

Quality, Trust and Health Information System Use in Kuwait Public Hospitals During Pandemic Covid19

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Abstract

Purpose: In Kuwait, huge amount of money was spent in implementing Health Information System (HIS) among healthcare facilities, and it must be ensured that it is used efficiently to maintain the goals of meeting users' needs and increasing work performance. This study aims to investigate the influence of trust on HIS use, and its influencing factors in Kuwait public hospitals.

Design/methodology/approach: This study proposes a model by extending the model of DeLone and McLean Information System Success Model by integrating Trust. A total of 314 participants completed the questionnaires.

Findings: The results revealed that users' trust towards HIS use is influenced by system quality, information quality, and service quality. Trust has a significant effect towards HIS use.

Research implications: The study develops and validates a research model by integrating DeLone and McLean model to trust. This study found that trust has a significant impact on HIS use.

Practical implications: This is a strong signal to health information system developers to enhance users' trust towards HIS use by enhancing information system quality factors.

Keywords: Health Information System, Public Hospitals, Trust, Quality, Covide-19, Kuwait.

Introduction

In the last decade, the extensive use of information technology has been proliferated in almost all aspects of life, one of which is the healthcare sector. Health information systems (HIS) are considered an important innovation in healthcare organizations that have changed the performance in general by improving the healthcare delivery and services. Health information system is described as "a comprehensive, integrated information system for managing the administrative, financial and clinical aspects of a hospital" (Esfahani et al., 2018).

The Ministry of Health in Kuwait initiated a project for shifting towards improving IT based healthcare information system in the country (Alaslawi, Berrou, Alhuwail, & Aslanpour, 2019). HIS implementation projects were designed to provide a set of elements that allow the improvement of work processes of healthcare professionals and other users, which in turn improves the quality of health services. HIS project mainly aimed to use a standardized, integrated electronic health information system, which leads to increase efficiency and improved quality of patient healthcare. Other goals include improving patient safety by ensuring data accuracy, accessing the needed information easily, eliminating the paper use, improving employees' performance, improving the quality of services, saving time of task performance, supporting decision making, and saving costs (Sebetci, 2018; Wager et al, 2017). It is worth to be mentioned also that the importance of HIS use has been raised during the pandemic of Covid-19 in terms of reducing manual processes, reducing direct contact among healthcare providers, eliminating time required for tasks processing, and enhancing instant accessing to the needed health information.

In fact, health information systems considered as important components of health structures (Schmidt et al., 2021). During Covid-19 pandemic, the role of HIS became even more critical than the normal situations (Liu, 2020) and several aspects related to HIS have gained important concern. The pandemic had raised the need to manage and use accurate and timely covid-19 related data to rapidly make decisions and respond to patients' treatments. Indeed, covid-19 pandemic provided an opportunity to detect the weaknesses in the existing HIS, and to apply the needed developments. In the light of these new developments, the role of trust in the system is very important, specifically in governmental sectors because it has a role of accepting the information system (Rasmi et al., 2018). In the current study, lack of trust in the system may cause users to prefer moving to the manual way in accomplishing their tasks, or performing tasks inefficiently, which undoubtedly, results in failure of the system and delay healthcare delivery. Thus, it is necessary to explore the effect of trust and its antecedents in health information system settings. Developing high level of trust among system users encourages them to perceive the effectiveness of HIS and motivates them to continue using it (Silic et al., 2018). Moreover, trust has a major role in hindering feelings of risk and uncertainty that result from experiencing new innovative behaviors (Tams et al., 2018), which may result in user resistance that is one of the biggest challenges in large-scale information system implementation.

Therefore, the aim of this study is to explore the influence of trust on HIS use, and its influencing factors in Kuwait public hospitals. Enhancing users' trust toward HIS use is crucial specially among the pandemic of Covid-19.

Literature Review

This study focuses on the quality factors of information systems. That is, system quality, information quality, and service quality; towards users' trust, which influence HIS use and users' satisfaction. This research proposed a model to address these issues (see Figure 1).

System Quality

System quality plays a major role in information system success (Gurkut & Nat, 2017; Muda & Afrina, 2019). System quality is defined by Delone and McLean (2003) as "the desirable characteristics of an information system that focuses on usability aspects and performance metrics", which include accessibility, ease of learning, ease of use, efficiency, flexibility, integration, interactivity, navigation, reliability, response time, convenience, customization,

system accuracy, system features, sophistication, and turnaround time. However, good system quality enhances user's experience, while Poor system quality complicates the use of IS and reduces user satisfaction, resulting in a poor user experience. (Dalle et al., 2020).

