EXAMINING THE INFLUENCE OF PERCEIVED NEED ON THE ADOPTION OF INFORMATION SYSTEM IN PUBLIC HOSPITALS IN YEMEN

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ABSTRACT

The importance of perceived need in the health sector, specifically its influence on health workers' behaviour towards the adoption of an information system (IS), needs to be better understood. Therefore, the purpose of the present study was to investigate the extent to which a perceived need factor influences physicians' and nurses' behaviour to adopt IS in public hospitals of Yemen. The data were collected from two public hospitals in Yemen using a self-administered questionnaire. The study suggests that the proposed model is able to investigate The impact of perceived need factor on the adoption of IS through the UTAUT model in public hospitals of developing countries. The findings of this research revealed that the social influence, the perceived need for IS and its benefits and the effort expectancy have significant effects on the physicians' and nurses' behavioural intentions to adopt IS. However, facilitating conditions does not have any substantial consequence on their behavioural intentions.

Keywords: Information system, public hospitals, developing countries, perceived need, UTAUT

INTRODUCTION

In response to the current challenges, many countries around the world have launched several initiatives to reform their health sector by introducing information systems (IS). According to the World Health Organization, an appropriate IS in the public sectors is seen as a crucial issue to strengthen the health system in developing societies (Lippeveld et al., 2000). The adoption of new technology is critical in addressing health issues (Hafeez-Baig and Gururajan, 2009). Previous studies have reported several difficulties associated with IS adoption in the healthcare sector. These difficulties include users' acceptance, attitudes, expected beliefs and perception (Yusof et al., 2008), physicians' and nurses' resistance (May et al., 2001).

Given the potential importance of the perceived need construct in the health sector, O'Carroll et al. (1998) discussed the information needs among healthcare practitioners and health policymakers. They noted that the requirement for certain varieties of information resources differed from one group to another as long as there are differences in the types of online applications that would help them to perform their work and in the styles of information seeking among health practitioners. The authors concluded that there had been even less organized effort to provide health services policymakers and public health practitioners with access to the kinds of information that they need for their work. In the same vein, Wu and Ware (2015) pointed out that the perceived need for particular innovation may vary among stakeholders, whereby lack of such perceived need for innovation was identified as a reason that hinders the usage of such innovation. Reeder (2010) conducted a systematic

review to assess the information requirements of healthcare practitioners. The obtained results of their study highlight the significance of involving public health practitioners in the design process for technology, which supports their information needs and work activities.

As indicated in the literature, the lack of knowledge about the end-users' information needs is one of the main reasons for the unsuccessful implementation of health information systems (Rangraz Jeddi et al. 2020). The importance of the perceived need construct in the health sector needs to be better understood in conjunction with its influence on employees' attitudes towards the adoption of IS (Nursyamsi et al. 2020). In this regard, Kushniruk and Borycki (2008) reported that it is essential for IS in the health sector to be easy to use, safe and meet user information needs. Moreover, the perceived need for change is fundamental to adopt any innovations (Zhu, 2013). Peek et al. (2014) regarded perceived need as the most frequently observed factor that makes the acceptance of technology more possible.

Resistance to change and use IS needs further research to increase its adoption level among the health sector's staff to obtain the potential benefits offered by these systems. In addition, there are still limited published articles that explore the factors that affect the adoption of IS from the perspectives of physicians and nurses in the context of Middle East countries such as Yemen. Moreover, this study focused its investigation on Yemeni public hospitals, which still face a major challenge in the IS development and therefore, this makes unique and compelling case studies to be investigated. To date, previous studies conducted in this area are very few, especially in Yemen. Findings from this research aim to aid the administration of hospitals to develop strategic plans to introduce or promote and use of IS.

Thus, to address these problems, we outlined three research questions i.e. (i) what are the factors that determine the adoption of IS?, (ii) is the proposed model valid in measuring the adoption of IS in the public health sector?, and (iii) what are the factors influencing the adoption of IS in the public health sector and what is the relative importance of these factors?The aims of this study is to identify and measure the factors that would influence the adoption of information systems among employees in the public health sector of Yemen.

This article is structured into sections that begin with the related work followed by proposed model formulation, methodology and discussion concerning model validation and refinement. Indirectly, the layout of the article describes the attainment of the research questions and objectives.

RELATED WORK

Perceived need is defined as the difference between the current level of knowledge and skills and what it should be (Borich (1980). It is also demarcated as the inference from investigating a current state and relating it with a vision of a better condition (Ling et al., 2011). Perceived need is the level that an individual perceives that he/she needs an information system to support his/her current work practices (Scornavacca, 2010). In IS research, the concept of perceived need appears in the early literature in the form of perceived informational needs (Scornavacca, 2010). Therefore, determining the vital information requirements is common to specific roles in the health system through different countries around the world. Bigdeli (2007) indicated that information needs vary according to the area of specialization. With the increased concern for decentralization in the health care sector, there has been a movement towards more information access across health care management. Current trends show that defining information needs must be based on consensus building among the actors involved in data collection and information production (Adi Alsyouf and Awanis Ku Ishak, 2018). Thus, health planners and health system professionals can improve

the management capabilities of health services by determining these information needs (Claude and Laura, 2000).

