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Usage Behavior Intentions of Healthcare Consumers Using Healthcare Self-Service Technologies

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Abstract

Applications of Self-service technologies (SSTs) are changing the way healthcare organizations provide services to their patients. Although the use of SSTs has significantly changed service delivery and its use can satisfy patients' pursuit of efficient service, there is still a lack of adequate overview of research on how the use of SSTs affects healthcare consumers' experience in healthcare facility settings. Therefore, this study aimed to understand the usage intentions of healthcare consumers using healthcare self-service technologies. In this study, questionnaires were distributed in a regional hospital in Taiwan, and a total of 640 valid questionnaires were obtained. After relevant research and path analysis, it was found that the perceived usefulness of medical consumers to SSTs will affect their attitudes and behaviors. In addition, this study contributes to the literature on SSTs through the results of this study.

Keywords: *Self-Service Technologies, Technology Acceptance Model, Perceived usefulness, Perceived ease of use, Attitude, Usage intention*

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Introduction

The traditional service is performed by service personnel face-to-face with customers, but with the rapid development of information technology, service providers can gradually use self-service technology to provide services without the need for service personnel (Meuter et al., 2000), but even the most reliable Self-service technologies (SSTs) cannot meet customer expectations, possibly due to technical errors or errors in the customer's own operations (Nili, Tate & Johnstone, 2019). SSTs offer unprecedented opportunities for healthcare organizations to improve services and enhance patient interactions. Self-service technology has received increasing attention, which not only helps hospitals reduce the cost of human resources and hardware equipment, however, how to guide customers to accept and use self-service technology is a key issue that medical institutions need to solve urgently.

SSTs can exist in any form of technology interface with which customers interact, such as self-check-in kiosk, self-ticketing machines, Self-service payment machine, and those available remotely through the Internet (Hilton et al., 2013; Scherer et al., 2015). Can be considered the next frontier in service excellence (Safaeimanesh et al., 2021). Performance and the convenience associated with such SSTs are the primary reasons why customers prefer SSTs to in-person service experiences (Galdolage, 2022). As far as medical institutions are concerned, traditional patients and their families have to complete various medical procedures and pay fees through service personnel, but through SST, they can use various services, including registration, examination, medicine collection and payment. Service functions are not limited by time and service manpower, effectively improving the quality of medical care.

The Technology Acceptance Model (TAM) mainly discusses the influence of perceived usefulness and perceived ease of use on user willingness (Davis, Bagozzi & Warshaw, 1989). Among them, "perceived usability" refers to the degree to which users believe that new information technology is easy to use; "perceived usefulness" refers to the user's perception that using the system is helpful for job performance and future; "attitude" refers to an individual's subjective evaluation of a positive or negative perception of a certain behavior. "Intention to use" refers to the degree to which the user is willing to continue to use the system. Strong (Davis, Bagozzi & Warshaw, 1989; Chuttur, 2009).

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Immediately after its introduction, the technology acceptance model has been widely used, and has received empirical support from many studies. Some studies have also confirmed that its predictive ability in information technology use behavior is higher than that of planned behavior theory (Mathieson, 1991), and subsequent studies Research applies it to self-service technology (Ugwuanyi et al., 2022; Hassan & Farmanesh, 2022; Chow, Yeow & See, 2022). Therefore, this study will use the technology acceptance model to explore the attitudes and behavioral intentions of medical consumers using medical self-service technology.

1. Method

2.1 Sample

This study was designed in a cross-sectional manner. The questionnaire survey method was used to collect research data. From February to June 2021, questionnaires were distributed to outpatients in a regional hospital in southern Taiwan, and 640 valid questionnaires were recovered.

2.2 Questionnaire Design

The self-made questionnaire in this study was revised with reference to domestic and foreign literature, including questionnaires such as background attribute data, perceived usefulness, perceived ease of usage, attitude and usage intention of the respondents. (1) Demographic variables: including gender, education level, age, occupation, average number of outpatient visits per month, etc. (2) Questionnaire scale: The questionnaire scale of this study is based on the relevant literature, and develops four factors, including perceived usefulness, perceived ease of use, attitude, and intention to usage behavior. “Perceived usefulness” refers to the degree to which users perceive self-service technologies as useful; “perceived usability” refers to the ease with which users can use self-service technologies; “Attitude” refers to users’ perceptions of self-service technologies. Subject to positive or negative subjective evaluations, "usage behavior intention" refers to the degree to which users are willing to continue using self-service technology. This questionnaire uses a five-point Likert scale, ranging from strongly agree to strongly disagree, and the respondents are required to give 5 to 1 points respectively.