Information Quality

Information is the core element for the user when using an information system, and the desired characteristics of the output information provided by a system is called information quality (DeLone & McLean, 2003). Information quality could be measured by examining the information system output with regard to accessibility, accuracy, relevance, understanding, conciseness, currency, timeliness, reliability, completeness, confidentiality and security, and trustworthiness (DeLone & McLean, 2016; Ibrahim et al., 2016; Ojo, 2017). When using an IS, high quality of information can result in increasing user satisfaction (Zhang et al., 2018). Information quality is then claimed to strengthen users' confidence in the system.

Service Quality

Service quality was defined by DeLone and McLean (2016) as the quality of support and services that information system organization and IT personnel provide to system users. For a successful implementation of an information system, the availability of a qualified IT expertise is recommended (Esfahani et al., 2018), as well as the availability of appropriate technical and communication infrastructure (Sheykhoteyefeh et al., 2017). In the field of IS research, Goodhue and Thompson (1995) define that technology is represented by computer systems, such as hardware and software, and support services, such as training, that are provided to users to assist in their tasks. Thus, in this study service quality represent a component of technology characteristics. Examples of service quality elements include technical competence, appropriate IT infrastructure, quick responsiveness, reliability, assurance, cooperation, empathy of the IT personnel staff, and following up services (DeLone & McLean, 2016; Ojo, 2017; Sheykhoteyefeh et al., 2017).

Trust

Trust has acquired extensive interest in information systems research. For the success of an information system, users must believe in the system effectiveness so they rely on the information and features it provides. Trust is described as the ability of a user to rely on the IS in risky and insecure settings (Mayer et al., 1995; Wang & Emurian, 2005). It concerns the belief of a certain performance but inability to manage that performance in the entity. Trust also refers to a person's perception or expectation towards certain technology in terms of its usefulness, dependability, accuracy and functionality to support them in their work (Nelloh, Santoso, & Slamet, 2019).

Recognizing the meaning of trust and its role in HIS use is a critical step in order to determine its dimensions and antecedents. In addition, identifying antecedents of trust in IS projects is important to empirically prove its impact on system effectiveness and efficiency (Rasmi et al., 2018), taking into account the insufficient empirical research that examine trust in large-scale IS projects, such as HIS (Jun et al., 2019). However, to fully understand the impact of trust on the post-adoptive implementation of HIS and to provide better guidance to managers, researchers need to examine more detailed and specific explanations of the casual paths associated with trust (Tams et al., 2018).

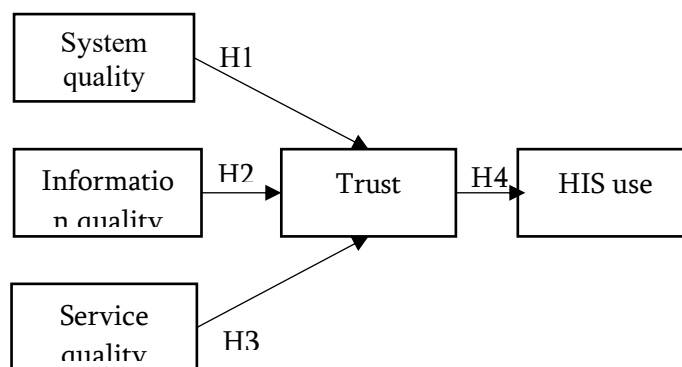
HIS Use

Actual use describes the frequency of technology use and times of use (Kim et al., 2007). When system users increase their frequency and duration of system use, this leads to increase in their performance in three dimensions: improvement in job processes, greater acquisition of knowledge, and enhanced communication.

Hypothesis Development

A number of theories are used in studying information technology. DeLone and McLean Information System Success model (D&M model) is the most popular used framework in studying information technology (DeLone & McLean, 2016). D&M model was used and validated in variance disciplines such as mobile banking (Tam & Oliveira, 2016), e-learning (Oliveira et al., 2018), and also digital libraries (Xu & Du, 2018). According to the considerable importance of trust that was mentioned earlier as a factor in the acceptance of information technology, combining trust with the D&M model is useful in understanding its influence of information system use. Indeed, D&M model lacks of attention to how trust influences IS use. Moreover, including trust in the context of information system could be justified by several reasons such as making the use of the IS more pleasant for the users, increasing the commitment and intention to re-use the IS, and increasing users' satisfaction when they feel contented about using the IS, which leads to increasing productivity (Elbeltagi & Agag, 2016; Kim & Peterson, 2017). Thus, integrating trust to D&M model will improve understanding of system use and user satisfaction (Tam et al., 2019). However, this study applies D&M model as the underpinning theory with an extension of trust.

