

Exploring critical factors influencing nurses' intention to use tablet PC in Patients' care using an integrated theoretical model

Shu-Lung Sun^a, Hsin-Ginn Hwang^a, Bireswar Dutta^a and Mei-Hui Peng^{a,b}

^aInstitute of Information Management, National Chiao Tung University (NCTU), Hsinchu, Taiwan; ^bInformation Management, Minghsin University of Science and Technology, Hsinchu, Taiwan

ABSTRACT

The use of health information technology (HIT) is expected to deliver benefits for patients, nurses, physicians, and organizations, but the benefits of HIT can only be attained if nurses accept and intend to use it as they are the leading user-group. The use of the tablet is becoming commonplace in healthcare organizations to improve patient care. The current study incorporates Technology Acceptance Model2 (TAM2) with two antecedents, facilitating condition and personal, to identify and understand the factors that influence nurses' intention to use the Tablet PC. The survey methodology was used to collect data from the nurses working in a regional healthcare center in Taiwan. The structural equation modeling (SEM) technique was employed to analyze the research framework. A total of 110 valid responses for analysis. The results suggest that the modified proposed research framework explains about 41.7% of the variance of nurses' behavioral intention. The partial least squares (PLS) regression indicated that perceived usefulness, subjective norm, and personal a positive and significant influence on nurses' intention to use the Tablet PC. But concerning the perceived ease of use, the insignificant path coefficient was reported. The finding also indicated that personal on the research model is much stronger than the subjective norm on Tablet PC performance. The proposed research framework contributes to the conclusive explanation for understanding nurses' intention to use. The current study brings perspectives from the technological and attitudinal differences that have largely been missing in the existing literature of the nurses' intention to use HIT. Thus, health care providers must take these factors into consideration as the findings of the current study advance theory and contribute to the basis for future study intended for enhancing our understanding of nurses' adoption behavior regarding HIT.

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1. Introduction

Over the last few years, technologies have had major effects on the healthcare sector. It has greatly consented that the use of information technology (IT) in the healthcare sector offers great potential for improving the quality, efficiency and effectiveness of the provided services, personnel, above all reduces the organizational expenses [1]. Previous studies even validated if hospitals did not adopt up-to-date information systems (IS), they could lose the trust of their patients [2,3]. Thus, hospital information systems (HIS) have gradually taken over conventional hospital operation procedures [3].

Nursing is information-intensive and by nature is the ambulatory duties as nurses frequently shift among several wards, conference rooms, and outpatient clinics. Additionally, access to accurate information regarding the patient's present condition, physicians' availability are also necessary to guarantee quality care [4] and achieve their patient care planning, implementation, as well as evaluation duties [5].

Thus, to provide updated information regarding the patients' condition in real-time to support nurses in their daily patients' care is the critical challenge of nursing information systems [6]. These days, advanced-technology portable medical devices facilitate effective point-of-care decisions by providing improved access to information, streamlining workflows, and promoting evidence-based practice [7]. The Tablet PC, mobile device, is a communication system integrated with all the IS functions that permit nurses not only communicate with other healthcare professionals but also use them to communicate with patients while coordinating patient care. The Tablet PC could manage patient information management, assessment, diagnosis, treatment, disposition, and discharge functions along with comprehensive functions to maximize nursing-job effectiveness and reduce the risk of medication errors [8,9]. In summary, the Tablet PC gives nurses information portability and instant mobile access to hospital IS data, to increase efficiency and effectiveness in the performance of regular nursing tasks [10].

In the IT perspective, different groups have different cognitive biases. Andre et al. [11] assumed that nurses differed significantly from other professional users in general competence, intellectual and cognitive capacity, as well as work arrangement and nature. Thus, to determine the overall success of the implementation of Tablet PC, nurses' adoption is crucial as they are the significant coordinator and a provider of patient care [12]. Even though the previous study pointed out that nurses would not consider a system that interferes with the way they care for patients or places limitations on the way they practice [12]. Therefore, understanding factors influencing nurses' intention to use Tablet PC are one of the key elements in ensuring its optimal integration and ultimately measurable benefits within the health care system and population. Thus, to address this issue, we propose a model based on the extended TAM2 to explore how nurses' technology readiness and perceptions of Tablet PC influence their intention toward Tablet PC use. We are positive that the results of the present study can improve our current understanding regarding nurses' intention to use the Tablet PC and might contribute to the knowledge of innovators adoption research.

2. Literature review

2.1. Technology acceptance model

Davis [13] introduced the Technology Acceptance Model (TAM) and proposed a theoretical framework that explained the relationship between users' attitude and behavioral intention. Based on this model, PU and PEOU were theorized the two salient beliefs that determine an individual's attitude toward accepting a technology. PU refers to the degree to which an individual considers that employing a particular system would improve his/her job performance [13] and PEOU is defined the degree to which an individual considers that using a particular system would be free from effort [13]. However, the perception of an individual towards a system may be affected by other factors stated as external factors in TAM.