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2.3 Data Analysis

This study uses SPSS for Windows 22.0 and AMOS 21.0 (Structural Equation Modeling, SEM) statistical software for data analysis. The statistical methods used are as follows:

(1) Descriptive Statistics Analysis: For the characteristics of sample attributes, this study adopts descriptive statistical analysis to understand the distribution of the number and percentage of variables to explore its actual situation.

(2) Correlation Analysis: Pearson's product-difference correlation analysis was used to test the correlation strength between the four variables of perceived usefulness, perceived ease of use, attitude and usage behavior intention.

(3) Path Analysis: to understand the causal relationship between the variables and the degree of correlation between the two variables.

2.4 Ethical considerations

Data collection will begin after the study has passed the review and approval of the Human Trials Committee (IRB: 1090903). This approval is a waiver of the subject's consent form. The participating planners will explain the research purpose and research process to the research subjects in detail before accepting the case.

3. Results

3.1 Descriptive statistics of respondents' basic information

The demographic characteristics of the sample are displayed in Table 1. Among the respondents, 330 were male (51.6%), and 310 were female (48.4%). Regarding age distribution, 375 (58.6%) were under 30 years old, and 108 (16.9%) were between 31 and 40 years old. Additionally, 406 (63.4%) reported being married, while 372 (58.1%) had pursued a college education, and 157 (24.5%) had completed senior high school. The occupation data revealed a predominant representation of the service industry, with 106 individuals (16.6%), and an average of 296 monthly medical visits (46.1%), with 239 (46.1%) reporting an average of less than one medical visit per month.

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3.2 Sample reliability and validity analysis

The scale was tested for expert validity by 2 scholars with expertise in medical management and 2 hospital practice directors (4 in total). 0.902. The items and Cronbach's alpha values of each dimension are as follows: perceived usefulness alpha value = 0.967; perceived ease of use alpha value = 0.979; attitude alpha value = 0.672; usage behavior intention alpha value = 0.975, overall reliability analysis of empirical data Cronbach's alpha value is 0.985, so the empirical data of this study should have a certain degree of reliability.

The Average Variance Extracted of each aspect of this study is the ratio of the measured variable explained by the latent variable to the total variance. If the extracted variance is above 0.5, it indicates that the measured variable explained by the latent variable is correct. Reliability and convergent validity. Fornell and Larcker (1981) indicated that considering the actual aspect of the data, an AVE higher than 0.36 can also be regarded as a reluctant standard. The AVE value of each aspect is greater than 0.47, and the Composite Reliability value is greater than 0.68, which means that the measurement results are correct properties (as shown in Table 2).

3.3 Pearson's correlation coefficient

In order to understand the relationship between the research variables, this study uses the Pearson correlation matrix to detect the degree of correlation between the four dimensions of the technology acceptance model, as well as the correlation between each dimension and the whole. The results of the study showed that there was considerable correlation between the dimensions, as shown in Table 3. The correlation between perceived usefulness and perceived ease of use was the highest ($r = 0.839$, $p<0.001$), that is, the degree of perceived ease of use and usefulness of self-service technology among medical consumers; further, perceived ease of use There is also a high degree of correlation with the intention to usage behavior ($r = 0.840$, $p < 0.001$), that is, when people have an evaluation of the ease of use of self-service technology, they will continue to use it.

