

Construction of Remote Patient Perceived Value Satisfaction Model with Online Medical Service for Specialties Based on ACSIM and TAM

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Abstract

With the development of medical treatment partnership and “internet + medical service” in China, this study proposes a remote patient perceived value satisfaction model (RPPVSM) with online medical service for specialties from the perspective of patient perceived value. Taking Shanghai Pulmonary Hospital Specialist Alliance (SPHSA) as the research subject, RPPVSM was constructed based on ACSI and TAM. Structural Equation Modeling (SEM) was modified to have a better degree of fitness and validation outcomes of the hypothesis as follows: Perceived ease of use has a significantly positive impact on perceived value with coefficient being 0.248; perceived usefulness has a significantly positive impact on the satisfaction with coefficient being 0.577; perceived value has a significantly positive impact on satisfaction with coefficient being 0.163. Perceived synergy has a significantly positive impact on perceived value with coefficient of 0.547; perceived ease of use will have a significantly positive impact on satisfaction through the perceived value variable with coefficient of mediation being 0.094; perceived synergy has a significant impact on satisfaction through perceived value with mediation coefficient being 0.196. The results suggest that the inclusion of the patient’s perception value index in the medical information platform is conducive to the construction of RPPVSM. Note: This study is not a clinical trial.

Introduction

We live in a true technological revolution that naturally impacts on healthcare services, changing the relationship between patients and healthcare professionals, that is, providing significant opportunities for healthcare professionals to deliver technology effective healthcare services to their customers and offering the latter ways to access all the information they need [1].

In 2015 and 2018, The General Office of the State Council respectively issued the Guiding Opinions on Propelling the Building of a Hierarchical Diagnosis and Treatment System [2] and the Opinions of the General Office of the State Council on Promoting the Development of “Internet plus Health Care” [3]. Chinese hospitals begin to explore the management model of medical services homogenization and sink medical resources through the Internet, which highlights the important role of medical treatment partnership in medical services and demonstrates the mainstream trend of China’s medical service market shifting from hospital-centered to patient-centered. In recent years, the Shanghai Pulmonary Hospital Specialist Alliance (SPHSA) has committed to establishing an online medical mode of homogenizing treatment and squeezing resources for remote patients. From the perspective of the perceived value, it aims to solve problems such as the increasing number of remote patients and the long waiting time for medical service in Shanghai Pulmonary Hospital (SPH); frequent dispatch of specialists to the medical consortium; and the lack of autonomy for patients to choose the remote consultation platform.

When exploring the online medical service mode for specialties within the medical treatment partnership, SPHSA first built the indicator system of the perceived value with online medical service based on the Delphi method and Analytic Hierarchy Process, incorporated it into the medical information platform, and highlighted the application function for remote patients, aiming to retain patients in the local area to enjoy homogeneous medical service, respond to their needs, improve their perceived value of medical care and satisfaction, and reduce their costs.

Also, the logical framework design and functional elements of the telemedical information platform based on the perceived value of medical services for remote patients should ultimately be achieved by various equipment parameters. Remote examination room of SPH composed of server host of remote outpatient system, high definition camera, vertical screen of reading video, video calling robot, mouse, keyboard and synchronizer, and logo layout of other examination rooms. Designing the system structure diagram and building up the platform network structure, and combining the platform hardware with software will make remote diagnosis and treatment of remote patients more convenient, and the patient’s autonomy stronger. In the implementation process, the realization of the information platform relied on the penetration of the original perceived value indicator and achieved initial results in practice.

However, it remains to be demonstrated whether the perception of the experience in receiving the service of online specialist diagnosis and treatment service can be scientifically measured, whether the medical information platform has a positive impact on the satisfaction and perceived value of remote patients in terms of usefulness, ease of use, and synergy of multiple hospital alliances, and whether the online medical treatment mode based on the perceived value is valid. Therefore, based on the patient’s value needs, this study discusses the construction of RPPVSM with online medical services for specialties. In terms of research

significance, it can not only objectively measure the satisfaction of remote patients with medical service, but also provide a theoretical framework for online medical service, enrich and expand the theory of medical quality management evaluation, and provide guidance for the practical and feasible customer value strategy of medical industry and the reconstruction of hospital business process management.

Theoretical Framework And Literature Review

Theoretical basis

ACSIM (American Customer Satisfaction Index Model) was developed based on the SCSB model by Fornell and others of the University of Michigan in the United States in 1996. Nowadays, ACSIM has been the most influential model. According to this model, the degree of customer satisfaction is determined by their expectations of service quality, perception of quality, and perception of value; customer loyalty depends on the degree of customer satisfaction and complaint handling [4]. Figure 1 shows The American Customer Satisfaction Index Model.

[Figure 1 near here]

The Technology Acceptance Model (TAM) was proposed by Davis in 1986. With the theory of reasoned action (TRA) as the main theoretical basis, Davis made a series of improvements to the theory and then put forward TAM with the main purpose of predicting and explaining user acceptance and adoption of information technology. According Davis (1989) perceived usefulness (PU) and perceived ease of use (PEOU) are the key to understand technology acceptance behavior [5]. PU is defined as "the degree to which a person believes that using a particular system would increase your work performance" and PEOU is "the degree to which a person believes that using a particular system would be effortless". The two central hypotheses in TAM are PU and PEOU that influence positively attitude towards of using a new technology, which in influences their intention to use it [5].

The structure of TAM is shown in Fig. 2. There are several hypotheses in TAM: the users' intention to use the system depends on their attitudes toward using and perceived usefulness; users' attitudes toward using the system depends on perceived ease of use and perceived usefulness; perceived usefulness is affected by perceived ease of use; the external variables such as system design features directly influence perceived ease of use and perceived usefulness.