With time, the TAM has been explored in several contexts and has become a robust, effective, and parsimonious model for predicting user's acceptance of new IS. Using TAM as the basis, TAM2 includes additional theoretical constructs covering social influence practices (subjective norm, voluntariness, and image) and cognitive influential practices (job relevance, output quality, and result demonstrability). TAM2 hypothesizes that users' subjective evaluation of the match between significant objectives at the task and the significances of carrying out job duties

employing the system functions as a base for developing insights concerning the usefulness of the system [14].

In synopsis, TAM [13], and TAM2 [14] propose contextual models to predict an individual's new technology adoption based on individual, reasoning, and organizational factors. Overall, previous studies have empirically investigated the hypotheses and shown some support to use both TAM and TAM2 as a theoretical model to examine users' intention to accept new IS.

2.2. Nurse's intention to use

In the health care context, prior studies have applied both TAM and TAM2 to explore the acceptance of differing ISs on physicians [15,16], nurses [17,18], specific healthcare professionals [19–25] (e.g. occupational therapists, physiotherapist, etc.), or mixed groups [26,27]. Ducey [28] examined nurses' Tablet computer use based on the TAM, and their results found the significant influence of all the relationships except subjective norm to intention to use. Tacy et al. [29] studied nurses' acceptance of technology based on TAM, and their findings also had a significant impact on nurse's intention to accept healthcare technology. Hay [30] examined factors that concern nurses' intention to use mobile technology, and their findings indicated that except subjective norm and PEOU, all other factors had a significant influence on behavioral intention. Overall, previous studies have shown positive support to use TAM2 as a theoretical model to examine nurses' intention to use the Tablet PC. Thus, a modified TAM2 model was developed and tested in the present study to explore the factors influencing nurses' attitude and intention in adoption behavior with the Tablet PC in Taiwan.

2.3. Tablet PC

Recognition of the value of the Tablet PC as an information and communication tool in nursing practice is comparatively new [31,32]. Hardwick et al. [33] recommended that handheld technology could be utilized by nurses to improve and streamline patient care by capturing clinical data, by organizing and reporting home health services, and by providing references for evidence-based practice. Doran [34] explored that personal digital assistants (PDA) could be beneficial for promoting timely communication, enabling evidence-based collaborative practice, and for supporting workplace learning.

Tablet PC improves the mobility offered by laptops by providing the competence to capture handwriting using a magnetic pen. Ever since the introduction of the first commercial Tablet PC in fall 2002, it has been increasingly

acquiring market share with sales expected to reach 134.1 million by 2022 [35]. The transportability and ease of use taking made possible by Tablet PC have attracted users from various sectors, including healthcare, construction, government, and education.

As nurses utilized the Tablet PC, they perceived a significant improvement in their own research values, skills, and awareness, additionally in the presentation and accessibility to research evidence. There was a significant improvement in perceptions of the quality of care and job satisfaction for Tablet PC users [36]. The current study is considered to advance this previous study by exploring the role of nurses' technology readiness in explaining variation in nurses' use of Tablet PC for accessing evidence-based information.

3. Research hypothesis

3.1. Perceived usefulness (PU) and perceived ease of use (PEOU)

Davis [13] proposed TAM that explains the relationship between users' attitude and behavioral intention. Kowitlawalul et al. [37] found that PU and PEOU influenced users' behavioral intention of their study. In the health care context, researchers found that PU is a crucial factor which can directly influence on adoption intention [38] if the tangible benefits of the IS are reasonably appreciated [38,39]. Ketikidis et al. [40] found that PEOU, but not PU significantly predicted nurses and medical doctors' behavioral intention to use HIT. Wong et al. [19] explored that PEOU was positively associated with behavioral intention to use the Internet for health-related information. Thus, the following two hypotheses based on the above discussion were proposed in this study:

H1: PU has a positive influence on the intention to use the Tablet PC.

H2: PEOU significantly and positively influences on individuals' intention to use Tablet PC.

3.2. Determinants of perceived usefulness in extended TAM2

According to Venkatesh and Davis [14], the subjective norm is a user's perception of whether people who are important to him/her think that the user should or should not adopt Tablet PC. Schepers and Wetzels [20] observed a significant positive effect of subjective norm on an individual's belief concerning a system's significant benefit that is perceived usefulness. Subjective norm has been investigated in the past in the study of personal health record [21], medical treatment [22], and nurses' uses of healthcare technology and system [23,24] adoption.

