Received: 17 May 2021 | Revised: 26 September 2021 | Accepted: 9 November 2021

Healthcare Technology Letters

DOI: 10.1049/htl2.12019

The Institution of Engineering and Technology WILEY

ORIGINAL RESEARCH PAPER

Kuwaiti hospital patients' continuance intention to use telemedical systems in the wake of the COVID19 pandemic

Ibtisam L F H Almutairi[1] | **Bodoor F Alazemi**[1] | **Faisal L F H Almutairi**[2]

[1] Division of Management, College of Business Studies, Public Authority for Applied Education and Training, Ardiya, Kuwait

[2] School of Management Studies, Universiti Sains Malaysia, Pinang, Malaysia

Correspondence
Ibtisam L F H Almutairi, Division of Management, College of Business Studies, Public Authority for Applied Education and Training, Kuwait.
Email: E_almutairi@hotmail.com

Abstract

The objective of this study is to investigate factors influencing patients' continuance intention to use telemedicine after the COVID-19 pandemic in the medical sector of Kuwait. To reach this purpose, the updated Delone and Maclean (2003) model was utilized to investigate the aforementioned factors. As such, this research applied quantitative research methods with a sample of 290 participants from patients in Dar Al Shifa Hospital, a private hospital in Kuwait which utilizes telemedical services called 'Sehaty online'. The corresponding data was analyzed using SmartPLS. The findings of this study revealed that information quality and system quality have a positive and significant influence on patient's satisfaction, whereas service quality has an insignificant influence on patient's satisfaction. Also, patients' continuance intention to use telemedicine is found to be significantly impacted by their satisfaction. Furthermore, several limitations of the study, related future research, and recommendations have been discussed.

1 | INTRODUCTION

At the end of 2019, health organizations worldwide faced challenges after the spread of the coronavirus (COVID-19) in regard to providing healthcare services, ensuring social distancing, and limiting people's face-to-face communication at the same time in order to control the virus [1]. On this basis, the State of Kuwait has imposed a complete ban, closed all private clinics and hospitals (since it has been observed that healthy people become infected with the virus while visiting hospitals), and relies only on emergency rooms in public hospitals [2]. In terms of social responsibility, several private hospitals and clinics in Kuwait fully utilized telemedical services as an alternative to traditional medicine during the COVID-19 crisis [2, 3].

Furthermore, Information and Communication Technologies (ICT) have been utilized to enhance the traditional environment of healthcare services with the usage of telemedicine as the most prominent service in the medical field. According to Kamal et al. [4], telemedicine is known as utilizing telecommunication technologies to diagnose, treat, and monitor patients by healthcare physicians and specialists [4]. Telemedicine applications examples may include live video conferences, portals, remote monitoring, and mobile health [5].Telemedical services have proven to be successful in reporting and tracking patient records, delivering, real time monitoring, providing correct medications, and early detection of clinical decline [1]. Moreover, the World Health Organization (WHO) has confirmed that the use of telemedicine services is efficient and cost-effective for health control [1].

The State of Kuwait has a national development plan for all sectors for the year 2035 which is known as "New Kuwait". One of the health development projects is the telemedical electronic portal lunched by the Kuwaiti ministry of health with the objective of achieving goals related to the New Kuwait development plan [2, 6]. Accordingly, Dar Al Shifa Hospital is one of the first private hospitals in Kuwait to use telemedicine services. In 2017, this hospital began providing telemedical service through an electronic service portal for patients entitled 'Sehaty online' [7]. As such, patients registered on 'Sehaty online' by calling the hospital help desk after identity validation via email. Registered patients can access the system to contact the healthcare team (physicians and help desk staff), check lab results, request medication refills and renewals, and schedule appointments [7]. Also, patients can consult their doctors to take a suitable online medical treatment and receive the appropriate prescribed medicine.

Despite strong encouragement and interest from governmental authorities and organizations in regard to the continued usage of telemedicine, there exists a generally limited and unclear research in this area, particularly in Kuwait [8, 9]. So far, the focus of a great part of the corresponding literature is on measuring and predicting the "acceptance" or "first-time use" of telemedicine in healthcare sector. However, these studies fail to shed light with respect to its long-term viability and continued usage after COVID-19 [10–12]. Moreover, the intention to continue using any technology in any field in Information Systems (IS), namely e-commerce, e-government, e-learning, e-health etc., at the individual level is essential for the survival of these systems [10]. Furthermore, the importance of continuance is evident from the fact that acquiring new users may cost as much as five times more than retaining existing ones, given the costs of searching for new users, setting up new accounts, and initiating new users in the IS [10]. Therefore, retaining current users and making them continue their usage is indispensable to the achievement of any information system's success for sustainability [8, 13]. In the context of this research, patients' choice to employ telemedicine after the COVID-19 pandemic would truly reflect the system's value and influence the legitimacy of health institutions' investments in such a program. Also, the continuity of telemedical service usage can help all stakeholders by reducing the pressure on overburdened hospitals and geography barratries, which can ultimately improve the healthcare sector's social responsibility [8, 9, 13].

In addition, it is known that user satisfaction has an important and sensitive role in users' intention to continue utilizing any technology in the IS [8, 10, 14, 15]. In a study conducted by Hossain et al. [16], satisfaction was found to be the strongest predictor for driving users' continuance intention to use [16]. Therefore, it can be concluded that when an individual is satisfied with a technology after the initial trial, he or she may have a higher intention to continue using that technology. This is due to the positive reinforcement of patients' attitude toward the technology after using it [17]. Thus, it is assumed that higher user satisfaction leads to higher continuance intention to use in the context of this research. Moreover, this situation highlights why decision makers and developers are interested to determine factors that would affect patients' decisions to continue using telemedicine. Therefore, this study attempts to fill this gap and investigate factors that influence patients' continuance intention to use telemedicine after COVID-19 in Kuwait's medical sector.