[Figure 2 near here]

The TAM model is still the most popular among researchers engaged in Acceptance and Use of Technology [6]. Considering that this study will develop a medical information system based on the perceived value of remote patients, and patients' acceptance of using this technology will be an important factor affecting their intention to use it, part of TAM is integrated into the theoretical framework of this study.

Model construction and hypothesis

Basic idea and model design

Patient satisfaction is an important measure of service quality in health care systems [7]. Considering that this research relies on the internet to develop a medical information platform based on the perceived value of remote patients, patients' acceptance of using this technology is included in the TAM model. This study adopts the theory of consumer value, the theory of Maslow's hierarchy of needs, and coordination theory as the basis of the theoretical research framework, and studies the process of reconstruction of the online treatment for specialties. Integrating TAM and ACSIM, this study combines variables of benefits and cost in the theoretical model of customer perceived value as well as variables of synergy capabilities to construct the model of remote patient value satisfaction with online treatment for specialties. The basic theoretical model is designed as Fig. 3.

[Figure 3 near here]

The combination of ACSIM and TAM enriches the customer satisfaction model based on information technology and perceived value. The research hypotheses of integrating the two models have been proved by many scholars. Integrating TAM and ACSIM, Yu, H. and Lv, Z. M. synthesized trust, safety, and loyalty to construct the model of factors influencing user loyalty. They obtained 265

valid data through the questionnaire survey and used SME to verify the model. The results showed that ease of use and usefulness have significant positive effects on the perception level and the perception level has an obvious effect on satisfaction [8].

Research hypotheses of the influence of perceived ease of use on perceived value and satisfaction

Ease of use in TAM is an important variable to measure the attitudes of technology acceptance, which not only has a positive influence on the user's attitudes towards using technology but also affects user perceived value. In his study Model Construction and Empirical Research of Online Shopping Customer Satisfaction Based on Technology Acceptance Model, Cai used SEM to verify that perceived ease of use has a significant effect on perceived value and customer satisfaction [9]. According to Hoffman and Novak, the simpler and more convenient the shopping website is, the more likely it is for customers to have pleasant shopping experiences [10]. If patients' perceived ease of use can be similarly grasped in the telemedicine information technology, their perceived value and satisfaction will be affected. Therefore, perceived ease of use will play an important role in the structure of this research model. Based on the above explanation, the following hypotheses are made:

H1: Perceived ease of use of technology has a significant positive effect on perceived value.

H2: Perceived ease of use of technology has a significant positive impact on satisfaction.

The influence of perceived usefulness on perceived value and satisfaction

Fishbein and Ajzen (1975) hold that when a certain behavior people take has good results, they will have a good impression of this behavior [11]. Bhattacharjee and Hikmet (2007) proposed that when users perceive the usefulness of information technology, their sense of perceived value and satisfaction of users will be improved, and thus repurchase intention is formed [12]. The research of Devaraj, Fan, and Kohli (2002) shows that perceived usefulness has a positive impact on satisfaction. In traditional medical services, patients can only make appointments through on-site registration, and they have to wait for thesis reports and the appointment time for specialist consultation [13]. Therefore, the sense of self-control is not strong. Compared with this, whether the sense of usefulness of using technology in telemedicine information platform of medical treatment partnership for specialties based on remote patient-perceived value, which is developed by this research, can have a relatively significant positive effect on the patient's satisfaction with medical treatment? Is this consistent with the verification results that the usefulness of online shopping technology platforms has a positive effect on satisfaction? Therefore, this research puts forward the following hypotheses:

H3: Perceived usefulness of technology has a significant positive influence on perceived value.

H4: Perceived usefulness of technology has a significant positive effect on satisfaction.

The influence of perceived value on satisfaction

When customer perceived value is achieved, an overall satisfaction level can be formed. Or if the difference between customer perceived value and their expected value that is greater than 0 can make them satisfied, it may affect the purchase satisfaction level of customers. In the model ACSIM, it is proved that customer satisfaction is determined by customer expectation of service quality, perception of quality, and perception of value, and the influence of perceived value on satisfaction is significantly positive [4]. Many studies share the same idea that perceived value has a significant effect on satisfaction [14]. Therefore, it is an important research relationship for patients whether the perceived value that they experience in medical service can positively affect their satisfaction and promote their willingness to experience again. Therefore, this research puts forward the following hypotheses:

H5: Perceived value has a positive influence on customer satisfaction.

The influence of perceived synergy capabilities on perceived value and satisfaction

Ansoff (1987) was the first one to propose the concept of synergy. He divided it into four categories: operational, management, investment, and sales [15]. Some scholars studied the structure of business synergy from the perspective of management, and hold that synergy is composed of five elements: system synergy, knowledge synergy, process synergy, resource synergy, and relational synergy [16]. It can be learned from the previous literature on synergy capabilities that the cooperation of subsystems within public

hospital groups is an important force for joint development and innovation, and a starting point for patients to experience new technology and new medical model. The elements of synergy capabilities mainly include culture synergy, strategy synergy, system synergy, information synergy, resource synergy, organization synergy, innovation synergy, and compact synergy. In particular, the coefficients of variables such as strategy synergy and innovation synergy are relatively high [17]. Besides, the synergy effect can be measured through calculating efficiency and cost, which is related to the desire for innovation synergy, including innovation in resource synergy, operation synergy, and value synergy [18]. The studies on synergy capabilities play a relatively important role in the influence of the regulatory role of the model of remote patient-perceived value satisfaction with online medical service for specialties. Therefore, combined with the synergy capabilities elements of cooperation synergy of public hospitals and the theoretical basis of the impact of cooperation synergy on satisfaction, the following assumptions are put forward:

H6: Perceived synergy capabilities have a positive effect on perceived value.