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3.4 Differences in Path Analysis of Medical Consumers Using Medical Self-Service Technology

The analysis results show that the structural model path analysis coefficients (as shown in Figure 1) are: perceived usefulness has a significant positive impact on perceived ease of use ($\beta = 0.839$, $p < 0.001$); perceived ease of use has a significant positive impact on attitude No significant effect ($\beta = 0.012$, $p>0.5$); perceived usefulness had a significant positive effect on attitude ($\beta = 0.500$, $p < 0.001$); attitude had an effect on behavioral intention ($\beta = 0.329$, $p < 0.001$); Figure 1 Normalized coefficients have been used for path values between facets. The variation explanatory power (R^2) of each endogenous latent variable in the research model to the overall model is: the variation explanatory power (R^2) of perceived ease of use (R^2) is 70.3% (0.703), and the variation explanatory power (R^2) of attitude is 25.9% (0.259), and the explanatory power (R^2) of variation using behavioral intent was 10.9% (0.109). The related research model path pattern is shown in Figure 1.

4. Discussion

This study employed a survey utilizing literature review and questionnaires to investigate the factors influencing healthcare consumers' behavioral intentions toward the use of self-service technology. The findings revealed that the average scores for "perceived ease of use," "perceived usefulness," and "usage behavioral intention" were all above 4.3. However, the dimension of "attitude" received an average score of only 3.7. The outcomes of the path analysis demonstrated that while all dimensions, except "perceived ease of use," exhibited a significant positive influence, the latter did not notably impact "attitude." Notably, "perceived usefulness" and "attitude" emerged as crucial determinants shaping medical consumers' behavioral intentions to adopt self-service technology.

Prior studies have indicated that the efficacy of services delivered via Self-Service Technologies (SSTs) is influenced by individuals' technological proficiency, thereby impacting their perceptions, adoption behavior, and evaluation of SSTs. From the standpoint of medical consumers, self-service technology is perceived to offer benefits such as time and cost savings, increased control over service delivery, reduced waiting times, convenient service locations, heightened interest in technology use, enhanced

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efficiency, flexibility, and reduced interactions with service staff (Curran, Meuter & Surprenant, 2003).

Another noteworthy observation contrasting our study's findings with the Technology Acceptance Model is the lack of a significant positive effect of "perceived ease of use" on "attitude." This deviates from Davis et al.'s (1989) findings. A plausible explanation for this divergence could be the need for medical consumers to re-learn processes due to the implementation of self-service technology, resulting in confusion and obstacles that affect their attitude.

Moreover, our study's findings highlight that the majority of SST users were from younger and middle-aged demographics. Past research has also illuminated that while information technology adoption can benefit consumers, each medical consumer's readiness to embrace new technology varies (Parasuraman & Grewal, 2000). Factors such as age significantly influence customers' willingness to accept new technologies, and overly intricate SSTs may deter customers from adapting to evolving technological advancements (Mansurov & Rosengren, 2017). Effective SSTs, coupled with proper technical configurations, can bolster comprehensive hospital management systems, enhancing usability for patients and medical personnel (Tu et al., 2022).

Lastly, despite the widespread adoption of SSTs in larger hospitals, several factors such as equipment complexity, costs, regulations, and policies hinder their implementation in smaller local hospitals and clinics. Additionally, SSTs are tailored by manufacturers to suit different operational modes and functions of each hospital. Our research has also identified that certain elderly patients remain more inclined toward traditional services, often seeking assistance from paramedics or hospital volunteers for SST usage. Given the rapid pace of technological advancement, the determinants and significance outlined in this study may evolve with continuous innovation. Future research can be adjusted to align with the development and application of self-service technology.

5. Conclusion

From this study, it is found that "perceived ease of use" has no significant effect on "attitude". This study suggests the following points: (1) Thinking about the design from the perspective of medical consumers; (2) Strengthening the use of SSTs Use promotion;

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(3) Humanized care and design can be added. This study can serve as a reference for hospitals to improve service quality in the future.

Since this study adopts a cross-sectional data collection method and uses the "Technology Acceptance Model" as an important variable to measure the importance of medical consumers to SSTs, future research can focus on the longitudinal method. Increase the measurement of "continuous use" and other aspects or use the eight theoretical models of the integrated technology acceptance model as the verification of the comprehensive model to extend the integrity of the theoretical model.

