EasyChair Preprint

№ 5684

Extending UTAUT to Understand the Acceptance of Queue Management Technology by Physicians in UAE

Adi Alqudah and Khaled Shaalan

June 3, 2021

Extending UTAUT to Understand the Acceptance of Queue Management Technology by Physicians in UAE

Adi A. AlQudah[1[0000-0003-3942-5869]] and Khaled Shaalan[1[0000-0003-0823-8390]]

[1] Faculty of Engineering & IT, The British University in Dubai, UAE
Adi.qudah@gmail.com

Abstract. Queue Management is significant to improve the provided healthcare services. Despite previous studies on technology adoption and users' intention to use various technologies in healthcare, users' acceptance of queue management solutions (QMS) have rarely been measured. End users in healthcare domain and their acceptance for information technologies are important to ensure the success of implementation for these technologies. It is essential to assess the level of acceptance for those users, and understand the related influencing factors. The objective of this study is to evaluate the factors that impact the acceptance of technology by physicians in UAE. It proposes a model based on the unified theory of acceptance and use of technology (UTAUT) extended by the construct "Trust". The study was conducted in healthcare organization in UAE and represents 63 physicians. To evaluate the proposed model, Structural Equation Modelling (SEM) was used, and data was analyzed using SmartPLS and SPSS Statistics Software. It was found that the proposed model could explain 62.3% of total variance in the behavioral intention to use Queue Management Solution (QMS) by physicians. The results also showed that Performance expectancy and Facilitating conditions are significantly influencing the physicians' intention to accept using QMS. Moreover, Trust as external factor has positive significant influence on the beliefs of physicians, especially when it comes to the importance of QMS to gain better performance results. This study can provide useful knowledge for decision-makers in healthcare organizations; who are planning to implement new QMS, or enhance the current available solution.

Keywords: Technology Acceptance, Unified Theory of Acceptance and Use of Technology, Structural Equation Modeling, Healthcare, Queue Management.

1 Introduction

Over the years, managing the queues is common problem in healthcare and considered significant for the safety and overall satisfaction of patients [1]. long queues in healthcare organizations can produce high levels of distraction for the employees instead of focusing on the original activities [2]. Queue management technology is becoming more popular to be implemented in healthcare organizations, to solve the issue of queues, gather data, and generate statistical reports about the current and future flow trends [3]. The acceptance to use queue management technology can be risky, and face resistance from health professionals, including physicians.

In the case of this study, the healthcare organization is looking to enhance the current implemented QMS, but there is a doubt regarding its benefit since there is a level of resistance from physicians to use the solution. Hence, the key question of this research is "what are the factors that can motivate the acceptance and actual use of QMS by physicians in UAE?". To answer such question, the study utilized the UTAUT model [4]. UTAUT model is the most relevant [5], and actively used in the technology acceptance studies in healthcare domain [5], [6]. The study considered the key constructs of UTAUT model, excluding the moderating factors. Also, the suggested model is extended by the construct "Trust" as inspired by the work of [5], [7]. Construct "Trust" is important to positively influence the beliefs of users, to obtain better performance results [7].

The key contribution of this study is to enrich the knowledge of research community, with respect to the application of UTAUT model to explain the acceptance of technology by physicians in UAE. The study can be also beneficial for decision-makers in healthcare, business analysts and IT corporations. It is important to find out how to enhance the level of technology acceptance (QMS in this case) in healthcare arena.

The coming sections will be responsible to give an idea about the related work, highlight the recent applications of UTAUT model in healthcare domain, present thorough explanation for the suggested model and its related hypotheses, report the conducted analysis and its based methodology. The final section will include the conclusion, main implications and limitations.

2 Literature Review

In 2003, the unified theory of acceptance and use of technology (UTAUT) has been proposed by [4], as a unified view for the technology acceptance by users. The authors could highlight various limits in other acceptance models, that were derived from Theory of Reasoned Action (TRA) [8]. Consequently, the TRA-driven models were combined to have a unified view to build UTAUT. It was confirmed that the ability to explain the intention to use technology by UTAUT is up to 70%, due to the inclusion of facilitating conditions (FC) and social influence (SI) factors along with age, gender, experience and voluntariness as moderating factors [4].