H7: Perceived synergy capabilities have a positive impact on satisfaction.

Mediation effect hypotheses

In the model of this study, the influence of perceived ease of use of technology on satisfaction and the influence of perceived usefulness on satisfaction will be verified in the direct effect first. According to the domestic scholar Cai's thesis Model Construction and Empirical Research of Online Shopping Customer Satisfaction Based on Technology Acceptance Model, it has been validated that perceived ease of use and perceived usefulness of technology significantly affect the perceived value and customer satisfaction, as shown in Fig. 4. But will perceived ease of use affect satisfaction through perceived value? Will the perceived usefulness affect satisfaction through the perceived value variable? These questions need to be verified by the model.

[Figure 4 near here]

Therefore, the following hypotheses are proposed:

H8: Perceived ease of use can have a significant positive effect on satisfaction through the perceived value variable.

H9: Perceived usefulness can have a significant positive effect on satisfaction through the perceived value variable.

H10: Perceived synergy capabilities can have a significant positive effect on satisfaction through the perceived value variable.

Methodological Approach

This research uses the questionnaire survey method. The Questionnaire method is applied for the design of the Satisfaction Questionnaire for Remote Patients on the Use of the Online Diagnosis and Treatment Mode for the Medical Treatment Partnership of Specialties based on the 5-Point Likert scale. The questionnaire was conducted on patients who received the online specialty treatment mode for remote patients and had previously been to SPH for medical treatment, that is, respondents need to meet both conditions.

The questionnaire design was based on the structure of RPPVSM with online medical services for specialties designed by theoretical framework, and combined with TAM and ASCIM. A total of five dimensions are designed, namely usefulness, ease of use, perceived value, perceived synergy, and satisfaction. Questions related to each dimension are listed in the questionnaire, among which the questions about the perceived value are designed according to Maslow's hierarchy of needs, echoing the value indicator system of online medical service for remote patients completed earlier, while questions of other dimensions are based on the TAM and the ACSI. The questionnaire covers five dimensions and contains a total of 69 questionnaire questions, including 10 questions about usefulness, 9 questions about ease of use, 8 questions about satisfaction, 16 questions on 4 secondary dimensions of synergy, and 26 questions on 5 secondary dimensions of perceived value.

The questionnaire was distributed in the form of a QR code through the questionnaire software WJX. A pre-questionnaire of 60 samples was first conducted to test whether the questionnaire questions had a certain degree of reliability and whether there was a statistical significance between the high-score group and low-score group with p-values all less than 0.001, representing good reliability of these 60 questionnaire samples. The same approach was then performed on the other dimensions for prediction,

which resulted in the same statistical significance. Subsequently, questionnaires were distributed again in the form of QR code. Through back-end statistics, a total of 257 questionnaires were recovered, with a recovery rate of 100%. On this basis, a preliminary descriptive analysis of the data was made. See Table 1 for details.

Table 1
Statistics of category variables of research subjects

		Frequency	Percentage	Valid percentage	Cumulative percentage
Gender	Male	142	55.3	55.3	55.3
	Female	115	44.7	44.7	100
	Total	257	100	100	
Age group	Under 18	3	1.2	1.2	1.2
	18–25	16	6.2	6.2	7.4
	26–30	33	12.8	12.8	20.2
	31–40	37	14.4	14.4	34.6
	41–50	47	18.3	18.3	52.9
	51–60	56	21.8	21.8	74.7
	Over 60	65	25.3	25.3	100
	Total	257	100	100	
Education	Junior high school or below	73	28.4	28.4	28.4
	Senior high schools or colleges	74	28.8	28.8	57.2
	Junior college	55	21.4	21.4	78.6
	University	51	19.8	19.8	98.4
	Master's degree or above	4	1.6	1.6	100
	Total	257	100	100	
Severity of lung disease	Mild	81	31.5	31.5	31.5
	Moderate	155	60.3	60.3	91.8
	Severe	21	8.2	8.2	100

[Table 1 near here]

Results

Analysis of reliability and validity

According to the data collected in this questionnaire, the overall reliability of the questions of the questionnaire was tested. Firstly, each piece of data was observed, and extreme values were identified and eliminated by using SPSS 24.0. The original 257 pieces of data are censored to 239 pieces of data. Secondly, according to the reliability analysis formula

$$\text{Cronbach alpha} = (n/n-1) * (1 - (\sum Si^2) / ST^2)$$

Cronbach alpha was calculated with SPSS 24.0 to be 0.912, which is greater than the standard value 0.7, and has good overall reliability. The AMOS24.0 tool was used to test the reliability of each question of each dimension (perceived value, synergy, ease of

use, usefulness, satisfaction), including the estimated factor loadings, significance, and question reliability. The items whose reliability is lower than 0.36 are eliminated. The formula for composing reliability is

$$CR = (\sum \lambda)^2 / ((\sum \lambda)^2 + \sum \delta)$$

After inspection, the questions that do not meet the requirements of the indicators are removed. The EA3, EA6, and EA7 questions of the ease of use dimension were eliminated; the secondary dimension of the perceived value, namely FR15.1 and FR16.1 of the respect dimension were eliminated; and S123.1 and S124.1 of the second dimension safety value dimension were eliminated. The number of other dimensions remains unchanged. The specific questions are shown in Table 2. Thirdly, the average value of the data of the secondary dimensions (knowledge synergy, institutional synergy, process synergy, and resource system) of the synergy dimension was taken as the observed data. In the same way, the average value of the data of the secondary dimensions (perceived survival value, perceived safety value, perceived society level, perceived respect value, and self-perceived value) of the perceived value dimension was taken as the observed data for the subsequent model construction path analysis and research. Fourthly, AMOS24.0 was used to calculate the AVE convergent validity of five dimensions (ease of use, usefulness, perceived value, satisfaction, and synergy). The AVE is calculated as