2 | LITERATURE REVIEW

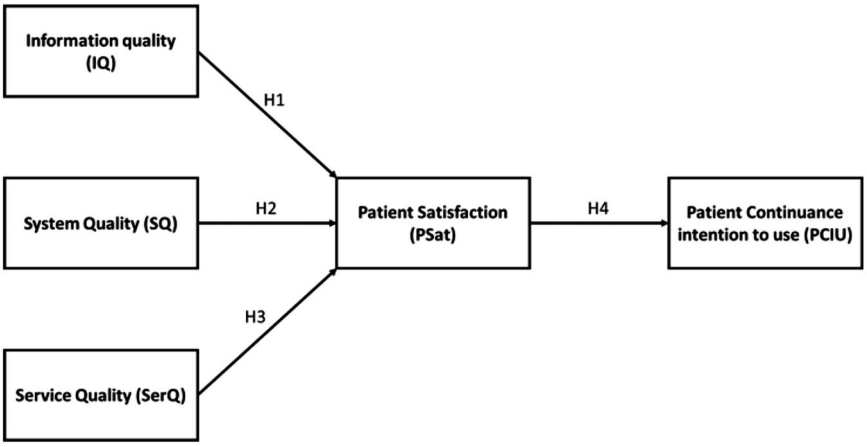
There exist a large number of technology adoption theories and models used in the context of telemedicine, such as the Technology Acceptance Models (TAM 1 and TAM 2), the Unified Theory of Acceptance and Use of Technology (UTAUT), the Theory of Planned Behavior, the Post-Acceptance Model (PAM), and many more [10]. However, the updated Information System success model is widely used to assess the success of any system employed in the medical sector [18, 19]. Moreover, it is considered to be the most suitable model in regard to explaining the factors that influence patients' continuance intention to use telemedicine [8]. This model has an advantage over other models and theories related to explaining user satisfaction considering the fact that user satisfaction is a strong predictor of continuance intention, according to many studies [8, 10]. In addition, it is suggested that information quality, system quality, and service quality determine user satisfaction; also, continuance intention to use is found in several studies to be determined by user satisfaction [8, 10, 16]. The continuance intention to use has rarely been studied with Information System success model [8, 12]. Thus, this study examines factors that influence continuance intention to use telemedical services among Kuwaiti patients after the COVID-19 pandemic.

Furthermore, corresponding literature has revealed that the successful usage of a system is dependent on its continuing utilization [16]. Moreover, continuance intention to use refers to patients' intention to continue using telemedicine [10]. Numerous studies in the field of telemedicine have proven that the success of any system in regard to its sustainability depends on retaining existing users and leading them to repeat using that system [8]. Patients will always want to keep using a particular system that can fill full their needs and help them improve their communication with the healthcare team. Thus, the goal of this paper is to identify factors influencing patients' continuance intention to use the telemedicine which is fully utilized in several Kuwaiti private hospitals. Identifying these factors can help improve telemedical services provided by private hospitals as well as expand these services in public hospitals. Hence, the next section elaborates more on the proposed research framework and hypothesis for each relationship based on a review of the relevant literature (see Figure 1).

2.1 | Information quality (IQ)

Information Quality (IQ) is one of the most popularly examined measures in the literature in general as well as in telemedical technology in particular [20]. Moreover, the Information Quality of telemedicine refers to the quality of outputs that are produced by the system and perceived by patients [21], which can be in the form of medical reports or online screens. The relationship between 'Information Quality' and 'User Satisfaction' has been supported in many studies [17, 21]. In the context in this study, Zhou et al. [20] have found that information quality is significantly and positively related to patients' satisfaction [20]. Furthermore, they argued that the accessibility of medical records directly affects the level of patients' satisfaction with telehealth services. Additionally, authors concluded that patients' effective usage of the information displayed on telehealth services can led to a positive impact on their satisfaction and the acceptance of telehealth services [20]. Moreover, according to the study of Keikhosrokiani et al. [22], after patients easily accessed their medical information in the mobile healthcare system (iHeart), they showed an extremely high level of satisfaction toward the practical application of this system [22]. Thus, it is assumed in this research that higher information quality of telemedicine leads to higher patient satisfaction.

FIGURE 1 Research conceptual model



H1: Information quality has a significant and positive effect on telemedicine users' satisfaction.

2.2 | System quality (SQ)

From the perspective of this paper, System Quality (SQ) is described as a system that has specific characteristics desired by patients and telemedicine users such as usability, responsiveness, flexibility, reliability, and ease of use. In a study related to m-health, Oppong et al., [23] found that system quality has no significant effect on user satisfaction [23]. However, numerous recent studies have reached contradictory results. As an example, Lin, H. C. [24] discovered that System Quality has a strong influence on system users' satisfaction in regard to e-health. As such, when users observe that the system features are more fitted to their needs in terms of responsiveness, flexibility, reliability, and ease of use, they gain more satisfaction [24]. Similarly, the empirical results of Kuo et al., [25] reveal that system quality is one of the most important system attributes in a virtual hospital environment, impacting the satisfaction of users. Moreover, the authors argued that systems utilized for critical tasks such as diagnosing monitoring patients should be reliable and have sufficient quality characteristics [25]. Thus, it can be hypothesized that:

H2: System Quality has a significant and positive effect on telemedicine users' satisfaction.

