone & McLean in 1992 is a widely cited framework in the IS literature [14]. In the updated IS success model [5], IS qualities, such as system quality, information quality, and service quality, and satisfaction are considered as the key predictors of IS success. System quality refers to the desire technical characteristics (e.g., ease of use and user friendly), while information quality captures the issue of content (e.g., complete, up-to-date, and precise). Service quality refers to the overall service support provided by service providers through IS (e.g., customer support and service). Many studies have used D&M model to test the influences of IS qualities on individuals' behavior in a variety of contexts, such as IS usage and continuous use [10][11][14][16]. Their studies confirm that IS qualities have positive effects on IS continued use behavior and behavioral intention.

2.2 Platform quality

When healthcare consumers choose an online health platform, they are IT users. The overall quality of the platform as an IT system may influence consumers' proceeding to the adoption of services on the platform. Thus, we consider consumers' perceived platform quality as an essential contributor. Defined as the user's overall assessment of the extent to which online health platform meets his needs as a system user [1], platform qualities can be assessed from three dimensions: system quality, information quality, and service quality [5]. Information quality refers to the relevance, accuracy, adequacy and timeliness of information provided by websites. System quality refers to the ease of use of website navigation, fast loading of graphics and text, stable operation of the system, etc. Platform service quality refers to the user's evaluation of a series of services provided by the

platform to help or promote its use of online health platform. In the process of accessing the platform, patients will form a pleasant user experience, which enhances users' willingness to pay. Therefore, we propose the following hypothesis:

H1: Perceived platform quality, composed of platform service quality, information quality, and system quality, has a positive impact on consumers' WTP for online health platform.

2.3 Consultation service quality

With the continuous expansion of e-commerce and online transactions, service quality in online transactions has also attracted extensive attention of scholars. Through literature review, we find that the research on online service quality can be divided into "consulting service benefit" and "consulting service risk".

2.3.1   Consultation service benefit

Perceived benefits refer to any positive utility that consumers want to maximize in relation to purchasing behavior[9]. Szymanski and Hise (2000) [13] believe that the convenience and timeliness of websites are the main determinants of consumers' online experience. This study suggests that perceived consulting service quality can be measured by service convenience and service timeliness. Service convenience refers to the ability to consume at anytime and anywhere without visiting offline physical stores, online consumption avoids physical and emotional troubles when consuming through other channels [7]; Service timeliness refers to consumers can obtain timely information directly from the website without seeking help from others [17].We believe that the benefits of consulting services have a positive impact on consumers' WTP. Therefore, we propose the following hypothesis:

H2: Consultation service benefit, composed of service timeliness and service convenience, has a positive impact on consumers' WTP for online health platform.

2.3.2   Consultation service risk

Consultation service risk in this study is defined as consumers' perceptions about the potential and uncertain negative values associated with paid online health consultation. As an e-service, the adoption of online health consultation may suffer various potential for loss in the pursuit of the desired healthcare outcome, with the most predominant ones being privacy risk and performance risk [2][19].In the study, performance risk mainly refers to the possibility that doctors make wrong medical advice because of poor medical skills or inadequate communication with patients. Privacy risk refers to the possibility that the user's personal health privacy or financial information can be disclosed without his or her permission. Some Internet companies may take opportunistic actions to achieve additional economic benefits by using consumer personal information. Simultaneously，Lack of face-to-face communication may reduce the diagnostic accuracy of doctors and adversely affect the rehabilitation of patients. Therefore, we propose the following hypothesis:

H3: Consultation service risk, composed of privacy risk and performance risk, has a negative impact on consumers' WTP for online health platform.

3.   RESEARCH METHODOLOGY

3.1 Data collection

We conducted online surveys for this pilot study. All the measurements are adapted from established constructs in the literature, using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). A pre-test with 200 questionnaires was conducted in January 2018 to refine the measurements. For the main pilot study, 2000 questionnaires were sent to individuals who have online health consultation experience in China's biggest online healthcare platform Haodf.com. We received 409 valid responses (response rate of

20.45%). The demographic information is summarized in Table 1.