The UTAUT model has been explored in different domain including banks [9], and education [10]. But it was claimed by [11] that there are limited applications of UTAUT to investigate information technology acceptance in healthcare.

In 2012, the acceptance of medical staff in Taiwan for an online patient-safety reporting system (PSRS) was studied by [12]. The study used the main constructs and moderating factors of UTAUT, with an integration for the factor of "Value of Perceived Consequence" as an attempt to make UTAUT more adequate. From 450 distributed surveys, only 183 (40.67%) responses were considered valid to be analyzed. The suggested model is significant and useful to predict the intention to use PSRS by medical staff. The results showed that the management support is significant to motivate the staff to use PSRS. The influence of performance expectance and perceived consequence

on the intention to use PSRS was moderated by the age, experience, gender and occupation of staff.

Similarly, the UTAUT model was extended in [13] by perceived credibility and perceived organizational support, to understand the physicians' acceptance of E-prescribing in Pakistan. A total of 295 physicians participated in the study. The collected data were analyzed using structural equation modeling (SEM) assess associations among the constructs. All suggested hypotheses were supported, all key constructs of UTAUT along with perceived credibility had positive significant influence on behavioral intention to use the E-prescribing technology. As well, it was confirmed that higher perceived organizational support will lead to higher usage behavior of E-prescribing by physicians. In general, the proposed model could explain 56.1% of the variance in behavioral intention to use E-prescribing technology, and 40.6% in the variance in adoption of E-prescribing.

Using the original UTAUT model, [14] explored the factors that influence the acceptance of nutrition information system by nutrition officers in primary healthcare organization. The results of linear regression analysis for 50 valid responses, could show that the model explained 49.1% with contribution of performance expectancy, effort expectance, and social influence, and 50.9% is explained by other constructs.

3 Research Model and Hypotheses

The research model is adopted from the UTAUT model, including the key constructs with exclusion for the moderating constructs. UTAUT extended by adding the construct "Trust" because it is crucial to enhance the performance expectance (perceived usefulness of users) and their acceptance of technology within the healthcare domain [7].

Performance Expectancy (PE) is describing the point where an individual is confident, that using an information technology will be beneficial to improve the personal performance results [4], [15]. The work of [13], [15] could confirmed that performance expectancy has positive influence on the user's behavioral intention in healthcare context. In this study, the following hypothesis has been developed:

H1: There is a significant positive impact for performance expectancy on behavioral intention of users while using technology in healthcare domain.

Effort Expectancy (EE) was described as the level of ease that is linked with suitability while using any system [4], [15]. Effort expectancy has the concept of using the system with no hassles [16]. It was verified that effort expectancy has positive impact on the users' behavioral intention in healthcare domain [13], [15]. Interestingly, the work of [17], [18] found that effort expectancy has positive influence on performance expectancy. So, the following hypotheses have been suggested in this study:

H2a: There is a significant positive impact for effort expectancy on the user's performance expectancy of technology in healthcare domain.

H2b: There is a significant positive impact for effort expectancy on behavioral intention of users while using technology in healthcare domain.

Social Influence (SI) refers to the perception of a person regarding the importance of social actors that expecting him/her to use technology [19]. It was confirmed by [20], [21] that perceived usefulness (performance expectancy) is impacted positively by social influence. Similarly, it was found by [13] that there is a positive effect for social influence on behavioral intention to use technology in healthcare. This study suggests the below hypotheses:

H3a: There is a significant positive impact for social influence on the user's performance expectancy of technology in healthcare domain.
H3b: There is a significant positive impact for social influence on the behavioral intentions (BI) of healthcare staff to use technology.

Facilitating Conditions (FC) is concerned about the existence of support and guidance from people including top management, guidance material and manuals to use information technologies [18]. The positive effect of facilitating conditions on healthcare staff's behavioral intention to use technology was verified in the studies of [13]. As well, [18], [22] could confirm that facilitating conditions is positively impacting the usage behavior of information systems in healthcare field Moreover, it was found that behavioral intention (BI) to use a technology has positive impact on the use behavior (UB) of that technology within the healthcare arena, regardless the type of technology [23], [24]. This study proposed the below hypotheses:

H4a: There is a significant positive impact for facilitating conditions on behavioral intention of healthcare staff to use technology.
H4b: There is a significant positive impact for facilitating conditions on healthcare staff's use behavior of technology.
H5: There is a significant positive impact for healthcare users' behavioral intention to use technology on the usage behavior of that technology.