Besides subjective norm, job relevance may also play a significant role in determining the PU of adopting a technology. Job relevance is defined as an individual's perception regarding the degree to which the target system is appropriate to his/her job [14]. This perception will, in turn, determine the PU of the Tablet PC. Once the decision-makers agree that the Tablet PC is relevant to the job, he or she will then decide if the Tablet PC will perform its tasks well, is known in TAM2 as output quality. Given that existing tool such as barcode might be able to perform the specific task of Radio Frequency Identification (RFID), the decision-maker will need to determine which of these two systems will be able to deliver the best output quality. Lastly, the Tablet PC will only be adopted if tangible results are visible and perceptible [14]. As stated by Venkatesh and Davis [14], an individual might be expected to form a positive perception of the usefulness of technology if the "covariations between usage and positive results are readily discernable". Thus, the following hypotheses were put forth:

H3: Subjective Norm has a positive influence on PU

H4: Subjective norm has a positive influence on the intention to use Tablet PC.

H5: Job relevance has a positive effect on PU.

H6: Output quality of Tablet PC has a positive influence on users' PU.

H7: Result demonstrability will have a positive effect on the PU of the Tablet PC.

3.3. Facilitating condition

According to Venkatesh et al. [25] facilitating condition is defined as the degree to which an individual believes that factors available in the environment support to use technology to perform a specific task. On healthcare, Groves and Zemel [41] found out that facilitating supports (skills training, information or materials available, and administrative support) were regarded as very significant factors which influenced the use of instructional technologies in patients' care. Previous studies have shown that facilitating conditions are positively related to PEOU and PU [42,43]. For example, Rouibah et al. [43] demonstrated that both the PEOU and the PU of a system were positively affected by facilitating conditions, such as the availability of training and resources. Similarly, Karaali et al. [42] found that the PEOU of a system is positively affected by the guidance and specialized instructions of the system.

H8: Facilitating condition has a positive effect on PU.

H9: Facilitating condition positively influences PEOU.

3.4. Personal innovativeness (PIIT)

Individuals are recognized to be different in their tendency to adopt new technologies [44]. Generally, innovation diffusion studies have recognized that highly innovative individuals are active information seekers about new ideas. They are able to deal with high levels of uncertainty and develop more positive intentions toward acceptance [45,46]. Agarwal and Prasad [47] defined personal innovativeness as the willingness of an individual to try out any new information technology and considered it as influential on usefulness perception [48] in addition to plays a significant role in concluding the outcomes of user acceptance of technology [49]. Lu [48] developed a conceptual framework to explain the factors influencing user acceptance of wireless internet and found that personal innovativeness determines the usefulness, and ease of use, which, in turn, influence user intention-behavior.

H10: Personal Innovativeness has a positive influence on PU

H11: Personal innovativeness in IT has a positive influence on PEOU

H12: Personal innovativeness has a positive influence on the intention to use Tablet PC.

Figure 1 presents the research framework used for the current study.

4. Materials and methods

4.1. Questionnaire design and data collection

An introductory list of measurement items was primarily developed after reviewing the literature regarding Tablet PC, TAM, and TAM2. The instrument used for the current study comprised three sections. In the first section, the cover page, the purpose of the study was provided. The second section considered respondents' demographic information, including their age, experience, and education level. The third section contained indicators regarding TAM2, facilitating condition, and personal innovativeness (34 items). All the items were determined on a five-point Likert scale, ranging from 1 for strongly disagree to 5 for strongly agree. Additionally, the content of the items was modified to enhance the reliability and validity of the items.

Both pretest and a pilot study were conducted to endorse the instrument. The pre-test involved five experts those are, one professor of Information Management (IM), three doctoral scholars in the medical information field, and nursing staff has been working in the hospital for more than 10 years. Respondents were asked to explore the appropriateness of items, the format, and the wording of the scales. The pilot study involved twenty nurses self-selected from the study population. Based on the respondents' response at the pre-test and pilot study, some items were modified to exhibit the survey's purpose more comprehensible and summarized in Appendix A (Table A1). The reliability for all items was acceptable (Cronbach's alpha is above 0.80) and items loaded in the confirmatory factor analysis are 0.70 or more. Thus, the instrument has endorsed reliability and content validity. Appendix B (Table B1) presents the result of the pilot study.