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Ethical approval statement: This study was approved by the Institutional Review Board of Show Chwan Memorial Hospital (IRB No. 1090903). All participants provided written informed consent prior to enrolment in the study. This research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

Author Contributions: Study conception and design: YHY; Data collection: LHK; Data analysis and interpretation: YHY; Drafting of the article: LHK; Critical revision of the article: YHY, LHK

Conflicts of Interest: The authors declare no conflicts of interest

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Table 1. Description of respondents.

Measure		Frequency N = 640	Percentage (%)
Gender	Women	310	48.4
	Male	330	51.6
Age	<30	375	58.6
	31-40	108	16.9
	41-50	94	14.7
	>51	63	9.8
Marital status	Single	214	33.4
	Married	406	63.4
	Widowed(divorced)	20	3.1
Level of education	Primary school	8	1.3
	Junior high school	38	5.6
	Senior high school	157	24.5
	Bachelor's degree	372	58.1
	Postgraduate (masters)	65	10.2
Occupation	Student	66	10.3
	Housekeeper	80	12.5
	Freelancer	86	13.4
	Manufacturing	93	14.5
	Service Industry	106	16.6
	Information Technology	35	5.5
	Agriculture, Forestry, Fishery and Animal Husbandry	21	3.3
	Financial Insurance Industry	40	6.3
	Public Servant	48	7.5
	Other	65	10.2
Number of Outpatient Visits Per Month	<1	239	37.3
	=1	296	46.1
	2-3	71	11.1
	>3	35	5.5

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Table 2. Measurements and confirmatory factor analysis

Construct	Mean	Standard Error (S.D)	Cronbach's alpha	Average Variance Extracted (AVE)	Construct Reliability (CR)
Perceived usefulness	4.390	.596	0.967	0.511	0.893
Perceived ease of use	4.384	.590	0.979	0.476	0.931
Attitude	3.784	.731	0.672	0.518	0.681
Usage intention	4.397	.631	0.975	0.596	0.941

Table 3. Pearson Correlation

Measure	Perceived usefulness	Perceived usefulness	Attitude	Usage intention
Perceived usefulness	1			
Perceived ease of use	.839***	1		
Attitude	.509***	.430***	1	
Usage intention	.744***	.840***	.329***	1

Note: ***p<0.001

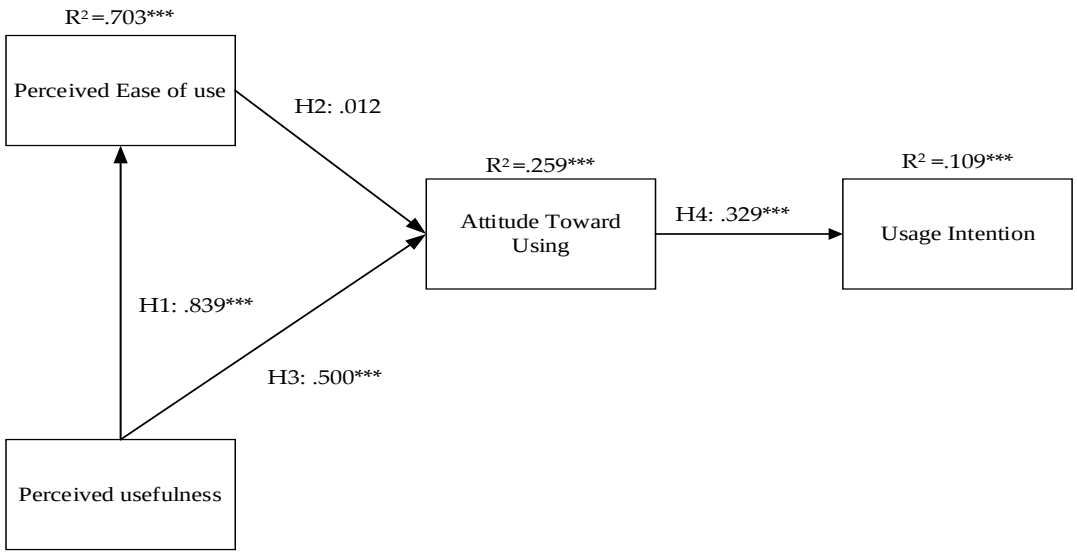

Figure 1. Path Analysis

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