Table 2
Analysis of the reliability and validity of the questionnaire

dimensions	Question	Parameter significance estimation			Factor load		Questions reliability		composition reliability	AVE	AVERAGE
		Unstd.	S.E.	t-value	P	Std.	SMC	1-SMC	CR	AVE	Mean
EASE OF USE	EA1	1				.737	.543	.457	.924	.669	4.152
	EA2	.966	.099	9.799	***	.779	.607	.393			
	EA4	1.106	.108	10.231	***	.811	.658	.342			
	EA5	1.104	.103	10.752	***	.849	.721	.279			
	EA8	1.029	.096	10.731	***	.847	.717	.283			
	EA9	1.217	.109	11.127	***	.877	.769	.231			
USEFULNESS	U2	.941	.048	19.550	***	.873	.762	.238	.947	.642	4.706
	U3	.888	.056	15.910	***	.784	.615	.385			
	U4	.982	.051	19.071	***	.859	.738	.262			
	U5	.879	.048	18.271	***	.847	.717	.283			
	U7	.748	.054	13.880	***	.729	.531	.469			
	U9	.943	.054	17.449	***	.826	.682	.318			
	U1	1.000				.889	.790	.210			
	U10	.883	.057	15.418	***	.773	.598	.402			
	U6	.765	.053	14.469	***	.747	.558	.442			
	U8	.744	.063	11.752	***	.656	.430	.570			
SATISFACTION	S3	1.153	.096	12.020	***	.855	.731	.269	.931	.627	3.212
	S4	.948	.092	10.346	***	.761	.579	.421			
	S5	1.014	.095	10.649	***	.779	.607	.393			
	S6	.968	.087	11.066	***	.803	.645	.355			
	S7	.912	.093	9.793	***	.728	.530	.470			
	S2	.930	.087	10.696	***	.782	.612	.388			
	S1	1.000				.786	.618	.382			
	S8	1.101	.095	11.615	***	.833	.694	.306			
SYNERGY	KNOWLEDGE	1.000				.850	.723	.278	.902	.700	4.077
	RESOURCE	.898	.078	11.490	***	.665	.442	.558			
	PROCESS	1.053	.060	17.483	***	.876	.767	.233			
	SYSTEM	.997	.052	18.988	***	.932	.869	.131			
VALUE	New Survival	1.000				.837	.701	.299	.934	.741	4.159
	New Society	1.162	.081	14.363	***	.887	.787	.213			
	New selfvalue	.926	.083	11.183	***	.758	.575	.425			

New Safety	.926	.061	15.246	***	.918	.843	.157
New Respect	1.120	.077	14.595	***	.895	.801	.199

$$AVE = (\sum \lambda^2)/n$$

The calculated AVE values are all greater than 0.5, which conforms to the standard value 0.5 of AVE recommended by Bagozzi, R. P., Fornell, C., and Larcker, D. F., indicating that the convergence effect is good [19].

According to data analysis, each non-standardized value is positive. For each dimension, the question loading is above 0.6; the question reliability is above 0.36, and the composite reliability is above 0.7. The recommended value proposed by Bagozzi, Fornell, and Larcker is above 0.6, so the composite reliability of each dimension in this research meets the requirements, indicating that there is sufficient internal consistency [19]. The specific data are shown in Table 2.

[Table 2 near here]

According to the data in the above tables, the AVEs of five constructs are rooted out, and the discriminant validity values of the five constructs of synergy, usefulness, ease of use, perceived value, and satisfaction are obtained, which will be compared with the Pearson correlation coefficient of other constructs. From Table 3, it can be concluded that the correlation coefficient of the five constructs is almost larger than that of the other constructs, but there are also individual data that do not meet the criterion.

Table 3
The construct discriminant validity of the satisfaction model of remote patients' perceived value of online medical services

	AVE	SYNERGY	USEFULNESS	EASE OF USE	VALUE	SATISFACTION
SYNERGY	.700	.837				
USEFULNESS	.642	.878	.801			
EASE OF USE	.669	.838	.857	.818		
VALUE	.741	.869	.799	.816	.861	
SATISFACTION	.627	.863	.929	.833	.843	.792

[Table 3 near here]

Analysis and revision of the fit index of questionnaire structure model

Based on the reliability and validity analysis of each construct, AMOS24.0 tool is used to try to run the SEM model to find out the fit index of the model. In SEM analysis, chi-square is usually used to change model fit, while literature review shows that sample size will affect its size [20]. Therefore, in addition to the sample size, we also consider chi-square (X^2/DF) to analyze the fit index of the model, Chin and Todd recommend a standard chi-square value of no more than 3 [21]. Running through AMOS24.0, it is found that although the value of chi-square/DF is between 1–3, the chi-square value is relatively large, and there are 239 samples. Besides, the report shows GFI is 0.731, AGFI 0.689, RMSEA 0.081, and CFI 0.899, IFI 0.899, PCLOSE 0, TLI 0.899. These values do not meet the index values recommended by the SEM model.