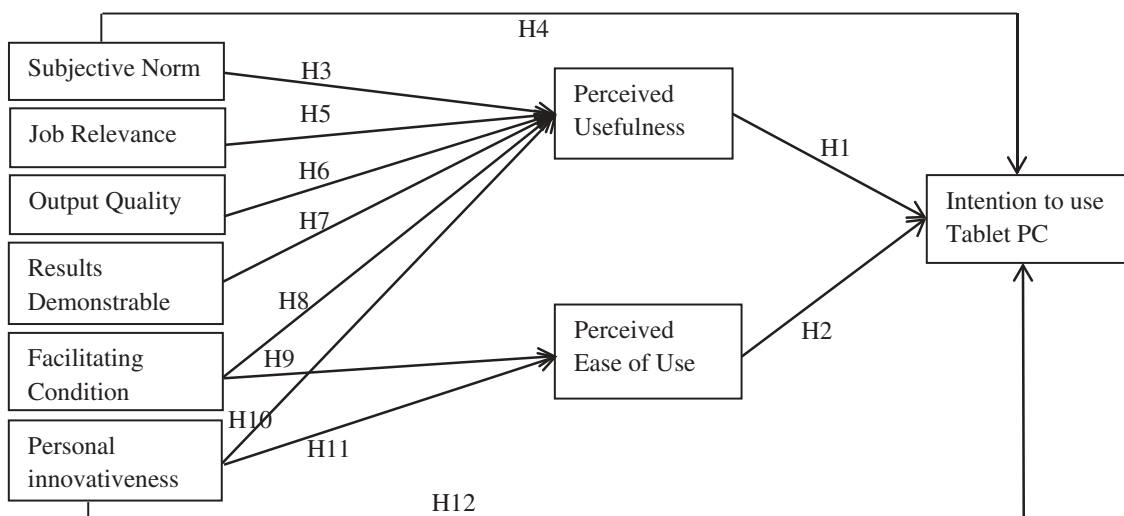


Figure 1. Research framework.

4.2. Research setting

The target population for the current study was the nurses working in a regional healthcare center. We used convenience sampling method as the survey instrument, as it is cost-effective and has been extensively used in IS research [50]. Prior to commencing the research, Institutional review board (IRB) approval was pursued and obtained from the home university, National Chiao Tung University (NCTU) in Taiwan. All participants were given the consent form and information sheet, which clearly described the purpose of the current study. Respondents were also notified about their rights to withdraw participation at any time during the study.

Moreover, we presented our participants with a short description of how the Tablet PC works in general. This approach was chosen because of two reasons. First, to overcome any lack of familiarity about Tablet PC that could have kept on among our participants by reasons of its continuous technological innovation and second, to form a reasonable opinion about the potential usages of Tablet PC.

4.3. Data analysis

Data analysis was conducted on the two-step approach suggested by Anderson and Gerbing [51]. First, testing convergent validity and discriminant validity of the measurement model, and subsequently testing research hypotheses and structural model. Structural equation modeling (SEM) was used for statistical analysis for three reasons. First, SEM is a multivariate technique that allows the simultaneous estimation of multiple equations [52]. Second, SEM executes factor analysis and regression analysis in the single step, as SEM, is used to test a structural theory. Third, PLS uses a non-parametric approach and is not limited by data normality [53]. All constructs were modeled, as reflective, for the model tested. The present study used AMOS statistical software for statistical purpose.

5. Results

5.1. Profile of sample

The current study collected 115 responses. Five of which were considered unusable, due to incomplete responses. Therefore, we incorporated 110 valid responses for the final analysis. The detailed of respondent demographics are shown in Table 1, and it points out that the respondents are different respectively in age, educational level, and experience.

5.2. Tests of the measurement model

Reliability analysis was tested using Cronbach's alpha and composite reliability (CR), to measure the model's internal

Table 1. Sample demographics.

Item	Option	Count	Percentage %
Age	21–30	11	10
	31–40	23	21.25
	41–50	33	30
	≥51	43	38.75
Education Level	Vocational school	4	3.75
	Specialist school	41	37.50
	Undergraduate	62	56.25
	Graduate	3	2.50
Experience	1–5	17	15
	6–15	29	26.25
	16–25	26	24
	26–35	29	26
	≥36	9	8.75

consistency. Table 2 shows the results. Cronbach's alpha of each construct ranged from 0.82 to 0.92, are above the recommended value of 0.7 by Hair et al. [52]. CR values of the latent factors are above 0.7 suggested by Hair et al. [52], implying adequate reliability and consistency for the measurement items of each construct.

Convergent validity of the scales is examined by using three standards suggested by Bagozzi and Yi [54]: (1) Loading of each indicator should be above 0.7 [55]; (2) CR value of each indicator should be higher than 0.7; and (3) Average variance extracted (AVE) of each construct should be exceeded the variance because of the measurement error of that construct (i.e. AVE should be exceeded 0.50). As Table 2 indicates, the factor loading of each item in the measurement model of current study exceeded are well above 0.7. CR values have ranged from 0.84 to 0.95 (Table 2). AVE values of constructs have ranged from 0.72 to 0.83, thus meeting each condition for convergent validity (Table 3).

To test discriminant validity, Fornell and Larcker [55] recommended that the square root of the AVE of the construct should be higher than the estimated correlation shared between the construct and other constructs in the model. Table 3 shows the square root of AVE for each construct was higher than the correlation values of the construct, thus meeting the condition for discriminant validity.