2.3 | Service quality (SerQ)

Service Quality (SerQ) has been defined in the literature in different ways based on what the service represents for the user. In the e-health context, service quality is defined as the patient's perception of the quality of service delivered by the healthcare team using electronic tools [21]. In this study, the healthcare team includes medical consultation and other supporting services, namely contacting the help desk for system registration, identity validation via email, and scheduling appointments.

In a number of prior studies, it was found that service quality has no significant effect on user satisfaction. In this regard, Kaium et al., [8] investigated factors affecting user satisfaction and the continuance usage intention of mHealth in developing countries. In their study, service quality represents the user evaluation of the provided services and support, which was concluded to be insignificant [8]. The authors explained that this result was due to the lack of adequate support, professionalization, and diversification of the provided services. On the other hand, many previous researches revealed that service quality's yielding satisfactory human relations and interaction between healthcare personnel and system users can enhance the assurance of the provided services and, therefore, increase user satisfaction [23, 26]. As a result, it is logical to hypothesize that:

H3: Service Quality has a significant and positive effect on telemedicine users' satisfaction.

2.4 | Patient satisfaction (P Sat.)

Patient Satisfaction (P Sat.) refers to the extent to which a patient is pleased or contented with telemedicine after having gained direct experience with this technology [16]. Also, it refers to the feeling of pleasure or displeasure that results from aggregating all the benefits that a patient hopes to receive from interaction with telemedicine services [17]. Many studies provide insights on the importance of user satisfaction on the continuance intention to use healthcare applications [14, 15]. In this regard, Zhou et al. [20] discovered that patients' satisfaction with medical services mainly includes comfort, professionalism, privacy, and waiting time. Moreover, authors demonstrated that patient satisfaction could significantly predict patient's continuance intention to use telehealth services [20]. For instance, Kaium et al. [8] concluded in a study related to mHealth in developing countries that patients become satisfied with using mHealth services regularly only when it fulfills their medical needs, which can lead them to have a constant intention to use this technology. Furthermore, Bhattacherjee, A., [10] found that the positive experience of patients and their satisfaction with telemedical services can be due to fast access to their medical information and good helping lines. Thus, when the expectations of the telemedicine are met by patients, their satisfaction grows, and this can give patients the intention to continue using

telemedical services. Therefore, the following hypothesis can be formulated:

H4: Telemedicine users' satisfaction has a significant and positive effect on patients' continuance intention to use.

3 | METHODOLOGY

3.1 | Data collection

Primary data was collected from patients who used 'Sehaty online' telemedicine of Dar Al Shifa Hospital in Kuwait. For this purpose, patients were contacted through emails and social media and their permission to obtain data was acquired. As such, from 407 distributed questionnaires, 290 valid responses were collected, resulting in a response rate of 41 percent which is more satisfying than the response rate of 29.2 percent in previous studies [27]. The response rate of this study also follows the sufficient statistical sample of 120, as calculated by G-power.

3.2 | Research instruments

The development of instruments was carefully made in order to reflect the nature of the study. Hence, the questionnaire was created and included 19 items for this study. Moreover, the variables were measured using the five-point Likert Scale, with five being 'Strongly Agree' and one being 'Strongly Disagree'. Also, because the respondents were Arabic speakers, it was vital for the questionnaire to be precisely translated from English to Arabic. Therefore, a back translation was performed, which is a procedure extensively applied to test the precision of the translation in a cross-cultural survey. The validated instruments shown in Appendix C were adapted from related previous studies to measure the variables of this research.

4 | FINDINGS AND DISCUSSION

4.1 | Respondents' profile

In the demographic information section, respondents were categorized by their age, gender, marital status, and level of education, as displayed in Table 1.

TABLE 1 Respondents' profile

Item		Frequency	Percentage
Age	20–30	82	28.2
	31–40	104	35.8
	41–50	82	28.2
	51–55	22	7.5
Gender	Male	172	59.3
	Female	118	40.7
Marital status	Single	117	40.3
	Married	158	54.4
	Divorced	15	5.1
Education	High school	12	4.1
	Degree	143	49.3
	Master	73	25.1
	PhD	62	21.3

4.2 | Measurement model

The research model of this study was tested using SmartPLS 3.3. In addition, an examination was conducted in regard to the measurement model (validity and reliability of the measures) and the structural model (testing the hypothesized relationships). As a result, all variables scored satisfactory values of Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE) and were above the cutoff points of 0.7, 0.7, and 0.5, respectively, as recommended by Hair et al. [28]. However, SerQ5 scored −0.060 for factor loading, which is below 0.4, as recommended by Thurasamy et al. [29]. Table 2 illustrates the convergent validity scores.

Second, the discriminant validity was examined in order to assess how truly distinct a construct is from other constructs. In the area of distinguishing validity, the correlations between variables in the estimation of the model did not exceed 0.95, as suggested by Kline [30] and the validity was tested based on measurements of the correlations between constructs and the square root of the average variance derived for a construct [31, 30]. Hence, Table 3 contains the results of the Fornell and Larcker Criterion and shows no value above the recommended cutoff point of 0.95 [31]

Moreover, the Heterotrait-Monotrait ratio (HTMT) is an estimate of what the true correlation between two constructs would be if they were perfectly measured (i.e. if they were perfectly reliable). Furthermore, HTMT is the mean of all correlations of indicators across constructs measuring different constructs (i.e. the Heterotrait-Monotrait correlations) relative to the (geometric) mean of the average correlations of indicators measuring the same construct (i.e. the Heterotrait-Monotrait correlations). Moreover, it can be used for discriminant validity assessment [28]. As such, the accepted level of HTMT is 0.90, as recommended by Gold et al. [32] (see Table 4).