Therefore, the Bollen-Stine Bootstrap 5000 iterations of AMOS24.0 is adopted to revise the model, and the revised chi-square value is 609.701, and the standard error SE, 1.091. In addition, according to the output report, the degree of freedom (DF) of the estimated model is 488, the chi-square value of the independent model is 7974.59, the estimated parameter 73, the DF of the independent model 528, and the number of samples 238. To achieve better results, the fit index of the model should be revised, specifically: GFI is 0.92, AGFI 0.91, which meets the standards; RMSEA is 0.03 < 0.08, which meets the standards; the three indexes of CFI, IFI, and TLI are revised to 0.98, all > 0.9, which meets the index requirements, and SRMR is 0.0462, which also meets the standards. The specific index data are as follows in Table 4:

Table 4
Analysis of original and revised fit index of remote patients' perceived value model of online medical services

Model Fit Index	Criterion	Model Fit of Research Model	Modified Model Fit	Whether it meets the criterion after revision or not
DF	The higher the better	485	488	Yes
Chi-square	The lower the better	1239.748	609.7	Yes
Chi-square(X^2/DF)	$1 < X^2/DF < 3$	2.556	1.25	Yes
GFI	> 0.9	0.731	0.92	Yes
AGFI	> 0.9	0.689	0.91	Yes
RMSEA	< 0.08	0.081	0.03	Yes
SRMR	< 0.08	0.0455	0.0462	Yes
CFI	> 0.9	0.899	0.98	Yes
IFI	> 0.9	0.899	0.98	Yes
TLI	> 0.9	0.899	0.98	Yes

[Table 4 near here]

Validation of the hypothesis about the direct effect of the SEM structure model

It can be found that there is a better degree of fitness based on the revised model. According to the existing new revised model, the significance estimation of the non-standardized data is carried out to find the significant path and the insignificant path, and the model can be improved. Bootstrap is used 5000 times to revise the standard error, the Z value is calculated based on the non-standardized data report output, and the path greater than 1.96 is shown in Table 5.

Table 5
Non-standardized statistical significance of the revised model path based on the remote patients' perceived value of online medical services

Hypothesis	Model path		Estimate	Revised SE	Z	P	SE-SE	Mean	SE-Bias
H1	VALUE ← EASE OF USE		.236	.107	2.206	.008	.001	.245	.002
H2	SATISFACTION ← EASE OF USE		.074	.136	.544	.408	.001	.074	.002
H3	VALUE ← USEFULNESS		.091	.101	.901	.224	.001	.086	.001
H4	SATISFACTION ← USEFULNESS		.508	.102	4.980	***	.001	.517	.001
H5	SATISFACTION ← VALUE		.195	.108	1.806	.032	.001	.194	.002
H6	VALUE ← SYNERGY		.521	.116	4.491	***	.001	.519	.002
H7	SATISFACTION ← SYNERGY		.213	.134	1.590	.054	.001	.203	.002

Note: boldface indicates the significant direct path

[Table 5 near here]

From Table 5, it is found that most of the paths between latent variables in the model path are significant, or Z value is higher than 1.96, including H1 (EASE OF USE → VALUE), H4 (USEFULNESS → SATISFACTION), H6 (SYNERGY → VALUE), and H5 (VALUE → SATISFACTION), whose Z value is very close to 1.96. Likewise, the standardized data is used to calculate the significance of the model path, which is consistent with the results obtained from the above non-standardized data calculation, indicating the path

relationship is established and significantly affects the dependent variable. It is proved that the four path correlations are significant, and the original hypothesis is reasonable, which is consistent with the results of the previous hypothesis of using Z values to report paths. The SMC in the output report is all greater than 0.33, and each dimension of the model is explainable.

The result after running the model using Amos 24.0 is shown in the Fig. 5. For other non-significant paths, it is recommended to delete them or indicate them with pink arrows, which are H3(USEFULNESS->VALUE), H7(SYNERGY->SATISFACTION), H2(EASE OF USE-> SATISFACTION). The specific AMOS model is shown in Fig. 5.

[Figure 5 near here]

Verification of the mediation hypothesis of the SEM structural model

The indirect path effect of the model is obtained by using bootstrap 5000 times. As shown in Table 6, the upper and lower confidence limits of SYNERGY->SATISFACTION and EASE OF USE->SATISFACTION do not contain 0, which means that the two kinds of mediation exist.

Table 6

Verification of the mediation hypothesis based on the revised model of remote patients' perceived value of online medical service

		Product of Coefficients (Multiplying coefficients)			Bias-Revised 95%CI		Percentile 95%CI	
Variables		Estimate	SE	Z	lower	upper	lower	upper
Total Effects								
H8 + H2	EASE OF USE->SATISFACTION	0.094	0.039	2.410	.035	.197	.031	.182
H10 + H7	SYNERGY->SATISFACTION	0.196	0.06	3.267	.093	.332	.093	.318
Indirect Effects								
H8	EASE OF USE->SATISFACTION	0.094	0.039	2.410	0.035	0.197	0.031	0.182
H10	SYNERGY->SATISFACTION	0.196	0.06	3.267	0.093	0.332	0.093	0.318
Direct Effects								
H2	EASE OF USE->SATISFACTION	0	0	/	0	0	0	0
H7	SYNERGY->SATISFACTION	0	0	/	0	0	0	0
Construction of Remote Patient Perceived Value Satisfaction Model with Online Medical Service for Specialties Based on ACSIM and TAM								

[Table 6 near here]

H8 is valid, meaning that the perceived ease of use will have a significantly positive impact on satisfaction through patients' perceived value variable. The coefficient of mediation is 0.094, which is interpreted as "when the satisfaction of EASE OF USE increases by one unit, the independent variable will cause the slope of SATISFACTION increases by 0.094 units through VALUE."

H9 is not valid. That is, the Hypothesis that the perceived usefulness will have a significantly positive effect on satisfaction by patients' perceived value variable is not true. The USEFULNESS->VALUE path mentioned above is not significant, so there is no need to verify the mediation of USEFULNESS->SATISFACTION.