Figure 1: Proposed Model

*System quality*

According to some research, users build a high level of trust in a system and use that particular system more when they feel that the quality of the system is high (Gao & Waechter, 2017; Silic & Ruf, 2018). In line of this, Sarkar et al. (2020) in their study showed that system quality has a positive impact on trust. Low system quality can affect user trust in IS because of believing that the not much achievement was met. (Yousuf & Wahab, 2017). This study hypothesized:

H1: System quality has a positive influence on trust in HIS use

Information quality

Healthcare institutions' management should ensure the provision of high quality information to support decision making either for patient healthcare or administrative performance. When the information is inaccurate, irrelevant, out of date, or inadequate, users may become uncertain if the system has enough capabilities and integrity to provide them with high quality information or high quality services. This may decrease their satisfaction (Yousuf & Wahab, 2017), further affect their trust in the system (Sarkar et al., 2020; Silic & Ruf, 2018), thus, information quality has a great influence towards trust (Nelloh et al., 2019). In addition, the quality of information can also impact the perceived benefits of the information system. Users depend on good quality of information to enhance their performance and effectiveness. In contrast, poor quality information will lower the perceived benefits of IS by the users (Mustafa et al., 2020). The current study proposed the following hypothesis:

H2: Information quality has a positive influence on trust in HIS use.

Service quality

According to Gao and Waechter (2017), service quality indicates a system's ability to present users with accurate, secure, responsive, and personalized offerings. Accurate, dependable and appropriate service provides users a high quality sense of being able to build trust in the information system (Apostolos, 2016; Wang et al., 2019). Many studies have shown that service quality is a determining factor for user confidence (Ofori et al., 2018; Sarkar et al., 2020; Silic & Ruf, 2018). On the other hand, lack of quality services such as inappropriate, undependable, or untimely services create distrust of users towards the information system (Apostolos, 2016; Gao & Waechter, 2017; Puriwat & Tripopsakul, 2017). Thus, it is hypothesized that:

H3: Service quality has a positive influence on trust in HIS use.

Trust

Indeed, trust allows users to perceive that an information system has sufficient capabilities to provide the services they need (Zhou, 2011). This entails that there is a good association between trust and other behavioral characteristics, such as intention to use (Sarkar et al., 2020). When users perceive a system of high quality, they will develop a high level of trust that motivate them to use that particular system more frequently (Silic & Ruf, 2018). If the users perceive that the system cannot provide accurate or current information, it gives the impression that the system cannot provide quality services on time, further affecting the trust in the system. Kim et al. (2017) explored the impact of trust on IS use and found that trust affects positively on IS use. In line of this result, Nelloh et al. (2019) and Sarkar et al. (2020) showed that trust is a strong predictor of continuance IS use. In contrast, other studies showed that there is no influence of trust on intention to use (Cao et al., 2018). However, the study hypothesized:

H4: Trust has a positive influence on HIS use

Methods

The research utilized a cross-sectional, self-structured questionnaire to collect the primary data. A total of 45 close-ended statements were used. A total of 45 close-ended statements were used with a 7-point Likert scale questions. The target population for this study includes health information system users in three selected public hospitals in Kuwait. Purposive sampling was used because it is limited to a specific group people who can provide the needed information.

The data was collected from individual HIS users, included in the sample, who have experience in using the system. HIS users include physicians, nurses, pharmacists, laboratory specialists, radiology specialists, and health information management personnel. The collected data was analyzed using Partial Least Squares (PLS-SEM) and the Statistical Package for the Social Sciences (SPSS).

Measures

The measures were adopted from previously published literature (see Table 1). The measures for system quality, information quality, and HIS use were adopted from Seddon et al. (1994), service quality from Pitt et al. (1995), and trust measures from Suh and Han (2003).