Diagonal in Bold: square root of the average variance extracted (AVE) from observed items;

Off-diagonal: correlations between constructs.
* $p < 0.05$; ** $p < 0.01$

5.3. Tests of the structural model

Figure 2 displays the standardized path coefficients, path significances, and variance explained (R^2) by each path, all supported by the path analysis results, except H2, H6, and H9. As with variance explained (R^2), R^2 of intention to use the Tablet PC reached 41.7 percent of nurses. Moreover, 58.1 percent of the variance of PU is explained by subjective norm, output quality, result demonstrable, facilitating condition, and personal innovativeness. 47.2 percent of the

Table 2. Descriptive statistics of the study dimensions.

Constructs	Item	Loadings	No. of items	Composite Reliability	Standardized Cronbach's α	AVE
PU	PU1	0.872	6	0.86	0.83	0.78
	PU2	0.834				
	PU3	0.817				
	PU4	0.883				
	PU5	0.944				
	PU6	0.955				
PEOU	PEOU1	0.965	4	0.82	0.85	0.76
	PEOU2	0.935				
	PEOU3	0.784				
	PEOU4	0.841				
SN	SN1	0.914	3	0.91	0.91	0.83
	SN2	0.973				
	SN3	0.821				
JR	JR1	0.886	2	0.86	0.84	0.79
	JR2	0.894				
PI	PI1	0.862	4	0.93	0.89	0.81
	PI2	0.872				
	PI3	0.892				
	PI4	0.954				
FCN	FCN1	0.916	3	0.87	0.88	0.72
	FCN2	0.953				
	FCN3	0.861				
OTQ	OTQ1	0.930	3	0.84	0.86	0.89
	OTQ2	0.924				
	OTQ3	0.901				
RDE	RDE1	0.700	5	0.89	0.85	0.74
	RDE2	0.952				
	RDE3	0.918				
	RDE4	0.898				
	RDE5	0.924				
INT	INT1	0.954	4	0.91	0.87	0.82
	INT2	0.950				
	INT3	0.890				
	INT4	0.915				

NOTE. PU = Perceived usefulness; PEOU = Perceived ease of use; SN = Subjective norm; JR = Job relevance; PI = Personal innovativeness; FCN = Facilitating condition; OTQ = Output quality; RDE = Result demonstrability; INT = Intention to use Tablet PC.

Table 3. Average variance extracted and discriminant validity.

	PU	PEOU	SN	JR	PI	FCN	OTQ	RDE	INT	AVE
PU	0.88									0.78
PEOU	0.21**	0.87								0.76
SN	0.31**	0.27**	0.91							0.83
JR	0.22*	0.14*	0.21**	0.89						0.79
PI	0.16*	0.17**	0.17*	0.28**	0.90					0.81
FCN	0.17**	0.13*	0.16**	0.18**	0.21**	0.85				0.72
OTQ	0.24*	0.18**	0.18**	0.16*	0.14*	0.22**	0.94			0.89
RDE	0.19*	0.28**	0.14*	0.12*	0.13*	0.17*	0.26**	0.86		0.74
INT	0.26**	0.14**	0.13*	0.22**	0.24**	0.19**	0.24*	0.31**	0.91	0.82

NOTE. PU = Perceived usefulness; PEOU = Perceived ease of use; SN = Subjective norm; JR = Job relevance; PI = Personal innovativeness; FCN = Facilitating condition; OTQ = Output quality; RDE = Result demonstrability; INT = Intention to use Tablet PC.

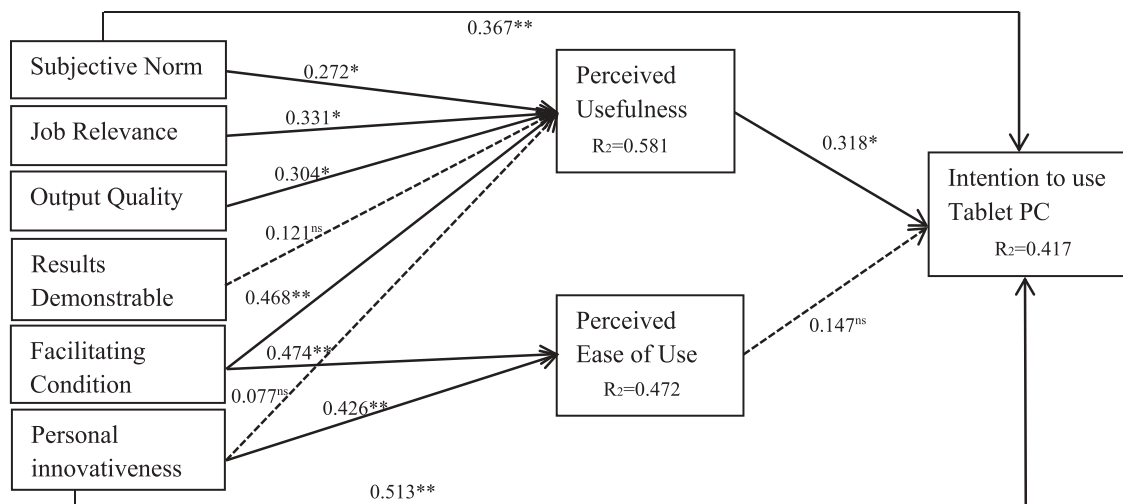
variance of PEOU is explained by facilitating condition and personal innovativeness. Table 4 reports the results of the hypothesis test.