H10 is valid. Perceived synergy has a significant impact on patients' satisfaction through remote patients' perceived value of medical treatment. The mediation coefficient is 0.196, which is interpreted as "When SYNERGY increases by one unit, the

independent variable will increase the slope of SATISFACTION by 0.196 units through VALUE”.

Conclusion And Discussion

(1) The incorporation of patients’ perceived value indicators into the medical information platform is helpful for the construction of RPPVSM

Based on the patient perceived value, the online medical service perceived value index system is established, which is integrated into the construction of telemedicine information platform, and plays a significant role in the construction and verification of remote patient perceived value satisfaction model with Online Medical Service. Based on questionnaire recovery and statistical analysis, patient perceived value is an important independent variable of medical satisfaction, which strengthens the position of patient-centered perceived value in the theoretical framework.

(2) The usefulness and ease of use of the medical information platform can enable patients to stay in the local area for medical treatment at ease.

According to the conclusion of the research model, usefulness directly affects patients’ satisfaction with medical service, with a positive impact coefficient of 0.577, while ease of use can significantly improve patients’ satisfaction with medical service through a positive impact on perceived value, with a mediation coefficient of 0.094. This suggests that the technological development of medical information platforms should start from the perspective of patients, with curing diseases at its core, so that the patients will be more satisfied and feel at ease to seek the local medical treatment by breaking the time and space limit to enjoy equal medical services.

(3) Strengthen the concept of modern medical mode and enhance the synergy among hospitals in the medical alliance

In the practice of offering online medical service for remote patients, the variables of perceived synergy capabilities of patients have a significant impact on the perceived value variable (coefficient 0.547), and can greatly affect their satisfaction of medical treatment through the perceived value variable (mediation coefficient 0.196), which suggests a great impact of perceived synergy on patient satisfaction. The medical treatment partnership should also attach importance to the cooperation between member hospitals at all levels. In addition, from the data scores, the average value of the patient perceived synergy dimension is about 4 points, and there is still room for improvement. It is suggested that hospitals strengthen the concept of modern medical mode, rely on the information platform, pay more attention to the cooperation between hospitals and between medical personnel, improve process synergy and system synergy, and refine the implementation rules.

The research on the construction of RPPVSM with online medical service for specialties based on ACSI and TAM has been verified and achieved some practical results. However, if the sample collection objects of effectiveness test can be further expanded to the samples of remote patients receiving traditional experts’ consultation treatment locally, then the comparison between various medical treatment models and online medical treatment models will be more comprehensive and the verification of effectiveness will be more convincing.

Therefore, new medical models should be promoted in the future practice course of the online medical models. While the advantages of hospital confederacy enable researchers to obtain more data from the local hospitals where patients receive diagnosis and treatment of experts and then receive the diagnosis and treatment provided by the online medical model, the effectiveness of this model is verified from more dimensions and the relevant details of the new medical treatment model are further optimized by looking for problems while practicing.

Declarations

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Compliance with Ethical Standards

Conflict of Interest: Zhang Zhemin declares that has no conflict of interest, Bráulio Alturas declares that has no conflict of interest.

This article does not contain any studies with animals performed by any of the authors.

Informed Consent: Informed consent was obtained from all individual participants included in the study. This study is not a clinical trial.

Authors' Contributions: Both authors participated in writing and reviewing the manuscript.

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Figures

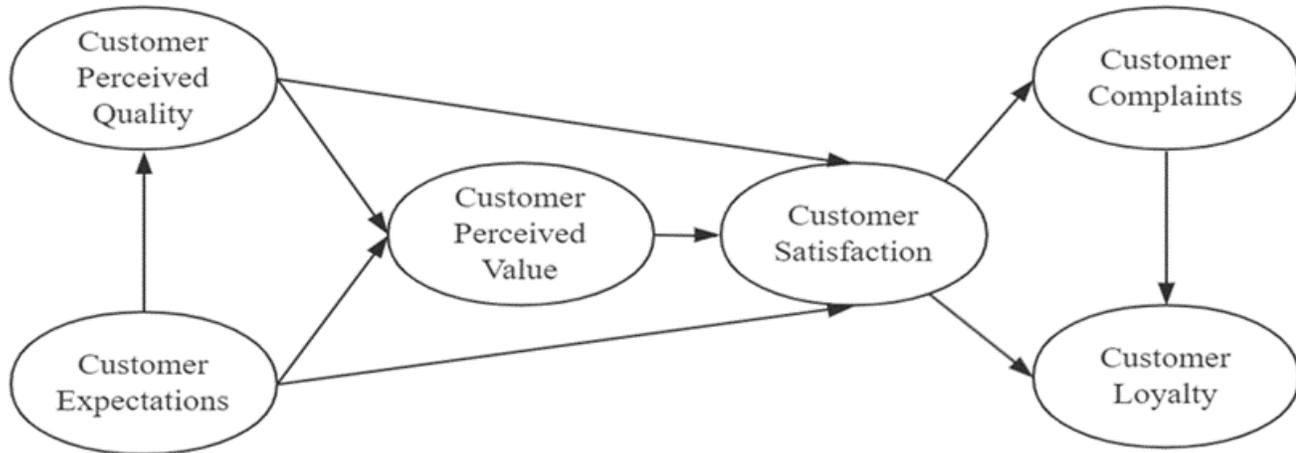


Figure 1

The American Customer Satisfaction Index Model (ACSIM).