Table 1: Questionnaire items

Construct	Questionnaire items	Source
System quality	HIS is easy to use HIS is user friendly Compared to other computer software, HIS is easy to learn I find it easy to get HIS to do what I want it to do	Seddon et al., 1994
Information quality	It is easy for me to become skillful at using HIS HIS provides me with accurate information HIS provides me with information relevant to my needs HIS provides me with up-to-date information HIS provides me with clear information HIS provides me with sufficient information HIS provides the needed information on time	Seddon et al., 1994
Service quality	The responsible IT personnel are always highly willing to help whenever I need support with the HIS The responsible IT personnel provide personal attention when I experience problems with the HIS The responsible IT personnel provide services related to the HIS at the promised time The responsible IT personnel have sufficient knowledge to answer my questions in respect of the HIS	Pitt et al., 1995
Trust	HIS is trust worthy I trust in the benefits of HIS I trust HIS HIS would do the job right even if not monitored	Suh & Han, 2003
HIS use	If HIS was not mandatory, I would still use it On average, I spend approximately _____ hours/week working with HIS. This represents _____ % of my work.	Seddon et al., 1994

Sample profile

A total of 450 questionnaires were distributed among different respondents via drop off and pick up (DOPU) method. The questionnaires were first distributed in March 2021 and ended in April 2021. Questionnaires were dropped off to each department in the selected hospitals, and picked up after 3 weeks. A total of 314 research questionnaires were collected, which generated around 70% response rate. Before analyzing the collected data, the demographic profile of the respondents was tabulated. SPSS was used to present, a limited set of characteristics, such as gender, education, working experience, and occupation. In this section, demographic characters are discussed in details.

Results of the demographic analysis revealed that the majority of the sample were female (59.9%) comparing to male (40.1%). Respondents ranged in age from 21 to 68 years old, with the majority of respondents (50.3%) being between 31 and 40 years old, followed by 21-30 age groups with 21.9% and the age group of 41-51 with 20.38%. In regard to the respondents' education level, most of them are highly educated having Bachelor Degree. The results showed that 10.8% of respondents are PhD holders, 9.2% have Master's degree, 47.7% have Bachelor degree, and 32.1% of the respondents were Diploma holders. Data was collected from different job holders, who work in hospitals, such as physicians, nurses, radiologists, pharmacists, etc. The majority of the respondents were Health Information Management personnel (39.8%) and nurses (29.6%), while Lab specialists have the lowest response rate (2.9%). As for work department, the results showed that most of the respondents work in the inpatient department (38.9%) followed by outpatient department (37.9%). 8.6% are working in multiple departments of ER, outpatient, and inpatient; and another 8.6% are working in ER department. Regarding the working experience of participants, which spanned from 1 year to 42 years, the results showed that the majority of participants (27.3%) have working experience from 6 to 10 years, followed by 21.6% of participants having 1-5 years of working experience. The analysis of the HIS use experience, which ranges from 1 to 15 years, shows that most of the participants (49.4%) have an experience from 1 to 5 years of using HIS, followed by 31.2% having an experience from 6-10 years, and 19.4% of participants used HIS for a period of 11-15 years. Table 2 summarizes the respondents' profile.

Table 2: Profile of Respondents

Demographics	Categories	Frequency	%
Gender	Male	126	40.1
	Female	188	59.9
Age	21-30	69	21.97
	31-40	158	50.3
	41-50	64	20.38
	51-60	20	6.36
	61-70	3	0.95
Total years of working experience	1-5 years	68	21.6
	6-10 years	86	27.38
	11-15 years	64	20.38
	16-20 years	50	15.9
	21-25 years	23	7.32
	More than 25	23	7.32

Table 2: Profile of Respondents (cont.)

Total years of HIS use	1-5	155	49.4
	6-10	98	31.2
	11-15	61	19.4
Education	PhD	34	10.8
	Masters	29	9.2
	Bachelor	148	47.1
	Diploma	103	32.8
Occupation	Physician	54	17.2
	Radiologist	16	5.1
	Pharmacist	17	5.4
	Lab specialist	9	2.9
	Nurse	93	29.6
	HIS personnel	125	39.8
Department	Emergency (ER)	27	8.6
	Outpatient	119	37.9
	Inpatient	122	38.9
	Pharmacy	4	1.3
	Statistics	4	1.3
	Lab	11	3.5
	ER, Outpatient, and Inpatient)	27	8.6

Findings

SmartPLS 3.3.3 (Ringle et al., 2015) software was used to analyze the model, which developed by assessing the measurement model (validity and reliability of the instrument), followed by assessing the structural model to test the developed hypothesis.