6. Discussion

The current study empirically validates the extended TAM2 from a health care perspective. The findings of this study offer several significant implications from the academic and practical point of view regarding the acceptance of Tablet PC. According to the findings of goodness-of-fit measurement, this study concluded that the research model positively represents the collected data and the factors, toward nurses' intention to Tablet PC use.

6.1. Principal findings

There was a significant positive association between PU and intention to Tablet PC use, supporting H1. It implies that if nurses believe Tablet PC is useful in patients' care, then nurses develop a positive attitude towards using the Tablet PC. Given this, when developing a Tablet PC system, the healthcare providers should focus on strengthening the usefulness of Tablet PC; considerably improve the functions that must meet nurses' requirement to carry out the medical practices. This development can motivate nurses to use the system persistently, and further improves their intention to use the Tablet PC. However, this finding is in line with Dutta et al. [56], also indicated that PU has both direct and indirect influences on the intention of Tablet PC



Note. * Significant at $p < 0.05$ level, $p < 0.01$ **, $p < 0.001$ ***, ns not significant at $p < 0.05$ level.

Fit Measures	RMSEA	GFI	AGFI	NFI	CFI
Thresholds	$\geq .05$	$\geq .90$	$\geq .80$	$\geq .90$	$\geq .90$
Figure 2	.07	.96	.86	.92	.95

Figure 2. Path analysis result.

Table 4. Hypothesis results.

Path	β	Results
PU → INT	0.318	H ₁ : Supported
PEOU → INT	0.147	H ₂ : Not supported
SN → PU	0.272	H ₃ : Supported
SN → INT	0.367	H ₄ : Supported
JR → PU	0.331	H ₅ : Supported
OTQ → PU	0.304	H ₆ : Supported
RDE → PU	0.121	H ₇ : Not Supported
FCN → PU	0.468	H ₈ : Supported
FCN → PEOU	0.474	H ₉ : Supported
PIIT → PU	0.077	H ₁₀ : Not supported
PIIT → PEOU	0.426	H ₁₁ : Supported
PIIT → INT	0.513	H ₁₂ : Supported

NOTE. PU = Perceived usefulness; PEOU = Perceived ease of use; SN = Subjective norm; JR = Job relevance; PI = Personal innovativeness; FCN = Facilitating condition; OTQ = Output quality; RDE = Result demonstrability; INT = Intention to use Tablet PC.

use. Conversely, PEOU is negatively correlated with the intention to Tablet PC use, consistent with the previous study using the health care professionals as subject [57]. Therefore, H2 is not supported. The Tablet PC is being used by nurses with a specific purpose, to improve their patients' care quality by increasing care coordination and eliminating errors, additionally, want to perform their patient care more efficiently. So, nurses are mostly concerned about whether the services and contents offered by the Tablet PC system are beneficial to improve their patients' care performance rather than the feeling of easiness to operate the system. If nurses perceive that despite the system is easy to use, but did not improve their patients' care performance, then their attitude toward using Tablet PC is not going to be improved anyway. Therefore, the difficulties with the system's interface or easiness to operate may possibly not be a significant consideration in patients' care perspective. Thus, the findings of the current study

recommend that health care system developers should emphasize on the factors, nurses reasonably expecting from the Tablet PC system, such as, timely and needed information about patients' care, authentic data regarding the patients' health condition, etc. could improve nurses' intention to use the Tablet PC.

The findings of the current study reported that subjective norm, job relevance, and output quality are significant factors of PU, which is in line with the findings of Venkatesh and Davis [14]. The results indicate that healthcare providers are likely to interpret Tablet PC as being useful if they perceive that individuals, nurses, who are significant to them, consider that they should adopt Tablet PC, and is consistent with previous studies which explore that subjective norm is an important factor in new technology adoption [14,58]. The findings also show that health care providers generally consider that the output quality of the Tablet PC will determine its usefulness. This is an important consideration for the healthcare providers as the organizations that are not implementing Tablet PC need to ensure that the benefits of using the Tablet PC overcome the benefits of using the existing system in order to confirm the usefulness of Tablet PC. Based on the factors determining the perceived usefulness of Tablet PC, this research has validated and confirmed the TAM2 model proposed by Venkatesh and Davis [14], although result demonstrability is not found to be a significant factor.