4.3 | Structural model

The structural model represents the theoretical or conceptual element of the path model. Also referred to as the inner model in PLS-SEM, the structural model includes latent variables and their path relationships [28]. The next step after the evaluation of the measurement model is to assess the structural model. In sync with PLS-SEM, there are five steps required to assess the structural model [28], including the assessment of collinearity (step one), assessment of the path coefficients (step two), coefficient of determination (R^2 value) (step three), blindfolding and predictive relevance Q^2 (step four), and effect size f^2 (step five).

TABLE 2 Convergent validity

Variables	Items	Factor loading	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Information Quality	IQ1	.900	.943	.959	.855
	IQ2	.930			
	IQ3	.929			
	IQ4	.939			
Patient continuance intention to use telemedicine	PCIU1	.883	.839	.904	.759
	PCIU2	.925			
	PCIU3	.800			
Patient satisfaction	Psat1	.874	.898	.937	.831
	Psat2	.937			
	Psat3	.924			
Service quality	SerQ1	.912	.909	.932	.775
	SerQ2	.860			
	SerQ3	.844			
	SerQ4	.902			
System quality	SQ1	.802	.877	.916	.732
	SQ2	.893			
	SQ3	.895			
	SQ4	.828			

TABLE 3 Fornell and Larker criterion

	IQ	PCIU	Psat	SQ	SerQ
IQ	.925				
PCIU	.343	.871			
Psat	.583	.398	.912		
SQ	.686	.380	.555	.856	
SerQ	−.098	−.044	−.105	−.056	.880

TABLE 4 HTMT ratio

	IQ	PCIU	Psat	SQ	SerQ
IQ					
PCIU	.385				
Psat	.630	.454			
SQ	.752	.438	.623		
SerQ	.098	.054	.102	.065	

Furthermore, Table 5 illustrates the results of PLS bootstrapping consisting of the Beta value, t-values, p-values, hypothesis results (whether supported or not) BCILL, BCIUL, f^2, and VIF scores. Additionally, Appendix A summarizes the results of the structural model and PLS bootstrapping.

4.3.1 | Assessment of the structural model for collinearity issues

The first step in the structural model is to assess collinearity issues. It is vital to safeguard against collinearity issues between the constructs before performing a latent variable analysis in the structural model. As such, the collinearity has been measured by measuring the VIF value. As such, the threshold value for the assessment is 3.3, following the recommendation of Diamantopoulos and Siguaw [33]. In this study, as illustrated in Table 5, all inner VIF values for the constructs are within the range of 1.001 to 1.902. Moreover, all values are less than 3.3, thus indicating that collinearity is not a concern in this study.

4.3.2 | Assessment of the significance of the structural model relationships

In order to test the hypotheses, the bootstrapping procedure has been employed to produce results for each path relationship in the model, as demonstrated in Table 5.

Bootstrapping in PLS is a nonparametric test which comprises repeated random sampling with replacement from the original sample with the goal of producing a bootstrap sample and attaining standard errors for hypothesis testing [28]. In regard to the number of resampling, Chin [34] suggested performing bootstrapping with 1000 samples. In this study, four hypotheses have been developed for the constructs. To test the

TABLE 5 Summary of the structural model (PLS bootstrapping)

H	Path	Std. Beta	Std. Error	T-value	P values	Decision	BCILL	BCIUL	f^2	Effect size	VIF
H1	IQ → Psat	.377	.067	5.612	P < .001 (.000)	Supported	.270	.487	.122	Small	1.902
H2	SQ → Psat	.295	.067	4.397	P < .001 (.000)	Supported	.191	.402	.075	Small	1.889
H3	SerQ → Psat	−.056	.058	.894	P > .05 (.186)	Rejected	−.132	.068	.004	No effect	1.010
H4	Psat → PCIU	.403	.046	8.732	P < .001 (.000)	Supported	.327	.473	.188	Medium	1.001

TABLE 6 The coefficient of determination (R^2)

Variable	R square
PCIU	.158
PSat	.388

TABLE 7 The predictive relevance (Q^2)

Variable	Q square
PCIU	.116
Psat	.316

significance level, t-statistics for all paths have been generated using the bootstrapping function in SmartPLS 3.3. The bootstrapping has been set to a significance level of 0.05, one-tailed test, and 1000 subsamples. Moreover, the critical value for the significance level of five percent ($\alpha = 0.05$) is 1.645 for the one-tailed test [29].

Based on the findings shown in Table 5, the value of the path coefficients has a standardized value approximately between −1 and +1 (values from −0.056 and 0.403). According to Hair et al., [28], estimated path coefficients near +1 demonstrate strong positive relationships and the closer the value gets to zero, the weaker the relationships become. In the next step, toward conducting the t-test, relationships are found to have t-values of more than or equal to 1.645. Therefore, these relationships are significant at 0.05 for H1 ($\beta = 0.377$, t = 5.612, P < 0.001), H2 ($\beta = 0.295$, t = 4.397, P < 0.001), H4 ($\beta = 0.403$, t = 8.732, P < 0.001), whereas H3 ($\beta = -0.056$, t = 0.894, P > 0.05) was observed to be insignificant. A summary of these findings is illustrated in Table 5.