Trust factor was studied as a predecessor for the acceptance of technology in different fields [19]. Trust has been defined as confidence of an organization and its services (level of reliability) [25]. Several studies have discussed that it is significant to trust the creator of a technology, and its positive impact on the intention to use that technology. Especially when the technology requires to allow share location feature, or digital exchanges [7]. As well, trust factor was underlined by [7] that it can positively influence the user's belief to gain better performance results, from using a particular technology within the healthcare context. This leads to the develop this hypothesis:
H6: There is a significant positive impact for user's trust of technology on the performance expectancy from that technology.

4 Research Methodology

Similar to previous studies that discussed the technology acceptance by healthcare professionals [13], [17], [26], this study have employed a quantitative approach to examine the developed hypotheses. The study included physicians who are working in healthcare organization in the United Arab of Emirates. A total number of 63 physicians to represent a target population of 88 physicians. The target population is known, so a non-probability sampling with convenience sampling techniques was used [27], [28]. Data were collected through survey that was conducted in February 2020, and sent to all prospective participants using their professional emails.

The survey contains measurements with 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). Google forms tool [29] was utilized to build the survey and gather the research data. The total number of returned questionnaires was 63 (71.6%). All returned questionnaires were considered valid (No missing data) since all questions were mandatory to be answered. Krejcie and Morgan sampling method is common approach that is used to estimate sample sizes [30]. As per the work of Krejcie and Morgan in [31], the minimum accepted sample size is statistically calculated as S = 63 – 73 for population N = 75 – 90. In the case of this study, the sample size is 63, which is the minimum required sample size. Although it is inadequate sample, but it can be relatively acceptable due to the small target population, time of the survey (COVID19 outbreak), and the busy clinical schedule of participants.

The survey was divided to three sections, where first section included the ethics and consent section, and second section for the demographic details. The third section contained 28 different items to examine the developed hypotheses. Each item was extracted from previous related studies, and modified to the context of this study. Items of UTAUT constructs were mainly adapted from the work of [13], [20], [32]–[35], while the Trust items were extracted from [35], [36]. None of the items was related to specific personal details, or contact details to ensure the anonymous response from participants.

5 Findings

An analysis was conducted through the Structural Equation Modelling (SEM) using SmartPLS3 [37], along with and IBM SPSS Statistics Software v.25 [38]. The structural and measurement models (inner and outer) were examined. Final model and the hypotheses to be presented. The results, revealed that the model looks theoretically valid in order to explain the acceptance of technology (QMS) by physicians in UAE.

5.1 Demographic Details

Table1 shows the demographic profile of the sample. Most of the respondents were males (71.43%), aged between 50 to 59 years old (42.86%), and mainly work within the Orthopedics clinic.

Table 1. Demographic details of participants

Sr.	Characteristics	Answer	Frequency	(%)
1	**Gender**	Female	18	28.57
		Male	45	71.43
2	**Age**	18 to 29	5	7.94
		30 to 39	15	23.8
		40 to 49	12	19.05
		50 to 59	27	42.86
		60+	4	6.35
3	**Clinic**	Orthopedics	28	44.44
		Internal Medicine	15	23.8
		Family Medicine	13	20.64
		ENT	7	11.11

5.2 Measurement Model

The measurement model represents the relations between indicators and latent constructs. The convergent and discriminate validities are essentials in order to assess the measurement model [39]. The convergent validity suggests the degree to which there is a high association between the constructs, that are theoretically identical. While, discriminant validity can provide to which degree that a specific construct is differentiated from other constructs [40].