Source: Fornell (1996)

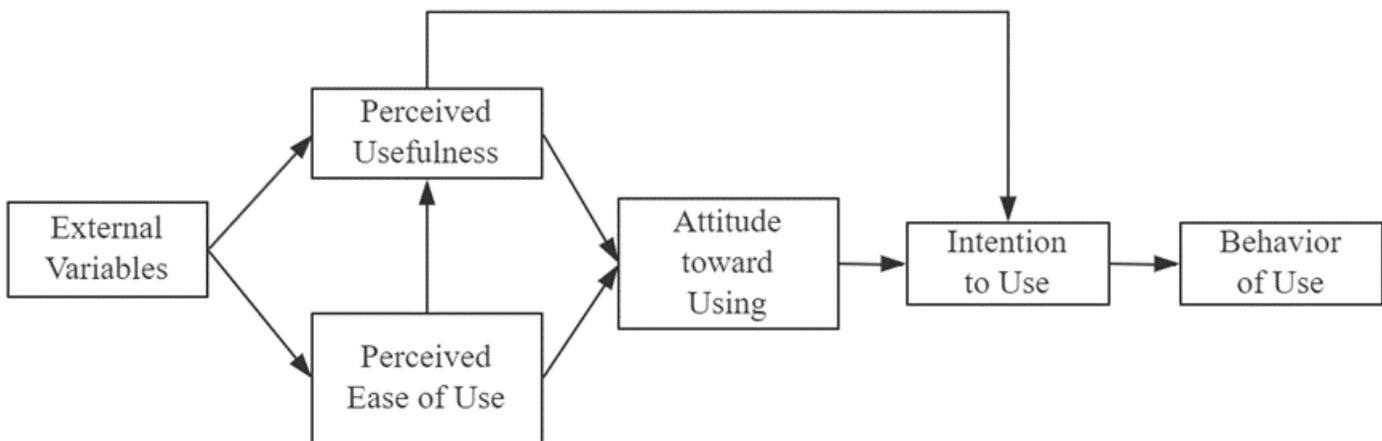


Figure 2

Technology Acceptance Model (TAM) Source: Davis (1989)

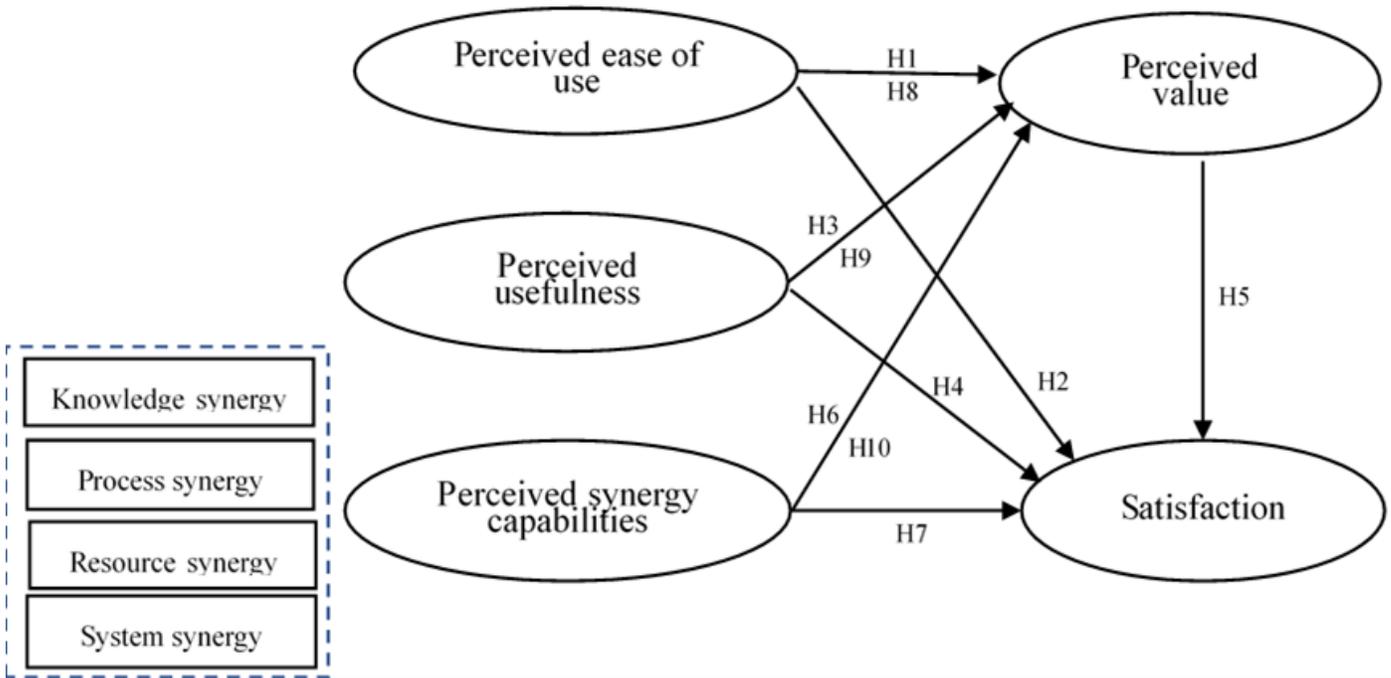


Figure 3

Model construction of remote patient-perceived value satisfaction with online medical service for specialties