Table 1.   Sample characteristics

Items	Types & Percentages(%)
Gender	Male (56.5%), female (43.5%)
Age	16-24 (16.9%); 25-34 (43.5%); 35-44 (21.2%); Other (18.4%)
Education	High school or lower (14.2%); college or undergraduate (71.1%); graduate (14.7%)
Users' experience	Less than 1 year (22.5%); 1-2 years (29.6%); 2-3 years (23.7%); 3+ years (24.2%)

3.2 Preliminary results

3.2.1   Measurement model analysis

The adequacy of measurement model was evaluated based on reliability, convergent validity, and discriminant validity. Convergent validity is assessed using three criteria: (1) the composite reliability (CR) should be at least 0.70, (2) the average variance extracted (AVE) should be at least 0.50[6], and (3) all of the item loadings should exceed 0.70[4][6][8]. Table 2 lists the factor loadings, composite reliability, Cronbach's alpha, and AVE of the eight constructs in the measurement model.

As illustrated in Table 2, all of the latent constructs exceed the recommended thresholds, with CR values ranging from 0.92 to 0.96, AVE values ranging from 0.78 to 0.89, and all item loadings exceeding 0.85, suggesting adequate convergent validity.

Table 2.   Reliability and convergent validity analysis

Construct	Items	Factor loadings	T statistical test	Composite reliability	AVE
Platform service quality	PSQ1	0.92	22.80	0.944	0.807
	PSQ2	0.87	19.18		
	PSQ3	0.90	21.39		
	PSQ4	0.92	22.44		
Information quality	IQ1	0.92	22.56	0.944	0.809
	IQ2	0.87	20.06		
	IQ3	0.90	19.11		
	IQ4	0.91	22.24		
System quality	SQ1	0.91	23.14	0.936	0.786
	SQ2	0.85	17.89		
	SQ3	0.88	21.12		
	SQ4	0.90	20.77		
Service convenience	SC1	0.92	22.31	0.926	0.807
	SC2	0.90	19.53		
	SC3	0.88	18.24		
Service timeliness	TI2	0.93	13.09	0.925	0.861
	TI3	0.93	12.28		
Privacy risk	PR1	0.95	24.93	0.957	0.882
	PR2	0.93	22.50		
	PR3	0.93	22.84		
Performance risk	PER1	0.92	18.71	0.945	0.852

	PER2	0.91	16.69		
	PER3	0.94	18.90		
WTP for online health platform	WTP1	0.94	9.71	0.935	0.827
	WTP2	0.91	9.33		
	WTP3	0.88	8.93		

Discriminant validity refers to the degree to which items differentiate between constructs, and it is examined using two criteria: (1) the square root of the AVE of each latent variable from its indicators should exceed that construct's correlation with other constructs; and (2) the items should load more highly on constructs they are intended to measure than on other constructs[4].From Tables 3 and 4 it is clear that all items meet the above two requirements, indicating a good discriminant validity of the constructs.

Table 3.   Discriminant validity analysis

	1	2	3	4	5	6	7	8
Platform service quality	**0.9**							
Information quality	0.18	**0.9**						
System quality	0.22	0.27	**0.89**					
Service convenience	0.18	0.17	0.25	**0.9**				
Service timeliness	0.08	0.17	0.21	0.2	**0.93**			
Privacy service risk	-0.05	-0.07	-0.09	-0.12	-0.06	**0.93**		
Performance risk	-0.03	-0.01	-0.05	-0.08	-0.05	0.46	**0.92**	
WTP for online health platform	0.25	0.15	0.19	0.22	0.15	-0.14	-0.23	**0.91**