According to WHO (2007), different types of health-related data are needed at different levels of the health care pyramid, and each level has its own need for information. Therefore, several studies highlighted the need for investigating this construct among healthcare actors at different levels. In this regard, Claude and Laura (2000) argued that information needs were mainly at the national level as statistical reports focusing mostly on measuring facility-based diseases. In a study conducted by Naiman (2013), it was reported that the adoption of innovations among clinicians occurred when these innovations addressed their perceived need. Romano (1994) suggested that the perceived need facilitates nurse's adoption of a computerized information system. In determining the factors that influence healthcare staff's attitudes towards the health information exchange, O'Donnell et al. (2011) found that perceived need influences ICT adoption. Concerning the information need, RHINO (2001) reported that one reason that leads to information system failure is the neglecting of the community level information needs in the design of the routine information phase. Poorly defined information needs result into failure to work effectively with the collected information.

The perceived need has also been effectively integrated into the theory of planned behaviour (TPB) by health psychologists (Paisley and Sparks, 1998; Payne et al., 2004). The researchers found that perceived need had an independent predictive effect on intentions and expectations within this theory. Several studies examined the effect of perceived need in the technology adoption area. Such studies found that an individual's perceived need is a significant factor that influences the adoption of technology (Uzoka et al., 2011). Taylor (2007) included perceived need as one out of the determinants of participants' acceptance model of grid projects. The results showed that perceived need was a significant predictor of their intention towards participating in the grid projects.

Another study found that perceived needs impact healthcare providers' intention to adopt and use IS (Hsiao et al., 2009). In addition, Hashim et al. (2015) found that adult learners' intention to adopt mobile learning is positively influenced by their perceived needs. In proposing a modified conceptual model for UTAUT, Ling et al. (2011) incorporated perceived need as another determinant of behavioural intention in the context of user acceptance of computer usage.

Therefore, identify the essential information needs are common to specific roles in the health system across different countries and geographies. The perceived need seems to be an essential factor that may predict the use of technology within the area of healthcare (Czaja et al., 2006). Hashim et al. (2015) pointed out the existing relationship between perceived needs and attitudes. Negative attitude leads to resistance to IS adoption (Campbell and Grimshaw, 2015). Identification of an individual's need for information is recognized as one of the leading indicators of the success of information technology (IT). Knowledge about potential factors influencing the innovation significantly increased (Kamal, 2006). For the current research, the perceived need construct refers to the extent to which the physicians and nurses perceive that their daily work relies on using information system to meet their work obligations and needs. Based on the previous discussion underlying the importance of perceived need in healthcare sector, the perceived need factor was introduced in this research.

THEORETICAL FOUNDATIONS AND THE RESEARCH MODEL

Over the years, the adoption of information system technology has been one of the most exciting areas given the priority by researchers (Venkatesh et al., 2003, Venkatesh and Davis,

2000). The individuals' adoption of IS has received more attention in different fields. Recently, research in information system technology has been conducted to explore either the users' acceptance or rejection of such systems. The user's intention to adopt and use IT is a vital aspect in determining the success or failure of IS. Several IT adoption models and theories have been developed in previous research.

Recently, UTAUT has emerged as one of the most popular and well-known theoretical models. It seems to be promising with regard to understanding behavioural intentions to accept and use technology. Researchers have demonstrated that this model is a valid and reliable theory for investigating the acceptance and use of IT. It aims to integrate all constructs in previous models for the prediction of IT behavioural intentions and user behaviour (Venkatesh et al., 2003).

UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT) MODEL

Venkatesh et al. (2003) have formulated the UTAUT model which aims to unify eight prominent competing IT acceptance and use models: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivation Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT). According to their work, the new model successfully integrates all constructs in these previous models and can explain variance for the prediction of IT behavioural intentions and use behaviour better than the earlier models. The four primary independent constructs are performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC). The dependent variables in this model are behavioural intentions to use and use behaviour.

Performance expectancy refers to the degree to which an individual believes that using the system will help to attain gains in job performance (Venkatesh et al., 2003). Effort expectancy refers to the degree of ease associated with the use of IS (Venkatesh et al., 2003). Social influence is defined as the degree to which an individual perceives that essential others believe he or she should use the new system (Venkatesh et al., 2003). Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of IS (Venkatesh et al., 2003). Currently, UTAUT has been widely used in various area, including IS in the public health sector (Al Aufa et al. 2020).