4.3.3 | The coefficient of determination (R^2)

The next stage is to evaluate the model's predictive accuracy through the derived value of the coefficient of determination (R^2). The value of R^2 is linked to the model's predictive power and ranges from zero to one, with a higher value indicating a higher level of predictive accuracy [28]. Using the SmartPLS algorithm, the value of R^2 has been calculated as shown in Appendix B.

Since there exists a variety of sets of rules regarding the acceptable value of R^2, this study has followed guidelines set by Cohen [35], designating the values of 0.02, 0.13, and 0.26 to represent a weak, moderate, and substantial level of predictive accuracy [35]. Overall, referring to Table 6, Information Quality (IQ), Service Quality (SQ), and System Quality (SerQ) explain 38.8 percent of Patient Satisfaction (Psat), which indicates a substantial level of predictive accuracy. In addition, Patient Satisfaction (Psat) explains only 15.8 percent of the variance in Patient Continuance Intention to Use telemedicine (PCIU), signifying a moderate level of predictive accuracy.

On the whole, the R^2 values found in this study are extremely similar to those reported in a majority of extant works of research in the corresponding literature. For instance, in a study conducted by Sun et al. [36], the R^2 value reported is 19.1 percent from which it can be concluded that the model can predict up to 19.1 percent of the factors influencing users' continuance intention to use [36]. This percentage is deemed to be satisfactory in the context of a social science study.

4.3.4 | Assessment of the effect Size (f^2)

In this stage, the effect sizes (f^2) have been evaluated. In this regard, the value of f^2 is connected to the relative impact of a predictor construct on endogenous constructs. According to Sullivan and Feinn [37], aside from reporting the p-value, both the substantive significance (effect size) and the statistical significance (p-value) are crucial to be reported [37]. Furthermore, in order to measure the effect size, guidelines set by Cohen [38] have been followed. Based on the study of Cohen [38], the values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively [38]. As it can be viewed in Table 5, Information Quality (IQ) and System Quality (SQ) have a small impact on generating the value of R^2 for Patient Satisfaction (PSat.). In addition, Service Quality (SerQ) has a no effect on the production of the value of R^2 for Patient Satisfaction (PSat). Moreover, Patient Satisfaction (PSat) has a medium effect on producing the value of R^2 for Patient Continuance Intention to Use telemedicine (PCIU).

4.3.5 | Assessment of the predictive relevance (Q^2)

As the final step, the predictive relevance of the model has been assessed through the blindfolding procedure, as suggested by Hair et al. [28]. Table 7 contains the corresponding findings.

On this subject, the value of Q^2 is larger than zero, implying that the model has sufficient predictive relevance. The analysis of the value of Q^2 or predictive relevance has been conducted using the blindfolding procedure. As such, on the foundation of the blindfolding assessment, the values of the predictive relevance Q^2 for Patient Satisfaction (Psat) and Patient Continuance Intention to Use telemedicine (PCIU) are 0.116 and 0.316, respectively. This indicates that the model is in possession of predictive relevance since the Q^2 values are considerably above zero.

5 | DISCUSSION AND RECOMMENDATIONS

In this study, Information Quality (IQ) was hypothesized to have a positive impact on Patient Satisfaction (PSat.) and this hypothesis was supported. Hence, it is suggested that telemedicine's assisting patients to acquire accurate, relevant, and up-to-date information can enhance their satisfaction. This conclusion was supported by Garcia et al., [21] and Zhou et al., [20] as they discovered that higher Information Quality (IQ) has a significant influence on patients' satisfaction.

In addition, System Quality (SQ) was hypothesized to have a positive influence on Patient Satisfaction (PSat.) and this hypothesis was supported. The results suggest that the telemedicine system's flexibility, reliability, and being easy to be utilized from patients' perspective can contribute to the enhancement of patients' satisfaction. This can only be reasonable because a system which is used for medical consultation and diagnosing should be reliable and able to accomplish such critical tasks. This result is also supported by Lin [24] and Kuo et al. [25] as they discovered that the system's measurement of desired quality characteristics, namely responsiveness, flexibility, and reliability, can positively impact system user satisfaction in healthcare.

On the other hand, Service Quality (SerQ) was hypothesized to have a positive influence on Patient Satisfaction (PSat.). However, this hypothesis was not supported and can be justified by the following explanation. Telemedicine is an extremely novel technology. Therefore, many individuals are still used to face-to-face interaction rather than electronic medical services. Moreover, the age of patients can serve as another barrier, since older patients may have difficulties in adapting to technology. In addition, conducting medical service through telemedicine is time-consuming, starting from scheduling appointments to receiving medicine, which may not be convenient for patients, especially if they are sick or in pain. Also, the registration process which is managed by calling the help desk and waiting for the identity verification email may be too complicated and time-consuming for patients. Thus, it can be recommended for electronic medical services to be available 24 h a day, starting from diagnosing to pharmaceutical services. Furthermore, registration and scheduling appointments should be easy and simple. The care team (physicians and the help desk staff) should be trained to provide electronic health services professionally and be more flexible when dealing with patients.