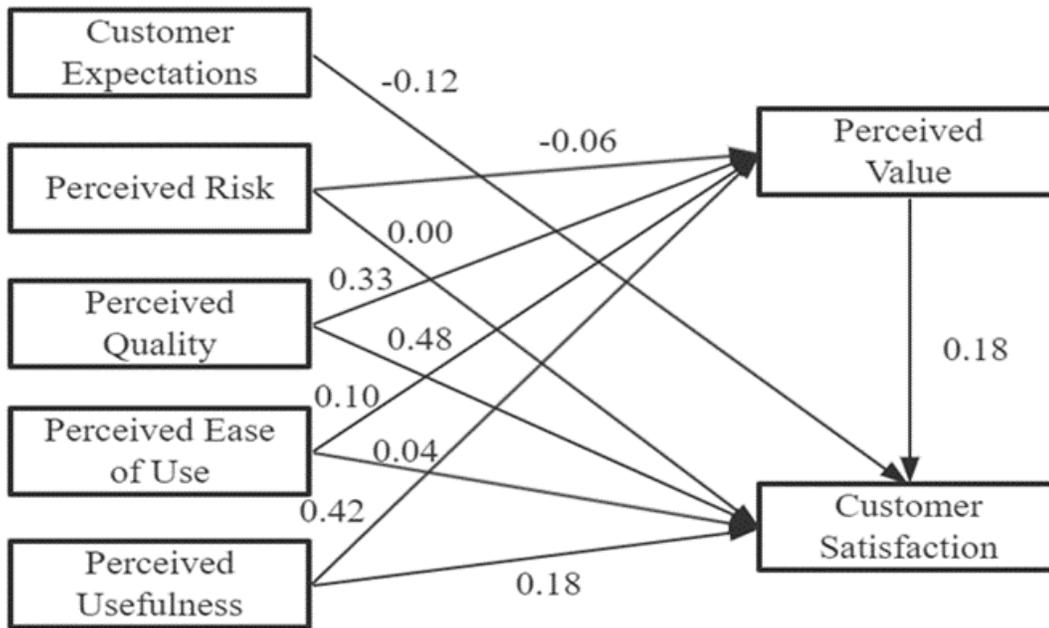


Figure 4

The test results of the model of online shopping satisfaction based on TAM.

Source: Cai (2015)

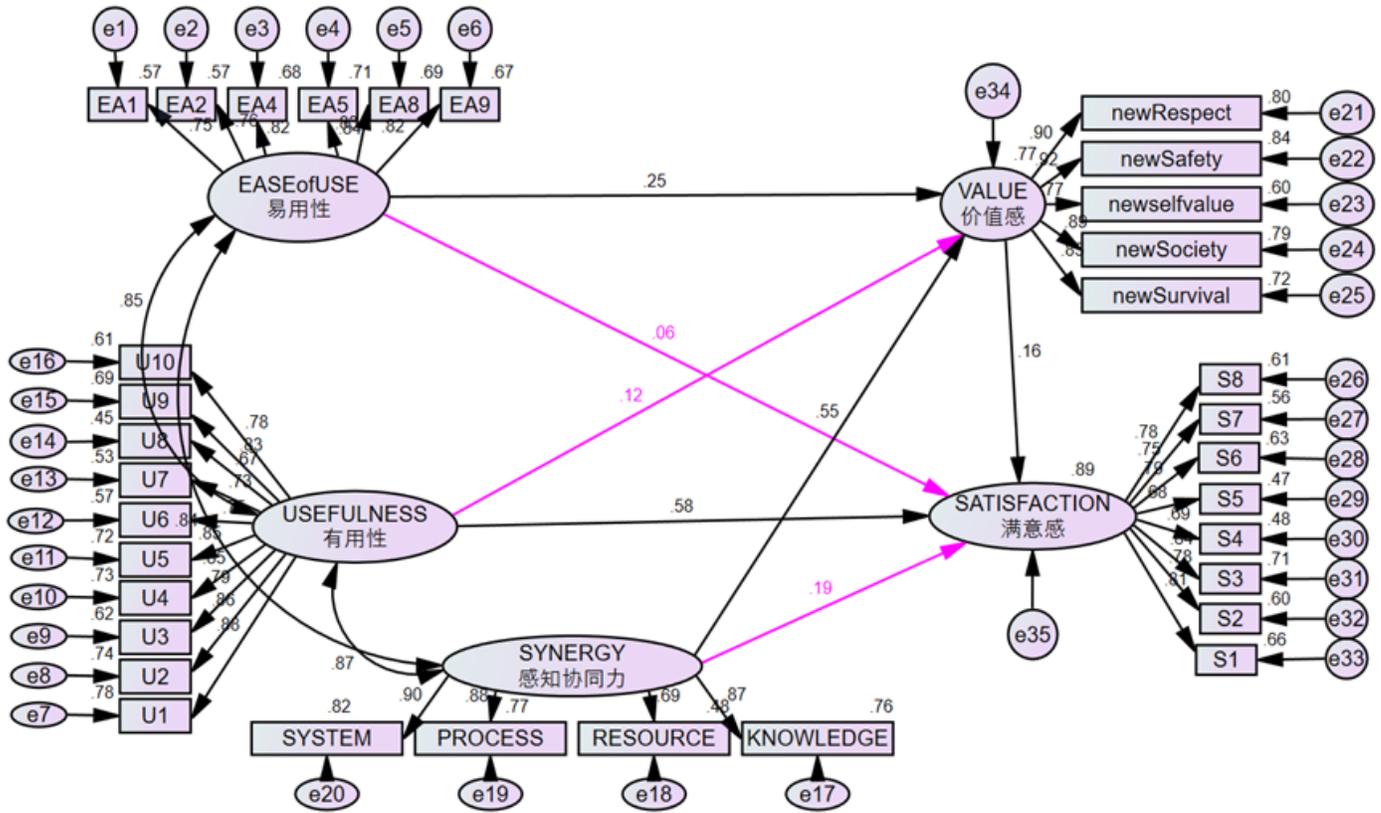


Figure 5

Based on the revised model of remote patients' perceived value of online medical services