Measurement Model

The measurement model quality can be assessed by considering the convergent and discriminant validity based on loadings, composite reliability (CR) and average variance extracted (AVE). The recommended cut off values for loadings should be > 0.5 (Hair et al., 2010), $AVE > 0.5$, $CR > 0.7$ (Hair et al., 2020; Ramayah et al., 2018). As shown in Table 3, all the loadings, AVE, and CR values are within the suggested limits. Then, the discriminant validity was assessed according to the suggestions of Franke and Sarstedt (2019) by looking at the HTMT ratio. The cut off values such as 0.85 and 0.90 can be applied to present HTMT results (Hair et al., 2020), where HTMT value above 0.90 implies a lack of discriminant validity (Henseler et al., 2015). The results show that all HTMT values are less than 0.90 except for Trust. However, HTMT bootstrapping upper level (UL) was less than 1.0.

Table 3: Results of Measurement Model

Construct	Items	Loading	AVE	CR
System quality	SQ1	0.887	0.731	0.932
	SQ2	0.878		
	SQ3	0.852		
	SQ4	0.855		
	SQ5	0.802		
Information quality	IQ1	0.885	0.712	0.937
	IQ2	0.840		
	IQ3	0.824		
	IQ4	0.869		
	IQ5	0.826		
	IQ6	0.816		
Service quality	SRQ1	0.923	0.780	0.934
	SRQ2	0.886		
	SRQ3	0.848		
	SRQ4	0.875		
Trust	TR1	0.912	0.761	0.927
	TR2	0.886		
	TR3	0.931		
	TR4	0.751		
HIS use	USE1	0.947	0.558	0.784
	USE2	0.595		
	USE3	0.651		

Table 4: Discriminant Validity

Construct	1	2	3	4	5	6
HIS use						
Information quality	0.336					
Service quality	0.375	0.704				
System quality	0.359	0.850	0.682			
Trust	0.360	0.912	0.746	0.843		

Structural model

To assess the structural model, SmartPLS was used to run bootstrap analysis with 5000 resample to find beta values, standard errors, p-values, t-values, and confidence intervals. The R^2 was measured as 0.164 ($Q^2 = 0.064$) for HIS use, and 0.743 ($Q^2 = 0.558$) for Trust. This suggests that the predictors might explain 16.4% of the variance in HIS use, 74.3% of the variance in Trust.

Then the researcher examined the predictors of system quality, information quality, service quality, Trust, and HIS use. The results show that System quality ($\beta = 0.234$, $p < 0.01$), Information quality ($\beta = 0.523$, $p < 0.01$), and Service quality ($\beta = 0.192$, $p < 0.01$) were positively related to Trust. Thus, H1, H2, H3 of this study were supported. Further, Trust ($\beta = 0.405$, $p < 0.01$) was found to be positively impact HIS use, which supports H4. (See Table 5).

Table 5: Hypothesis Testing

Hypothesis	Relationship	Std. Beta	Std. Error	t-value	P-value	BCI LL	BCI UL	f ²	VIF
H1	System quality → Trust	0.234	0.056	4.187	$p < .001$	0.162	0.338	0.079	2.720
H2	Information quality → Trust	0.523	0.052	10.118	$p < .001$	0.435	0.603	0.370	2.866
H3	Service quality → Trust	0.192	0.047	4.082	$p < .001$	0.100	0.262	0.078	1.835
H4	Trust → HIS use	0.405	0.049	8.242	$p < .001$	0.302	0.476	0.196	1.000

Discussion and Conclusion

After conducting PLS-SEM analysis, the results reveal that hypothesis on the influence of system quality, information quality, and service quality (H1, H2, H3) on user trust towards HIS use were supported indicating positive relationships. Trust has a significant impact on HIS use, which supports H4.

This study has proven that system quality has positively influence user trust towards using HIS and this is in line with the findings of Gao and Waechter (2017) and Silic and Ruf (2018) who argued that if IS users perceived a system of high quality in use, they will strongly trust that particular system, and accordingly, spend more time using it. The finding of this study shows a significant correlation among information quality and user trust of HIS. According to the results, information quality can be considered to have higher influence on Trust compared to the influence of system quality on Trust. If the system provides high quality of data privacy and confidentiality and overall data protection, people will embrace its use (Platt et al., 2018). Also, trust in health information and the belief in its security safeguards may increase the level of users' trust in the HIS and consequently leads to system utilization. Further, it has been shown that service quality has a positive impact on user trust, which is consistent with previous studies (Ofori et al., 2018; Sarkar et al., 2020; Silic & Ruf, 2018).

Indeed, Begum et al. (2020) note that the quality of HIS influences its utilization by users because this system has aspects that impact the level of trust that people place on it. The level of HIS utilization primarily rests on the level of trust that users place on them. In line of this, the current study found that user trust is positively influencing HIS use.