Finally, Patient Satisfaction (PSat) was hypothesized to have a positive impact on Patient Continuance Intention to Use telemedicine (PCIU). This hypothesis was supported, and the corresponding results suggest that patients who are satisfied with the quality factors of telemedicine tend to have the intention of to continue their usage of the system. This conclusion agrees with the findings of Aborujilah et al. [14] and Zhou et al. [20] that indicate that patient's satisfaction can improve the chance of their Continuance Intention to Use telemedicine.

6 | PRACTICAL AND THEORETICAL IMPLICATIONS

Continuance is the long-term viability of an IS success indicator rather than acceptance or first time use [39]. The findings of this study practically contribute in many ways. For instance, when healthcare policymakers can analyze what system quality factors are more relevant to voluntary continuance usage of telemedicine in the healthcare sector even after the COVID-19 pandemic, they can improve and expand their medical services. Moreover, having a successful and sustainable telemedical experience would not only reduce hospital overcrowding, but also make the health regimen more convenient and effective for all stakeholders. Furthermore, another implementation of this study is in the healthcare sector of Kuwait, where enhancing the quality of telemedicine as a system and focusing on patients' satisfaction is critical for patients' decision to continue using telemedicine which is emerging nowadays. On this subject, telemedicine service quality is found to be the most challenging in regard to patient satisfaction. As such, decision makers need to take recommendations made in that regard into account.

Theoretically, this study emphasized why patients' continuance intention to use is critical in the context of this research. With this respect, a recent study highlighted that continuance intention to use in the e-health context is a gap in the literature which needs to be investigated more thoroughly from different perspectives [8]. Moreover, continuance intention to use has been rarely integrated with the information system success model in the existing literature [40]. The existing literature has a gap of the limited investigation of the system quality factors in information system success model effect on patients' continuance intention to use, whereas most of literature focused on the user behavioral perspective [12, 40]. Therefore, examining continuance intention to use regarding telemedicine systems from that perspective would enrich the extant knowledge.

7 | LIMITATIONS AND FUTURE SUGGESTIONS

This study was limited to one case (Kuwait). Moreover, it was carried out only for private hospitals in Kuwait (namely Dar Al Shifa). Hence, it is suggested to be expanded to public hospitals as well as other countries in the same regions. Also, this research was limited to the perspective of patients, regarding which it is suggested for this study to be expanded in the view of the

healthcare team (physicians and help desk staff) as an essential component of the healthcare system. Furthermore, as the corresponding data was collected only from a private hospital (i.e. Dar Al Shifa), a study using the same model conducted on public hospitals would be another addition to future literature.

8 | CONCLUSION

The purpose of this study is to investigate factors influencing patients' continuance intention to use telemedicine after the COVID-19 pandemic in Dar Al Shifa Hospital in Kuwait. In this regard, Information Quality (IQ) and System Quality (SQ) are found to have a significant influence on telemedicine users' satisfaction (TUS), whereas Service Quality was discovered not to have a significant influence on telemedicine users' satisfaction (TUS). Additionally, the results indicated that telemedicine users' satisfaction (TUS) has a significant influence on patients' continuance intention to use telemedicine in Dar Al Shifa Hospital.

ACKNOWLEDGEMENTS

The authors would like to acknowledge all the participants who have managed and implemented the study. Its contents are solely the responsibility of the authors and do not necessarily represent any official views.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ORCID

Ibtisam L F H Almutairi https://orcid.org/0000-0002-0921-4641
Bodoor F Alazemi https://orcid.org/0000-0003-4165-4097
Faisal L F H Almutairi https://orcid.org/0000-0002-9929-2968