Table 2. Results of convergent validity

Constructs	Items	Loading	Cronbach's Alpha	Composite Reliability
Behavioral Intention	BI1	0.869	**0.834**	**0.889**
	BI2	0.803		
	BI3	0.806		
	BI4	0.789		
Effort Expectancy	EE1	0.775	**0.829**	**0.871**
	EE2	0.711		
	EE3	0.841		
	EE4	0.701		
	EE5	0.757		
Facilitating Conditions	FC1	0.882	**0.904**	**0.933**
	FC2	0.888		
	FC3	0.880		
	FC4	0.877		
Performance Expectancy	PE1	0.755	**0.817**	**0.872**
	PE2	0.764		
	PE3	0.702		
	PE4	0.832		
	PE5	0.827		
Social Influence	SI1	0.819	**0.847**	**0.897**
	SI2	0.715		
	SI3	0.836		
	SI4	0.929		
Trust	TRU1	0.894	**0.885**	**0.925**
	TRU2	0.934		
	TRU3	0.862		
Use Behavior	UB1	0.920	**0.873**	**0.922**
	UB2	0.866		
	UB3	0.893		

As presented in Table 2, to examine the convergent validity, two methods were used. The loading for each measure, along with its associated constructs to assess the internal consistency, while the second method to appoint the composite reliabilities [41]. Scales internal consistency was verified, since their Cronbach's Alpha exceeds threshold value (0.70) as suggested by [39]. Also, all constructs specified results of composite reliability that above 0.8 which confirmed good reliability [42]. Besides, the results of factor loadings for each item in the model's constructs were 0.70 or more. Thus, all items were valid, and can be added to the final study [43].

As seen in Table 3, the Average Variance Extracted (AVE) value is more than the threshold value of 0.50, which means that construct can create a minimum 50 percent of the variance of its items [43], [44]. On the other hand, Fornell-larcker scale and cross-loadings have been applied to examine if discriminant validity exists [44]. As in Table 3, bold diagonal items specify the square root of AVE scores, that are higher than the associations among the constructs (represented by the off-load diagonal items [45]).

Table 3. Fornell Larcker scale for discriminant validity.

	AVE	BI	EE	FC	PE	SI	TRU	UB
BI	0.669	**0.817**						
EE	0.576	0.611	**0.759**					
FC	0.776	0.665	0.617	**0.881**				
PE	0.579	0.688	0.497	0.534	**0.761**			
SI	0.687	0.349	0.598	0.408	0.219	**0.829**		
TRU	0.805	0.394	0.473	0.294	0.398	0.437	**0.897**	
UB	0.797	0.696	0.623	0.702	0.523	0.509	0.324	**0.893**

5.3 Structural Model

The structural model is responsible to provide details about the predictive power of the model (R2) and path significance. PLS-Graph using a nonparametric test of significance (bootstrapping method) was conducted with 500 resamples to specify the significance levels, and path coefficients [46], [47]. The model's results as presented in Figure 1 showed that it can explain 62.3% of total variance in the intention to use QMS by physicians in UAE, along with 58.6% for the actual use by physicians for the queue management technology. As well, all significant paths can be seen in Figure 1.

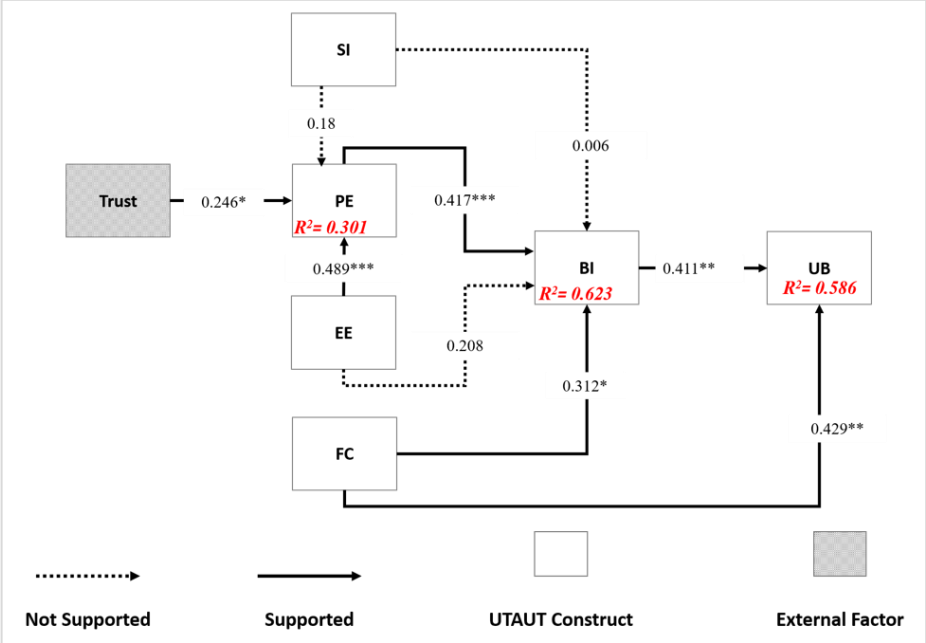

Fig. 1. Study Final Model –Total Effect Hypotheses.