From the results of this study, the intention to use Tablet PC was indirectly influenced by facilitating condition and mediated by both PU and PEOU. Facility terms influenced nurses' perception of the usefulness of Tablet PC. Patmon et al. [59] stated that facility with

the help of instructing support the nurses to play an important role in the success of the refinement process and cooperation of people with each other in patients' care. The facilitating condition referred the supports of system management such as instructions on how to use the Tablet PC and technical support to overcome the potential barriers of using the Tablet PC and have a facilitating role for the nurses of the system. In other words, while nurses develop positive opinions that their access to health resources are going to be easy, and they would be supported technically and managerially, their intention to accept the Tablet PC would also be improved.

Personal innovativeness continues as a significant factor of intention to use, as well as a significant antecedent of PEOU as expected. But this construct does have an insignificant influence on PU. Thus, hypotheses 12 and 11 are accepted, whereas hypothesis 10 is rejected. In the current study, the effect of personal innovativeness is much stronger than social influence. This finding banked on the study of Basak et al. [60] in the healthcare technology adoption perspective and is reasonably in line with the stronger curiosity and higher confidence level in nurses' own capabilities as often shown in more innovative Tablet PC users. The Tablet PC is experiencing more frequent healthcare technology and patients' care changes, in comparison with other health care technologies. Nurses with higher personal innovativeness tend to be more accommodating of such periodic changes and thus more willing to accept it. However, such long-term influence of personal innovativeness has comprehensive, practical importance in nurses' continuous intention to use the Tablet PC. Additionally, a regression analysis exhibits that the effect is higher among those nurses who like to experiment with new technologies ($t = 3.26$, $p = 0.000$) and those nurses never hesitate to try out new healthcare technologies ($t = 4.47$, $p = 0.000$). These findings are consistent with the study by Sun [61] reported positive empirical support to the persevering psychological effect of personal innovativeness on nurses' sustainable intention to use the Tablet PC.

6.2. Theoretical and managerial contributions

This study contributes to theory and practice in multiple ways. First, integrated model analyzed in this study, combined elements of the TAM2, additional determinants facilitating conditions and personal innovativeness have overcome the limited applicability of the TAM2 to study health care users' acceptance of healthcare IT and the results of the study improve the current understanding in the field of technology acceptance and healthcare IT implementation. Second, the study instrument provides not only a comprehensive evaluation but also has the ability to analyze what aspects of the Tablet PC (technology, behavioral or user's demographic differences) adoption are challenging from the users' perspective. Third,

our extended research model explains how variations in usage intention are influenced by Tablet PC perception in nurses. The acceptance theory evolved from the current study could be improved for application in large-scale services and organizations considering the adoption of Tablet PC. Fourth, to some degree, this study also suggests the requirement for researchers not to moderate the influences of antecedent factors on healthcare professionals, including nurses' acceptance of IS. The impacts of such factors could be examined from the angle of interacting effects on core TAM constructs. Fifth, Study findings indicated that respondents are ambitious regarding new innovation acceptance, Tablet PC of their daily patients' care. But previous studies suggested if the innovations challenge intensely embedded task patterns of nurses, they would be unwilling to make the innovation part of their routine work [46]. However, innovations lose their aptitude to make an irretrievable contribution to policy-making effectiveness. Thus, health care policymakers need to pay attention to the compatibility of new technologies or innovations with effective work practices, norms, and values. Sixth, as the current study focuses on Tablet PC use and unlike studies examine behavioral intention, any development regarding the better understanding of phenomena can translate into higher acceptance and usage of the health information system after implementation. Finally, the results of this study lead to better technology usage and could also have a better consideration for healthcare providers and policymakers before taking the decision about further spending on new HIS implementation.

6.3. Limitations and future research

Despite its significant findings and implications, this study comprises some limitations. First, the use of Tablet PC has offered nurses new ways to take care of patients and make decisions more easily than before. However, incidents of security breaches intentionally or unintentionally raise concerns among users. Thus, we consider that interpreting the security policies regarding the usage of Tablet PC is a significant future research area, as nurses must understand what they are approving to use and how the patients' data can be protected. Second, the moderate sample size, 110 subjects and a sole study with samples in Taiwan, meet the minimum criteria for statistical analyses, but limit the generalization of the findings and may be subject to unexpected results based on idiosyncrasies in the data sample. Thus, future study should select the respondents from more representative samples.

7. Conclusions

Healthcare organizations are gradually embracing new HIS in their patients' care. As the significant coordinator and provider of patient care, nurses'

intention to use HIS determines the overall success of its implementation. Thus, the acceptance by nurses is a primary condition to ensure that the expected benefits will materialize. This study examined critical factors influencing nurses' intention to use Tablet PC through an integrated model derived from the classical theory TAM2 with the attitudinal behavioral determinants, such as facilitating conditions and personal innovativeness. Empirical results of the current study offered meaningful intuitions for perception, interpretation, and anticipation of the proposed research model as well as exhibit good explanatory power to predict nurses' intention to use Tablet PC, providing a new direction for researchers to contemplate in subsequent research. The current study principally identified three relevant factors, i.e. PU, subjective norm, and personal innovativeness, directly influencing nurses' intention to use Tablet PC. Subjective norm, output quality, and facilitating conditions are consistently found to predict PU, and facilitating conditions and personal innovativeness is found to predict PEOU, which indirectly affecting nurses' intention to use Tablet PC. The current study also found that personal innovativeness has significantly more influence than the subjective norm on Tablet PC performance. This finding leads that users' innovativeness is critical to his decision on system use.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix A

Table A1. Items and Sources.