In this study, system quality, information quality, and service quality are significant factors influencing user trust towards HIS use. Also, trust is found to be a significant factor that influence health information system use, which in turn affect user satisfaction. The findings of the study would enable top managers, planners, system developers, and decision makers to enhance the factors that affect user trust towards HIS use. In addition, the results will perform a strong basis for providing solutions and recommendations to decision makers to better administer the needed development of the implemented HIS at public healthcare sector.

Theoretical and practical Implications

This study provides theoretical and practical contributions. Theoretically, the study develops and validates a research model by integrating DeLone and McLean model to trust. This study found that trust has a significant influence on HIS use, further showing that researchers need to consider user trust when investigating HIS adoption. From a practical perspective, the study act as an influential factor in motivating top management on how to enhance user trust towards using HIS. In addition, hospital managers and system developers should consider the findings of this study for efficient HIS development to cope with the new needs of healthcare providers, and the new way of delivering healthcare services during covid-19 pandemic.

References

- Alaslawi, H., Berrou, I., Alhuwail, D., & Aslanpour, Z. (2019). Status and trends of e-Health tools in Kuwait: a narrative review. *Journal of Health Informatics in Developing Countries*, 13(2), 1–21.
- Alaslawi, H., Berrou, I., Alhuwail, D., & Aslanpour, Z. (2019). Status and trends of e-Health tools in Kuwait: a narrative review. *Journal of Health Informatics in Developing Countries*, 13(2), 1–21.
- Apostolos, G. (2016). Consumer-brand relationships' development in the mobile internet market: evidence from an extended relationship commitment paradigm. *Journal of Product & Brand Management*, 25(6), 568–585. <https://doi.org/10.1108/JPBPM-05-2015-0884>
- Begum, T., Khan, S. M., Adamou, B., Ferdous, J., Parvez, M. M., Islam, M. S., ... Anwar, I. (2020). Perceptions and experiences with district health information system software to collect and utilize health data in Bangladesh: a qualitative exploratory study. *BMC Health Services Research*, 20(1), 465. <https://doi.org/10.1186/s12913-020-05322-2>
- Cao, X., Yu, L., Liu, Z., Gong, M., & Luqman, A. (2018). Understanding mobile payment users' continuance intention: a trust transfer perspective. *Internet Research*, 28, 0. <https://doi.org/10.1108/IntR-11-2016-0359>
- Dalle, J., Hastuti, D., Mahmud, Prasetia, I., & Baharuddin. (2020). Delone and mclean model evaluation of information system success: A case study of master program of civil engineering universitas lambung mangkurat. *International Journal of Advanced Science and Technology*, 29, 1909–1919.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, 19(4), 9–30. <https://doi.org/10.1080/07421222.2003.11045748>
- DeLone, W. H., & McLean, E. R. (2016). *Information Systems Success Measurement*.
- Elbeltagi, I., & Agag, G. (2016). E-retailing ethics and its impact on customer satisfaction and repurchase intention: A cultural and commitment-trust theory perspective. *Internet Research*, 26(1), 288–310. <https://doi.org/10.1108/IntR-10-2014-0244>
- Esfahani, A. A., Ahmadi, H., Nilashi, M., Alizadeh, M., Bashiri, A., Farajzadeh, M. A., ... Rasouli, H. R. (2018). An evaluation model for the implementation of hospital information system in public hospitals using multi-criteria-decision-making (MCDM) approaches. *International Journal of Engineering and Technology(UAE)*, 7(1), 1–18. <https://doi.org/10.14419/ijet.v7i1.8404>
- Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: a comparison of four procedures. *Internet Research*, 29(3), 430–447. <https://doi.org/10.1108/IntR-12-2017-0515>
- Gao, L., & Waechter, K. (2017). Examining the role of initial trust in user adoption of mobile