6 Discussion

This study has explored the physicians' Intention to accept queue management technology in UAE. Association between BI and PE (β=0.417, P<0.001) as proposed in H1. This finding is consistent with the results of previous studies [15], [48], and indicates that a rise in performance expectancy can positively enhance physicians to accept and use QMS. Similarly, effort expectancy is significantly influencing performance expectancy (β= 0.489, P<0.001), which is supporting hypothesis H2a, similar to what was reported by [17], [18]. This means that using QMS with hassle-free by physicians can improve their motivation to use the solution; since it is significantly helping them to do their work easily, and gain better results. But it was found that there is no significant effect from effort expectancy on the behavioral intention of physicians regarding the usage of QMS, where (β=0.208, P=0.065), so H2b was rejected. This finding is compatible with what has been found by [17], [49]. This finding can be explained by the experience level of the participants, who are familiar with using complex solutions (i.e., electronic medical records) to achieve their daily work activities.

Moreover, there was no significant path between social influence and performance expectancy (β=0.18, P=0.085), So H3a is not supported, which is opposite to the results of [21], [50]. Similarly, the results (β=0.006, P=0.479) of social influence shows non-significant impact on behavioral intention to use QMS as per the settings. So H3b is not

supported as well, which is similar to the findings of [51]. These results suggest that the physicians do not care about the opinion of their colleagues, to decide regarding the intention to use QMS, or enhance their belief that QMS can help to perform better. This might also refer to the relatively high levels of experience and age in the sample. Also, the results show significant influence for facilitating conditions on behavioral intention (β=0.312, P<0.05), then hypothesis H4a is supported, and compatible with the findings of [13], [52]. Likewise, H4b was confirmed (β=0.429, P<0.001), which is similarly was confirmed by [18], [22]. Having the right technical support and resources in place is significantly crucial, to motivate physicians' intention and actual usage of queue management technology. Furthermore, Figure 1 shows that the actual use of QMS by physicians is significantly impacted by the behavioral intention to use QMS (β=0.411, P<0.01). this result supports H5 and similar to what has been found in [18]. Finally, the results indicated that the participated physicians trust QMS, to gain better performance results and achieve their work tasks proficiently, which is supporting H6 (β=0.246, P<0.05) and in line with the findings of [7], [19].

7 Study Implications

The study attempts to extend the UTAUT acceptance model, with the addition to "Trust" factor. Trust factor was compatible to be injected to the model, and it was helpful to strengthen its explanatory power with respect to the expected performance results. Practically, this study has presented a useful tool to managers, analysts, and decision-makers in healthcare organizations. They can identify the factors that are crucial to improve the acceptance to use QMS by physicians. The findings can help to ensure better future implementations of QMS, and can be employed to improve the current developed QMS by applying optimizations. Healthcare organizations and information technology providers need to consider the nature of users, gender and age.

8 Conclusion and Study Limitations

This study designed to recognize the factors that can motivate physicians in UAE to accept queue management technology. The data were collected through survey includes items with 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). The analysis was completed using structural equation modelling (SEM). The results showed that that performance expectancy and facilitating conditions are significantly influencing the physicians' intention to accept and use QMS. Also, Trust was found significant for of physicians, to believe that QMS can help them to gain better performance results. In general, the proposed model could explain 62.3% of total variance in the intention to use QMS by physicians in UAE, along with 58.6% for the actual use of QMS.

The key limitations of the study are represented by small sample size (63 physicians), and the time of survey. The survey was distributed at the beginning stage of COVID19 outbreak in UAE (February 2020), and physicians were mainly busy with

different activities that are related to the pandemic precautions. Also, the majority of respondents (more than 71%) were males which could bias results.

Acknowledgment

This work is a part of a project undertaken at the British University in Dubai.

References

[1] M. M. Davis and J. Heineke, "Understanding the Roles of the Customer and the Operation for Better Queue Management," *Int. J. Oper. Prod. Manag.*, vol. 14, no. 5, pp. 21–34, May 1994.