Construct	Item No.	Item	References
Perceived Usefulness (PU)	PU1	I expect using Tablet PC will improve the quality of my job to provide better patient care	Venkatesh and Davis [2000]; Dutta et al. [2018]
	PU2	I believe using Tablet PC will allow me to better control over my work schedule	
	PU3	I expect using Tablet PC would allow me to finish task more quickly	
	PU4	I expect using Tablet PC would allow me to finish more task within my work schedule than before	
	PU5	I believe using Tablet PC would improve my overall usefulness in my job.	
	PU6	Overall, practicing Tablet PC would be a useful tool in my profession	
Perceived Ease of Use (PEOU)	PEOU1	I think that my interaction with Tablet PC would be clear and understandable	Venkatesh and Davis [2000]; Dutta et al. [2018]
	PEOU2	I expect learning of Tablet PC would be easy for me	
	PEOU3	I believe that I would be skillful of using Tablet PC	
	PEOU4	Overall, I expect that use of Tablet PC will be easy.	
Subjective Norm (SN)	SN1	People who influence my behavior think I should use Tablet PC	Venkatesh and Davis [2000]
	SN2	Others think I should use Tablet PC	
	SN3	People who are important to me think I should use Tablet PC	
Job Relevance (JR)	JR1	Usage of Tablet PC is relevant to the patient's care.	Venkatesh and Davis [2000]
	JR2	Usage of Tablet PC is important to the patient's care.	
Personal Innovativeness (PI)	PI1	If I heard about a new information technology, Tablet PC, I would look for ways to experiment with it.	Lu et al. [2005]
	PI2	Among my peers, I am usually the first to explore new information technologies.	
	PI3	I like to experiment with new information technologies, Tablet PC.	
	PI4	Generally, I would not hesitant to try out new information technologies.	
Facilitating condition (FCN)	FCN1	When I need help to use the Tablet PC, guidance is available to me	Venkatesh and Davis [2000]
	FCN2	When I need help to use the Tablet PC, specialized instruction is available to help me	
	FCN3	When I need help to use the Tablet PC, a specific person is available to provide assistance.	
Output Quality (OTQ)	OTQ1	The quality of the output I get from the Tablet PC is high	Venkatesh and Davis [2000]
	OTQ2	I have no problem with the quality of the Tablet PC's output	
	OTQ3	I rate the results from the Tablet PC is excellent	
Result Demonstrability (RDE)	RDE1	I have no difficulty telling others about the results of using the Tablet PC.	Venkatesh and Davis [2000]
	RDE2	I believe I could communicate to others the consequences of using Tablet PC.	
	RDE3	The results of using Tablet PC are apparent to me.	
	RDE4	I would have difficulty explaining why using Tablet PC may be beneficial.	
	RDE5	I would have difficulty explaining why using Tablet PC may not be beneficial.	
Intention to use Tablet PC (INT)	INT1	When it is available I intend to use the Tablet PC.	Dutta et al. [2018]
	INT2	When it is available in my organization, I intend to adopt the Tablet PC.	
	INT3	The probabilities that I use the Tablet PC for all my activities when available in my organization are very high	
	INT4	Whatsoever the environments, I do not intend to use the Tablet PC when it becomes available in my organization	

Appendix B**Table B1.** Results of confirmatory factor analysis and reliability analysis.

Constructs	Item	Loadings	Standardized Cronbach's α
PU	PU1	0.871	0.82
	PU2	0.832	
	PU3	0.816	
	PU4	0.882	
	PU5	0.942	
	PU6	0.954	
PEOU	PEOU1	0.964	0.83
	PEOU2	0.933	
	PEOU3	0.782	
	PEOU4	0.842	
SN	SN1	0.915	0.88
	SN2	0.972	
	SN3	0.820	
JR	JR1	0.882	0.82
	JR2	0.889	
PI	PI1	0.861	0.86
	PI2	0.873	
	PI3	0.894	
	PI4	0.952	
FCN	FCN1	0.914	0.84
	FCN2	0.951	
	FCN3	0.862	
OTQ	OTQ1	0.931	0.81
	OTQ2	0.921	
	OTQ3	0.891	
RDE	RDE1	0.714	0.78
	RDE2	0.951	
	RDE3	0.917	
	RDE4	0.886	
	RDE5	0.921	
INT	INT1	0.952	0.82
	INT2	0.951	
	INT3	0.891	
	INT4	0.915	