REFERENCES

1. Yamin, M.A.Y., Alyoubi, B.A.: Adoption of telemedicine applications among Saudi citizens during COVID-19 pandemic: An alternative health delivery system. J. Infect. Public Health. 13, 1845–1855 (2020)
2. KUNA. Kuwaiti Health Minister launches the first electronic network for telemedicine surgeons in Kuwait. Accessed 1 December 2020. https://www.kuna.net.kw/ArticleDetails.aspx?id=2782665
3. Ramírez-Correa, P.E., Rondan-Cataluña, F.J., Arenas-Gaitán, J., Alfaro-Perez, J.L.: Moderating effect of learning styles on a learning management system's success. Telemat. Informat. 34(1), 272–286 (2017)
4. Kamal, S.A., Shafiq, M., Kakria, P.: Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). Technol. Soc. 60(1), 101212 (2020)
5. Miller, L.E., Rathi, V.K., Kozin, E.D., Naunheim, M.R., Xiao, R., Gray, S.T.: Telemedicine services provided to medicare beneficiaries by otolaryngologists between 2010 and 2018. JAMA Otolaryngol. Head Neck Surg. 146(9), 816–821 (2020)
6. New Kuwait. New Kuwait website. (2020)Accessed 5 December 2020. https://deepblue.lib.umich.edu/bitstream/handle/2027.42/35622/b1378752.0001.001.pdf
7. Dar Al Shifa Hospital website. https://www.daralshifa.com/. Accessed 2 November 2020
8. Kaium, M.A., Bao, Y., Alam, M.Z., Hoque, M.R.: Understanding continuance usage intention of mHealth in a developing country. International Journal of Pharmaceutical and Healthcare Marketing (2020)
9. Zhang, X., Yan, X., Cao, X., Sun, Y., Chen, H., She, J.: The role of perceived e-health literacy in users' continuance intention to use mobile healthcare applications: An exploratory empirical study in China. Inf. Technol. Develop. 24(2), 198–223 (2018)
10. Bhattacherjee, A.: Understanding information systems continuance: An expectation-confirmation model. MIS Quarter. 351–370 (2001)
11. Chen, Y., Yang, L., Zhang, M., Yang, J.: Central or peripheral? Cognition elaboration cues' effect on users' continuance intention of mobile health applications in the developing markets. Int. J. Med. Inf. 116, 33–45 (2018)
12. Yan, M., Filieri, R., Gorton, M.: Continuance intention of online technologies: A systematic literature review. Int. J. Inf. Manage. 58, 102315 (2021)
13. Leung, L., Chen, C.: E-health/m-health adoption and lifestyle improvements: Exploring the roles of technology readiness, the expectation-confirmation model, and health-related information activities. Telecommun. Policy 43(6), 563–575 (2019)
14. Aborujilah, A., Mohammad, R., Al-Othmani, A.Z., Husen, M.N., Long, Z.A., Ali, N.A., Murugan, V.A.L.: Adoption and Continuance Intention Model of Applying Telemedicine Technology in Digital Games Addiction. In: 2020 14th International Conference on Ubiquitous Information Management and Communication (IMCOM), pp. 1–9. IEEE, Piscataway (2020)
15. Sayyah Gilani, M., Iranmanesh, M., Nikbin, D., Zailani, S.: EMR continuance usage intention of healthcare professionals. Informatics Health Social Care 42(2), 153–165 (2017)
16. Hossain, M.N., Talukder, M.S., Khayer, A., Bao, Y.: Investigating the factors driving adult learners' continuous intention to use M-learning application: A fuzzy-set analysis. J. Res. Innovative Teach. Learn. 14(2) (2020)
17. Al-Debei, M.M., Jalal, D., Al-Lozi, E.: Measuring web portals success: A respecification and validation of the DeLone and McLean information systems success model. Int. J. Business Inf. Syst. 14(1), 96–133 (2013)
18. Isaac, O., Abdullah, Z., Ramayah, T., Mutahar, A.M.: Internet usage, user satisfaction, task-technology fit, and performance impact among public sector employees in Yemen. Int. J. Inf.earning Technology 34(3), 210–241 (2017)
19. Lwoga, E.: Critical success factors for adoption of web-based learning management systems in Tanzania. Int. J. Edu. Develop. ICT 10(1), 4–21 (2014)
20. Zhou, M., Zhao, L., Kong, N., Campy, K.S., Qu, S., Wang, S.: Factors influencing behavior intentions to telehealth by Chinese elderly: An extended TAM model. Int. J. Med. Inf. 126, 118–127 (2019)
21. Garcia, R., Olayele, A., Han, W.: Defining dimensions of patient satisfaction with telemedicine: An analysis of existing measurement instruments. In: Proceedings of the 50th Hawaii International Conference on System Sciences. IEEE Computer Society Press, Los Alamitos (2017)
22. Keikhosrokiani, P., Mustaffa, N., Zakaria, N., Abdullah, R.: Assessment of a medical information system: The mediating role of use and user satisfaction on the success of human interaction with the mobile healthcare system (iHeart). Cognition Technol. Work 22, 281–305 (2019)
23. Oppong, E., Hinson, R.E., Adeola, O., Muritala, O., Kosiba, J.P.: The effect of mobile health service quality on user satisfaction and continual usage. Total. Qual. Manag. Bus. Excell. 32(1), 1–22 (2018)
24. Lin, H.-C.: Nurses' satisfaction with using nursing information systems from technology acceptance model and information systems success model perspectives: A reductionist approach. Comp. Informat. Nursing 35(2), 91–99 (2017)
25. Kuo, K.-M., Liu, C.-F., Talley, P.C., Pan, S.-Y.: Strategic improvement for quality and satisfaction of hospital information systems. J. Healthcare Eng. 2018(1), 1–14 (2018)
26. Tantarto, T., Kusnadi, D., Sukandar, H.: Analysis of service quality towards patient satisfaction (comparative study of patients using telemedicine application and face to face consultation in healthcare). Eur. J. Busi. Manag. Res. 5(5), 1–7 (2020)
27. Johnson, C., Taff, K., Lee, B.R., Montalbano, A.: The rapid increase in telemedicine visits during COVID-19. Patient Exp. J. 7(2), 72–79 (2020)