Table 4.   Cross loadings of the items

	Platform service quality	Information Quality	System quality	Service convenience	Service timeliness	Privacy risk	Performance risk	WTP for online health platform
PSQ1	0.916	0.184	0.208	0.193	0.062	-0.072	-0.055	0.250
PSQ2	0.866	0.143	0.221	0.134	0.101	-0.040	-0.012	0.150
PSQ3	0.895	0.179	0.167	0.124	0.040	0.007	0.014	0.243
PSQ4	0.916	0.145	0.206	0.175	0.100	-0.072	-0.051	0.247
IQ1	0.151	0.916	0.222	0.134	0.125	-0.082	-0.050	0.128
IQ2	0.189	0.869	0.272	0.178	0.180	-0.029	0.051	0.128
IQ3	0.170	0.901	0.258	0.164	0.138	-0.047	-0.001	0.125
IQ4	0.141	0.911	0.223	0.145	0.149	-0.105	-0.037	0.142
SQ1	0.197	0.214	0.910	0.254	0.205	-0.079	-0.015	0.153
SQ2	0.217	0.287	0.854	0.237	0.188	-0.045	-0.032	0.155
SQ3	0.180	0.185	0.884	0.219	0.196	-0.047	-0.023	0.139
SQ4	0.194	0.271	0.897	0.189	0.169	-0.127	-0.102	0.210
SC1	0.191	0.191	0.267	0.918	0.200	-0.148	-0.123	0.207
SC2	0.160	0.144	0.199	0.898	0.170	-0.023	0.014	0.148
SC3	0.118	0.130	0.216	0.879	0.171	-0.156	-0.111	0.227
ST2	0.094	0.157	0.228	0.186	0.928	-0.056	-0.023	0.124
ST3	0.063	0.149	0.169	0.187	0.928	-0.059	-0.074	0.150
PR1	-0.023	-0.084	-0.065	-0.074	-0.030	0.952	0.436	-0.125

	Platform service quality	Informatio n Quality	System quality	Service convenience	Service timeliness	Privacy risk	Performanc e risk	WTP for online health platform
PR2	-0.064	-0.065	-0.099	-0.135	-0.093	0.932	0.459	-0.156
PR3	-0.054	-0.055	-0.075	-0.134	-0.050	0.933	0.410	-0.118
PER1	-0.031	-0.010	-0.011	-0.060	-0.010	0.450	0.923	-0.241
PER2	-0.038	-0.020	-0.105	-0.108	-0.077	0.422	0.910	-0.187
PER3	-0.013	0.003	-0.021	-0.060	-0.060	0.411	0.936	-0.198
WTP1	0.215	0.120	0.193	0.183	0.148	-0.170	-0.264	0.940
WTP2	0.251	0.135	0.170	0.193	0.153	-0.141	-0.183	0.905
WTP3	0.211	0.144	0.141	0.218	0.095	-0.065	-0.163	0.881

3.2.2 Structural model analysis

Figure 1 illustrates all of the PLS analysis results for the structural model, including the path coefficients and their statistical significance. The bootstrapping procedure with the re-sampling method was used to analyze the statistical significance of the parameter estimates to derive valid standard errors or t-values.
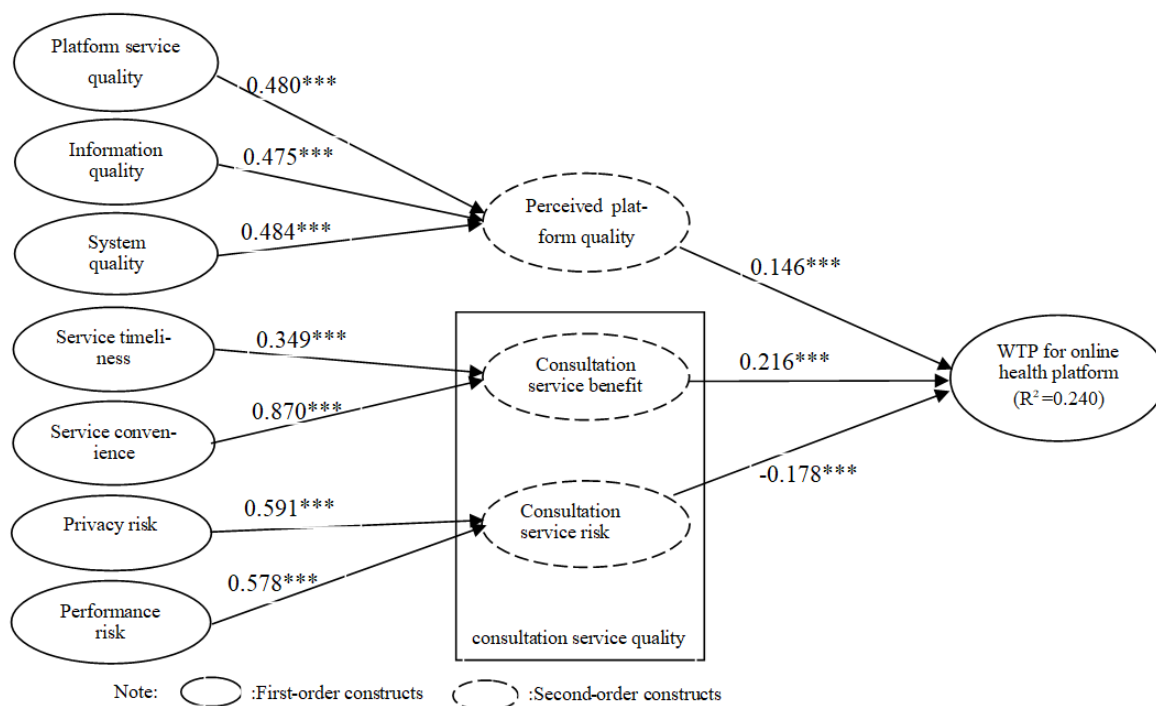