[2] S. A. Afolalu, K. O. Babaremu, S. O. Ongbali, A. A. Abioye, A. Abdulkareem, and S. B. Adejuyigbe, "Overview Impact Of Application Of Queuing Theory Model On Productivity Performance In A Banking Sector," *J. Phys. Conf. Ser.*, vol. 1378, no. 3, p. 032033, Dec. 2019.

[3] K. K. Gosha, "Queueadmin: the Advance Queue Management System for Barbershop Administration," Auburn University, 2007.

[4] Venkatesh, Morris, Davis, and Davis, "User Acceptance of Information Technology: Toward a Unified View," *MIS Q.*, vol. 27, no. 3, p. 425, 2003.

[5] A. E. Bennani and R. Oumlil, "Factors fostering IT acceptance by nurses in Morocco: Short paper," in *Proceedings - International Conference on Research Challenges in Information Science*, 2013.

[6] A. Perlich, C. Meinel, and D. Zeis, "Evaluation of the technology acceptance of a collaborative documentation system for addiction therapists and clients," *Stud. Health Technol. Inform.*, vol. 247, pp. 695–699, 2018.

[7] A. D. Beldad and S. M. Hegner, "Expanding the Technology Acceptance Model with the Inclusion of Trust, Social Influence, and Health Valuation to Determine the Predictors of German Users' Willingness to Continue using a Fitness App: A Structural Equation Modeling Approach," *Int. J. Human–Computer Interact.*, vol. 34, no. 9, pp. 882–893, Sep. 2018.

[8] M. Fishbein and I. Ajzen, "Belief, attitude, intention, and behavior: An introduction to theory and research," *Addison-Wesley Pub. Co, Reading, Mass*, 1975.

[9] E. AbuShanab, J. M. Pearson, and A. J. Setterstrom, "Internet Banking and Customers' Acceptance in Jordan: The Unified Model's Perspective," *Commun. Assoc. Inf. Syst.*, vol. 26, no. 1, pp. 493–524, 2010.

[10] S. Baltaci-Goktalay and Z. Ozdilek, "Pre-service teachers' perceptions about web 2.0 technologies," *Procedia - Soc. Behav. Sci.*, vol. 2, no. 2, pp. 4737–4741, 2010.

[11] B. Holtz and S. Krein, "Understanding Nurse Perceptions of a Newly Implemented Electronic Medical Record System," *J. Technol. Hum. Serv.*, vol. 29, no. 4, pp. 247–262, Oct. 2011.

[12] I. C. Chang and H. M. Hsu, "Predicting medical staff intention to use an online reporting system with modified unified theory of acceptance and use of technology," *Telemed. e-Health*, vol. 18, no. 1, pp. 67–73, Jan. 2012.

[13] I. U. Khan, Y. Yu, Z. Hameed, S. U. Khan, and A. Waheed, "Assessing the Physicians' Acceptance of E-Prescribing in a Developing Country: An Extension of the UTAUT

Model With Moderating Effect of Perceived Organizational Support," *J. Glob. Inf. Manag.*, vol. 26, no. 3, pp. 1–10, Jul. 2018.

[14] J. K. Masyarakat, S. Nurhayati1, D. Anandari1, and W. Ekowati, "Unified Theory of Acceptance and Usage of Technology (UTAUT) Model to Predict Health Information System Adoption," *KEMAS J. Kesehat. Masy.*, vol. 15, no. 1, pp. 89–97, 2019.

[15] M. Ahmadi, N. Mehrabi, A. Sheikhtaheri, and M. Sadeghi, "Acceptability of picture archiving and communication system (PACS) among hospital healthcare personnel based on a unified theory of acceptance and use of technology," *Electron. Physician*, vol. 9, no. 9, pp. 5325–5330, Sep. 2017.

[16] F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Manage. Sci.*, vol. 35, no. 8, pp. 982–1003, Aug. 1989.

[17] A. Alaiad, L. Zhou, and G. Koru, "An exploratory study of home healthcare robots adoption applying the UTAUT model," *Int. J. Healthc. Inf. Syst. Informatics*, vol. 9, no. 4, pp. 44–59, 2014.