- payment services: an empirical investigation. *Information Systems Frontiers*, 19(3), 525–548. <https://doi.org/10.1007/s10796-015-9611-0>
- Gefen, D., Benbasat, I., & Pavlou, P. A. (2008). A Research Agenda for Trust in Online Environments. *Journal of Management Information Systems*, 24(4), 275–286.
- Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly: Management Information Systems*, 19(2), 213–233. <https://doi.org/10.2307/249689>
- Gurkut, C., & Nat, M. (2017). Important Factors Affecting Student Information System Quality and Satisfaction. *Eurasia Journal of Mathematics, Science and Technology Education*, 14. <https://doi.org/10.12973/ejmste/81147>
- Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, 109(August), 101–110. <https://doi.org/10.1016/j.jbusres.2019.11.069>
- Hair, J. F. J., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis : a global perspective* (7th ed.). Upper Saddle River (N.J.) : Pearson education.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Jun, J., Lee, W. J., & Jung, J. (2019). The mediating roles of trust and system quality in achieving system success: A system integrator perspective. *Journal of Asian Finance, Economics and Business*, 6(2), 203–212. <https://doi.org/10.13106/jafeb.2019.vol6.no2.203>
- Kim, B., Park, S., & Lee, K. (2007). A structural equation modeling of the Internet acceptance in Korea. *Electronic Commerce Research and Applications*, 6, 425–432. <https://doi.org/10.1016/j.elerap.2006.08.005>
- Kim, H.-J., Lee, J.-M., & Rha, J.-Y. (2017). Understanding the role of user resistance on mobile learning usage among university students. *Computers & Education*, 113, 108–118. <https://doi.org/https://doi.org/10.1016/j.compedu.2017.05.015>
- Kim, Y., & Peterson, R. A. (2017). A Meta-analysis of Online Trust Relationships in E-commerce. *Journal of Interactive Marketing*, 38, 44–54. <https://doi.org/10.1016/j.intmar.2017.01.001>
- Liu, C. (2020). Health information systems amid COVID-19 outbreak: Lessons from China. *Health Information Management Journal*, 50, 183335832094755. <https://doi.org/10.1177/1833358320947557>
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. *The Academy of Management Review*, 20(3), 709–734. <https://doi.org/10.2307/258792>
- Muda, I., & Afrina, E. (2019). Influence of human resources to the effect of system quality and information quality on the user satisfaction of accrual-based accounting system. *Contaduria y Administracion*, 64, 1–24. <https://doi.org/10.22201/fca.24488410e.2019.1667>
- Mustafa, S. Z., Kar, A. K., & Janssen, M. F. W. H. A. (2020). Understanding the impact of digital service failure on users: Integrating Tan’s failure and DeLone and McLean’s success model. *International Journal of Information Management*, 53, 102119. <https://doi.org/https://doi.org/10.1016/j.ijinfomgt.2020.102119>
- Nelloh, L. A., Santoso, A. S., & Slamet, M. W. (2019). Will Users Keep Using Mobile Payment? It Depends on Trust and Cognitive Perspectives. *Procedia Computer Science*, 161, 1156–1164. <https://doi.org/https://doi.org/10.1016/j.procs.2019.11.228>
- Ofori, K. S., Boakye, K., & Narteh, B. (2018). Factors influencing consumer loyalty towards 3G mobile data service providers: evidence from Ghana. *Total Quality Management &*