Figure 1.   The PLS results of the structural model

High item loadings on the designated constructs further indicate the validity of each latent factor. The significant path coefficients support our hypotheses 1 to 3 regarding the direct impacts of perceived platform quality, and consultation service quality on consumers' WTP for online health platform. Specifically, perceived platform quality is positively associated with consumers' WTP for online health platform, and the path coefficient is significant at the 0.001 significance level ($\beta = 0.15$, $p < 0.001$). Thus, H1 is supported. Consultation service benefit is positively associated with consumers' WTP for online health platform, and the path coefficient is significant at the 0.001 significance level ($\beta = 0.22$, $p < 0.001$). Thus, H2 is supported. Consultation service risk is negatively associated with consumers' WTP for online health platform, and the path coefficient is significant at the 0.001 significance level ($\beta = -0.18$, $p < 0.001$). Thus, H3 is supported.

The result indicates that perceived platform quality and consultation service benefit can promote

consumers' WTP , consultation service risk may reduce users' WTP, which is of great significance for the improvement of medical platform.

4. DISCUSSIONS

In this preliminary study, the findings identify a comprehensive set of quality factors most relevant to this context and explain their influence on user's WTP toward online health platform. Our results show that if consumers hold more positive evaluation of the platform and service quality, they are more likely to pay for the online health platform in future; if consumers evaluate the services as risky, they are less likely to pay.

The current pilot study has several limitations which should be solved in future research. First, we have decomposed consultation service quality into consultation service benefit and consultation service risk, whereas, in future study, we can also decompose consultation service quality in other ways. Second, the present study only focused on data from subjects in China. Future studies should collect data from other countries and compare their results with this study to see if there are any differences. Third, this study mainly considers the impact of overall perceived quality of the platform on consumers' WTP. Future research can consider adding other variables, such as trust and user satisfaction.

Our study offers several implications for theory and practice. In theory, firstly, this paper introduces the dimension analysis of perceived platform quality and perceived service quality, the quality of subdivided perception platform and perceived service quality can lay a foundation for further research on consumers' quality evaluation. Secondly, this paper analyses the impact of perceived platform quality and perceived service quality on consumers' willingness to pay, and this study deeply understands what factors will affect users' willingness to pay. Thirdly, this study promotes the research on the intention of using the online medical platform under the free mode to the research on the willingness to pay for the online medical platform under the paid mode. We have enriched the research of online health platform under payment mode.

In practice, firstly, online health platform operators need to control platform quality and service quality from multiple dimensions, that is, platform operators should conduct reasonable platform supervision and control according to the impact of different dimensions of quality evaluation on consumers' willingness to pay. Secondly, the platform should strive to improve the quality of perceived platform and perceived service quality to enhance users' willingness to pay. Third, online health platform operators need to take a number of measures to reduce users' risk assessment of the quality of consulting services, and then enhance consumers' willingness to pay. Platform operators should strengthen the protection of users' privacy information, strictly control the quality of doctors on the platform, so as to reduce users' risk perception of the platform and make users more willing to pay for online medical consultation services.

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