[18] P. Ifinedo, "Technology acceptance by health professionals in Canada: An analysis with a modified UTAUT model," in *45th Hawaii International Conference on System Sciences*, 2012, pp. 2937–2946.

[19] D. Rajanen and M. Weng, "Digitization for fun or reward? A study of acceptance of wearable devices for personal healthcare," in *Proceedings of the 21st International Academic Mindtrek Conference, AcademicMindtrek 2017*, 2017, vol. 2017-Janua.

[20] J. Li, Q. Ma, A. H. Chan, and S. S. Man, "Health monitoring through wearable technologies for older adults: Smart wearables acceptance model," *Appl. Ergon.*, vol. 75, pp. 162–169, Feb. 2019.

[21] L. Briz-Ponce and F. J. García-Peñalvo, "An Empirical Assessment of a Technology Acceptance Model for Apps in Medical Education," *J. Med. Syst.*, vol. 39, no. 11, Nov. 2015.

[22] I.-C. Chang, H.-G. Hwang, W.-F. Hung, and Y.-C. Li, "Physicians' acceptance of pharmacokinetics-based clinical decision support systems," *Expert Syst. Appl.*, vol. 33, no. 2, pp. 296–303, Aug. 2007.

[23] K. Dou *et al.*, "Patients' Acceptance of Smartphone Health Technology for Chronic Disease Management: A Theoretical Model and Empirical Test," *JMIR mHealth uHealth*, vol. 5, no. 12, p. e177, Dec. 2017.

[24] M. Nematollahi, A. Moosavi, M. Lazem, N. Aslani, M. Kafashi, and A. Garavand, "Factors affecting in adoption and use of electronic medical record based on unified theory of acceptance and use of technology in Iran," *Shiraz E Med. J.*, vol. 18, no. 9, p. 57582, 2017.

[25] E. Garbarino and M. S. Johnson, "The Different Roles of Satisfaction, Trust, and Commitment in Customer Relationships," *J. Mark.*, vol. 63, no. 2, p. 70, Apr. 1999.

[26] A. J. E. De Veer, J. M. Peeters, A. E. M. Brabers, F. G. Schellevis, J. J. D. J. M. Rademakers, and A. L. Francke, "Determinants of the intention to use e-health by community dwelling older people," *BMC Health Serv. Res.*, vol. 15, no. 1, Mar. 2015.

[27] C. G. Karno and E. Purwanto, "The effect of cooperation and innovation on business

performance," *Qual. - Access to Success*, vol. 18, no. 158, pp. 123–126, 2017.

[28] Ujang Sumarwan,, Muhammad .H. Rasyidha, Mukhamad Najib, "The Influence of Intention to use Medians Potato Varieties on the Result of Technological Innovation Development with Technology Acceptance Models," *J. Manaj.*, vol. 24, no. 1, p. 38, Mar. 2020.

[29] Google, "Google Forms: Free Online Surveys for Personal Use," *Google*, 2020. [Online]. Available: https://www.google.com/forms/about/. [Accessed: 03-Jan-2021].

[30] L. C. Chua and J. Penyelidikan, "Sample Size Estimation Using Krejcie And Morgan And Cohen Statistical Power Analysis: A Comparison," *J. Penyelid. IPBL*, vol. 7, pp. 78–86, 2006.

[31] R. V. Krejcie and D. W. Morgan, "Determining Sample Size for Research Activities," *Educ. Psychol. Meas.*, vol. 30, no. 3, pp. 607–610, Sep. 1970.

[32] A. Sarlan, R. Ahmad, W. F. W. Ahmad, and D. D. Dominic, "A study of SME private healthcare personnel acceptance of Clinic Information System in Malaysia," *Int. J. Bus. Inf. Syst.*, vol. 14, no. 2, p. 238, 2013.

[33] M. Cimperman, M. Makovec Brenčič, and P. Trkman, "Analyzing older users' home telehealth services acceptance behavior-applying an Extended UTAUT model," *Int. J. Med. Inform.*, vol. 90, pp. 22–31, 2016.

[34] R. ul Amin, I. Inayat, B. Shahzad, K. Saleem, and L. Aijun, "An empirical study on acceptance of secure healthcare service in Malaysia, Pakistan, and Saudi Arabia: a mobile cloud computing perspective," *Ann. Telecommun.*, vol. 72, no. 5–6, pp. 253–264, Jun. 2017.