- Business Excellence*, 29(5–6), 580–598. <https://doi.org/10.1080/14783363.2016.1219654>
- Ojo, A. I. (2017). Validation of the DeLone and McLean Information Systems Success Model, 23(1), 60–66.
- Oliveira, T., Felice, M., & Aparicio, M. (2018). E-learning success determinants: Brazilian empirical study. *Computers & Education*, 122, 273–290. <https://doi.org/10.1016/j.compedu.2017.12.001>
- Pitt, L. F., Watson, R. T., & Kavan, C. B. (1995). Service quality: a measure of information systems effectiveness. *MIS Quarterly*, 173–187.
- Platt, J. E., Jacobson, P. D., & Kardia, S. L. R. (2018). Public Trust in Health Information Sharing: A Measure of System Trust. *Health Services Research*, 53(2), 824–845. <https://doi.org/https://doi.org/10.1111/1475-6773.12654>
- Puriwat, W., & Tripopsakul, S. (2017). The impact of e-service quality on customer satisfaction and loyalty in mobile banking usage: case study of Thailand. *Polish Journal of Management Studies*, 15(2), 183–193. <https://doi.org/10.17512/pjms.2017.15.2.17>
- Ramayah, T., Cheah, J. H., Chuah, F., & Ting, H. (2018). *Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 3.0: An Updated and Practical Guide to Statistical Analysis*. (2nd, Ed.). Pearson.
- Rasmi, M., Alazzam, M. B., Alsmadi, M. K., Almarashdeh, I. A., Alkhasawneh, R. A., & Alsmadi, S. (2018). Healthcare professionals' acceptance Electronic Health Records system: Critical literature review (Jordan case study). *International Journal of Healthcare Management*, 1–13. <https://doi.org/10.1080/20479700.2017.1420609>
- Sarkar, S., Chauhan, S., & Khare, A. (2020). A meta-analysis of antecedents and consequences of trust in mobile commerce. *International Journal of Information Management*, 50(March 2019), 286–301. <https://doi.org/10.1016/j.ijinfomgt.2019.08.008>
- Schmidt, A., Abboud, L., & Bogaert, P. (2021). Making the case for strong health information systems during a pandemic and beyond. *Archives of Public Health*, 79, 13. <https://doi.org/10.1186/s13690-021-00531-5>
- Sebetci, O. (2018). Enhancing end-user satisfaction through technology compatibility: An assessment on health information system. *Health Policy and Technology*, 7(3), 265–274. <https://doi.org/https://doi.org/10.1016/j.hlpt.2018.06.001>
- Seddon, P. B., Kiew, M.-Y., & Patry, M. (1994). A Partial Test and Development of the DeLone and McLean Model of IS Success. *ICIS 1994 Proceedings*.
- Sheykhotayefeh, M., Safdari, R., Ghazisaeedi, M., Mohammadzadeh, N., Khademi, S. H., Torabi, V., ... Seyed Farajolah, S. S. (2017). Hospital Information Systems Implementation: An Evaluation of Critical Success Factors in Northeast of Iran. *Global Journal of Health Science*, 9(2), 93. <https://doi.org/10.5539/gjhs.v9n2p93>
- Silic, M., Barlow, J., & Back, A. (2018). Evaluating the Role of Trust in Adoption: A Conceptual Replication in the Context of Open Source Systems. *AIS Transactions on Replication Research*, 4, 1–17. <https://doi.org/10.17705/1atrr.00021>
- Silic, M., & Ruf, C. (2018). The effects of the elaboration likelihood model on initial trust formation in financial advisory services. *International Journal of Bank Marketing*, 36(3), 572–590. <https://doi.org/10.1108/IJBM-02-2017-0038>
- Suh, B., & Han, I. (2003). The Impact of Customer Trust and Perception of Security Control on the Acceptance of Electronic Commerce. *International Journal of Electronic Commerce*, 7(3), 135–161.
- Tam, C., Loureiro, A., & Oliveria, T. (2019). The individual performance outcome behind e-commerce: integrating information systems success and overall trust. *Internet Research*, (October).
- Tam, C., & Oliveira, T. (2016). Understanding the impact of m-banking on individual performance: DeLone & McLean and TTF perspective. *Computers in Human Behavior*,

- 61, 233–244. <https://doi.org/https://doi.org/10.1016/j.chb.2016.03.016>
- Tams, S., Thatcher, J. B., & Craig, K. (2018). How and why trust matters in post-adoptive usage: The mediating roles of internal and external self-efficacy. *Journal of Strategic Information Systems*, 27(2), 170–190. <https://doi.org/10.1016/j.jsis.2017.07.004>
- Wager, K. A., Lee, F. W., & Glaser, J. P. (2017). *Health Care Information Systems: A Practical Approach for Health Care Management*. Wiley.
- Wang, & Emurian, H. (2005). An Overview of Online Trust: Concepts, Elements, and Implications. *Computers in Human Behavior*, 21, 105–125. <https://doi.org/10.1016/j.chb.2003.11.008>
- Wang, W.-T., Ou, W.-M., & Chen, W.-Y. (2019). The impact of inertia and user satisfaction on the continuance intentions to use mobile communication applications: A mobile service quality perspective. *International Journal of Information Management*, 44, 178–193. <https://doi.org/10.1016/j.ijinfomgt.2018.10.011>
- Xu, F., & Du, J. (2018). Factors Influencing Users' Satisfaction and Loyalty to Digital Libraries in Chinese Universities. *Computers in Human Behavior*, 83. <https://doi.org/10.1016/j.chb.2018.01.029>
- Yousuf, A. M., & Wahab, E. (2017). The Role of Trust in the Relationship between Quality Factors and Customer Satisfaction in Mobile Banking: A Conceptual Framework. *The Social Sciences*. <https://doi.org/10.3923/sscience.2017.712.718>
- Zhang, K., Haiqin, X., Zhao, S., & Yu, Y. (2018). Online reviews and impulse buying behavior: the role of browsing and impulsiveness. *Internet Research*, 28, 0. <https://doi.org/10.1108/IntR-12-2016-0377>
- Zhou, T. (2011). An empirical examination of initial trust in mobile banking. *Internet Research*, 21(5), 527–540. <https://doi.org/10.1108/10662241111176353>