28. Hair, J.F., Hult, G.T.M., Ringle, C., Sarstedt, M.: A Primer on Partial Least Squares Structural Equations Modeling (PLS-SEM), 2nd ed. SAGE, Thousand Oaks (2017)
29. Thurasamy, R., Cheah, J., Chuah, F., Ting, H., Memon, M.A.: Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 3.0: An Updated Guide and Practical Guide to Statistical Analysis. Pearson, Kuala Lumpur (2018)
30. Kline, R.B.: Principles and Practice of Structural Equation Modeling. The Guilford Press, New York (2016)
31. Fornell, C., Larcker, D.F.: Evaluating structural equation models with unobservable variables and measurement error. J. Market. Res. 18(1), 39–50 (1981) https://doi.org/10.2307/3151312
32. Gold, A.H., Malhotra, A., Segars, A.H.: Knowledge management: An organizational capabilities perspective. J. Manag. Inf. Syst. 18(1), 185–214 (2001) https://doi.org/10.1080/07421222.2001.11045669
33. Diamantopoulos, A., Siguaw, J.A.: Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. British J. Manag. 17(4), 263–282 (2006)
34. Chin, W.W.: How to write up and report PLS analyses. In: Handbook of Partial Least Squares, pp. 655–690. Springer, Berlin, Heidelberg (2010)
35. Cohen, A.: Comparison of correlated correlations. Stat. Med. 8(12), 1485–1495 (1989)
36. Sun, Y., Guo, Y., Liu, D., Wang, N.: Exploring consumers' continuance intention to use peer-to-peer accommodation service: The role of psychological ownership. In: Proceedings of the 52nd Hawaii International Conference on System Sciences. IEEE Computer Society Press, Los Alamitos (2019)
37. Sullivan, G.M., Feinn, R.: Using effect size-or why the p value is not enough. J. Graduate Med. Educ. 4(3), 279–282 (2012). https://doi.org/10.4300/JGME-D-12-00156.1
38. Cohen, J.: Statistical Power Analysis for the Behavioral Sciences, 2nd ed. L. Erlbaum Associates, Hillsdale (1988)
39. Akter, S., Ray, P., D'Ambra, J.: Continuance of mHealth services at the bottom of the pyramid: The roles of service quality and trust. Electron. Mark. 23(1), 29–47 (2013)
40. Kim, K.H., Kim, K.J., Lee, D.H., Kim, M.G.: Identification of critical quality dimensions for continuance intention in mHealth services: Case study of onecare service. Int. J. Inf. Manage. 46, 187–197 (2019)
41. Isaac, O., Abdullah, Z., Ramayah, T., Mutahar Ahmed, M.: Examining the relationship between overall quality, user satisfaction and internet usage: An integrated individual, technological, organizational and social perspective. Asian J. Inf. Technol. 16(1), 100–124 (2017)
42. Alrajawy, I., Isaac, O., Ghosh, A., Nusari, M., Al-Shibami, A.H., Ameen, A.A.: Determinants of student's intention to use mobile learning in Yemeni Public Universities: Extending the Technology Acceptance Model (TAM) with anxiety. Int. J. Manag. Human Sci. 2(2), 1–9 (2018)
43. Chang, H.-L., Szu, W.-W., Tu, Y.-J.: Drivers of eHealth adoption: Linking eHealth adoption to service concept. In: Proceedings of the International Conference on Electronic Business (ICEB), pp. 85–92. IEEE, Piscataway (2017)

How to cite this article: Almutairi, I.L.F.H., Alazemi, B.F., Almutairi, F.L.F.H.: Kuwaiti hospital patients' continuance intention to use telemedical systems in the wake of the COVID19 pandemic. Healthc. Technol. Lett. 8, 159–168 (2021)
https://doi.org/10.1049/htl2.12019

APPENDIX A

PLS bootstrapping results:

APPENDIX B

PLS algorithm:

APPENDIX C

Research Instrument

Construct	Item no.	Original	Adapted	Citation
Information quality (IQ)	4	IQ1: The LMS provides up-to-date information. IQ2: The LMS provides information that is exactly what I need. IQ3: The LMS provides information that is relevant to my job. IQ4: The LMS provides information that is easy to understand.	IQ1: Telemedicine (Sehaty online) provides up-to-date information. IQ2: Telemedicine (Sehaty online) provides information that is exactly what I need. IQ3: Telemedicine (Sehaty online) provides information that is relevant to my case. IQ4: Telemedicine (Sehaty online) provides information that is easy to understand.	[41]
System quality (SQ)	4	SQ1: I find it easy to use the Internet to find what I want. SQ2: I think using the Internet is secure. SQ3: I find the Internet to be flexible to interact with. SQ4: I think the Internet speed is satisfactory.	SQ1: I find it easy to use Telemedicine (Sehaty online) to find what I want. SQ2: I think using Telemedicine (Sehaty online) is secure. SQ3: I find Telemedicine (Sehaty online) to be flexible to interact with. SQ4: I think Telemedicine (Sehaty online) speed is satisfactory.	[42]
Service quality (SerQ)	5	SerQ1: Telecare center provides you 24-h telecare consultation and telephone access service. SerQ2: Health examiners provide the service of pharmaceutical consultation through audio/video consultation. SerQ3: Helps hospital patients with scheduling and registration. SerQ4: Professionalism of the health examiner service personnel. SerQ5: Timely response from the health examiner.	SerQ1: Care team of Telemedicine (Sehaty online) provides you with 24-h consultation. SerQ2: Care team of Telemedicine (Sehaty online) provides the service of pharmaceutical consultation. SerQ3: Care team of Telemedicine (Sehaty online) helps patients with scheduling and registration. SerQ4: Professionalism of the Telemedicine (Sehaty online) care team service personnel. SerQ5: Timely response from the Telemedicine (Sehaty online) care team.	[43]
User satisfaction (Psat)	3	Sat1: My decision to use the Internet was a wise one. Sat2: The Internet has met my expectations. Sat3: Overall, I am satisfied with the Internet.	Psat1: My usage of Telemedicine (Sehaty online) was a wise one. Psat: Telemedicine (Sehaty online) has met my expectations. Psat: Overall, I am satisfied with Telemedicine (Sehaty online).	[3]
Patient continuance intention to use (PCIU)	3	CI1: I intend to continue using OBD rather than discontinuing its usage. CI2: My intention is to continue using OBD than using any alternative means (traditional banking). CI3: If I could, I would discontinue my use of OBD.	PCIU1: I intend to continue using Telemedicine (Sehaty online) rather than discontinue its use. PCIU2: My intention is to continue using Telemedicine (Sehaty online) than using any alternative means (communicating face to face). PCIU3: If I could, I would continue my use of Telemedicine (Sehaty online).	[10]