[35] S. Boon-itt, "Quality of health websites and their influence on perceived usefulness, trust and intention to use: an analysis from Thailand," *J. Innov. Entrep.*, vol. 8, no. 1, Dec. 2019.

[36] X. Guo, X. Zhang, and Y. Sun, "The privacy-personalization paradox in mHealth services acceptance of different age groups," *Electron. Commer. Res. Appl.*, vol. 16, pp. 55–65, 2016.

[37] J.-M. SmartPLS, Ringle, C. M., Wende, S., and Becker, "SmartPLS," 2015. [Online]. Available: https://www.smartpls.com/.

[38] "SPSS® Statistics 25.0 - Overview | IBM," 2017. [Online]. Available: https://www.ibm.com/products/spss-statistics.

[39] M. S. Hair Jr, Joseph F., G. Tomas M. Hult, Christian Ringle, *A primer on partial least squares structural equation modeling (PLS-SEM)*. 2016.

[40] I. A. Rahman, A. H. Memon, N. H. Abdullah, and A. A. A. Azis, "Application of PLS-SEM to Assess the Influence of Construction Resources on Cost Overrun," *Appl. Mech. Mater.*, vol. 284–287, pp. 3649–3656, Jan. 2013.

[41] N. J. Ashill and D. Jobber, "Measuring State, Effect, and Response Uncertainty: Theoretical Construct Development and Empirical Validation," *J. Manage.*, vol. 36, no. 5, pp. 1278–1308, Sep. 2010.

[42] U. Sekaran and R. Bougie, *Research methods for business: A skill building approach*, 7th ed. John Wiley & Sons, Inc., 2016.

[43] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report

the results of PLS-SEM," *Eur. Bus. Rev.*, vol. 31, no. 1, pp. 2–24, Jan. 2019.

[44] C. Fornell and D. F. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *J. Mark. Res.*, vol. 18, no. 1, p. 39, Feb. 1981.

[45] J. M. Tsai, M. J. Cheng, H. H. Tsai, S. W. Hung, and Y. L. Chen, "Acceptance and resistance of telehealth: The perspective of dual-factor concepts in technology adoption," *Int. J. Inf. Manage.*, vol. 49, pp. 34–44, 2019.

[46] J. R. Gil-Garcia, "Using Partial Least Squares in Digital Government Research," in *Handbook of Research on Public Information Technology*, IGI Global, 2011.

[47] V. E. Vinzi, L. Trinchera, and S. Amato, "PLS Path Modeling: From Foundations to Recent Developments and Open Issues for Model Assessment and Improvement," in *Handbook of Partial Least Squares*, Berlin, Heidelberg: Springer Berlin Heidelberg, 2010, pp. 47–82.

[48] P. E. Idoga, M. Toycan, H. Nadiri, and E. Çelebi, "Assessing factors militating against the acceptance and successful implementation of a cloud based health center from the healthcare professionals' perspective: A survey of hospitals in Benue state, northcentral Nigeria," *BMC Med. Inform. Decis. Mak.*, vol. 19, no. 1, Feb. 2019.

[49] M. Lárusdóttir, Å. Cajander, and J. Gulliksen, "Informal feedback rather than performance measurements - User-centred evaluation in Scrum projects," *Behav. Inf. Technol.*, vol. 33, no. 11, pp. 1118–1135, 2014.

[50] D. Becker, "Acceptance of Mobile Mental Health Treatment Applications," in *Procedia Computer Science*, 2016, vol. 58, pp. 220–227.

[51] R. P. Francis, "Examining healthcare providers' acceptance of data from patient self-monitoring devices using structural equation modeling with the UTAUT2 model," *Int. J. Healthc. Inf. Syst. Informatics*, vol. 14, no. 1, pp. 44–60, 2019.

[52] S. Kim, K.-H. Lee, H. Hwang, and S. Yoo, "Analysis of the factors influencing healthcare professionals' adoption of mobile electronic medical record (EMR) using the unified theory of acceptance and use of technology (UTAUT) in a tertiary hospital," *BMC Med. Inform. Decis. Mak.*, vol. 16, no. 1, p. 12, Dec. 2016.