PROPOSED MODEL

To identify the factors influencing the intention to adopt IS, the current research added the perceived need factor to the UTAUT model. In addition, Venkatesh et al. (2003) asserted that facilitating conditions have a direct impact on the system usage, and other researchers found that facilitating conditions positively and directly influence behavioural intentions(Aggelidis and Chatzoglou, 2009, Alwahaishi and Snásel, 2013). Therefore, this research modified the hypothesized relationships of the facilitating conditions on behavioural intentions postulated by Venkatesh et al. (2003) to be a direct influence on behavioural intentions. The present study did not take into account the moderating impact of age and gender in its investigation for a few reasons. The first reason is that as pointed by the literature in the healthcare area, healthcare professions are regarded as very technology-intensive and to meet job requirements of healthcare providers, they should always update their skills regardless of whether they are young or old and whether they are males or females (Hamidfar et al., 2008, Zheng, 2005, Curry and Moore, 2003). Moreover, all that matters for them is how to make their patients feel comfortable and good by providing them with healthcare with good quality.

Therefore, they would work harder to achieve this, and their age or gender would not make any difference in this. Consequently, the proposed model was formulated, as shown in Figure 1.
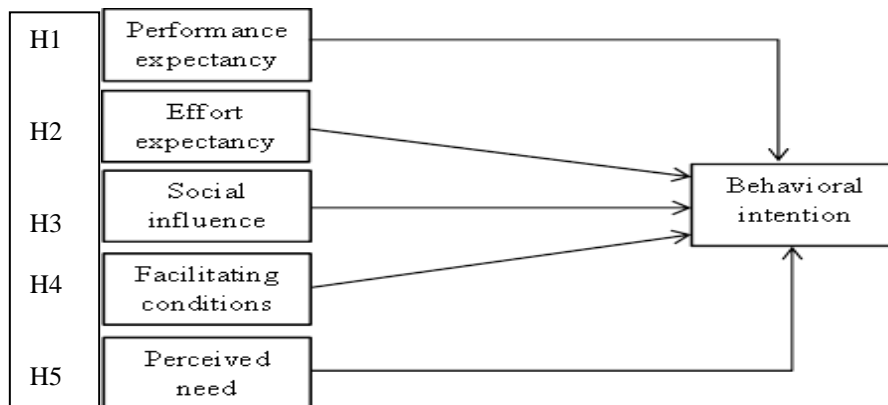

FIGURE 1. The proposed model

HYPOTHESES

Based on the literature review, the research hypotheses are formulated as follow:
H1: Performance expectancy will positively affect behavioural intentions.
H2: Effort expectancy will positively affect behavioural intentions.
H3: Social influence will positively affect behavioural intentions.
H4: Facilitating conditions will positively affect behavioural intentions.
H5: Perceived need will positively affect physicians' and nurses' behavioural intentions.

METHODOLOGY

A quantitative structured paper-based questionnaire was administered to 180 physicians and nurses who were working at two public hospitals located in Taiz city of Yemen: one in a rural area and another in an urban area. These two hospitals were selected as the target sample to obtain a clear picture in the whole province using a stratified sampling technique. Thus, the study targeted these two public hospitals because of four main reasons: a) Based on the Health Information Systems Assessment Report in Yemen, the public health sector is the main healthcare provider. On the other hand, for the current study, the hospital information system is one of the health information system types. It plays a severe role in extracting the required information from the employees related to the adoption process. b) These two hospitals are the biggest in the urban and rural areas, respectively, and they are typical hospitals, as mentioned above. They also provide healthcare services to a large portion of the population in Taiz province and other neighbouring provinces. The two hospitals: one hospital in the urban area and one in the rural area, were selected to get a representative sample of the health staff population in the whole province and to achieve the study aim. c) For these reasons, there is a pressing need for research towards understanding the factors that impact public health sector employees' in the adoption of IS (Ridhi Bhatia; Udita Taneja, 2018). The questionnaire was organized into two parts. The first part was designed to collect demographic data including age, gender, occupation and educational level and also to determine whether they use IS in their work or not. The second part includes questions asking about the respondent's perception of IS. The strategy used for data collection was a self-administered questionnaire to collect the necessary data.

TABLE 1. Summary of measurement scales

Constructs	Measures	
Performance Expectancy	PE1	Using Health Information System will improve the quality of the work I do
	PE2	Using Health Information System will give me greater control over my work
	PE3	Using Health Information System will enable me to accomplish my tasks more quickly
	PE4	Health Information System will support the critical aspects of my job
	PE5	Using Health Information System will enhance my effectiveness on the job
	PE6	Health Information System will allow tasks to be done more accurately
	PE7	Health Information System will increase the chance of getting a promotion
Effort Expectancy	EE1	Learning to operate the Health Information System is easy for me
	EE2	It is easy for me to remember how to perform tasks using the Health Information System.
	EE3	Interacting with the Health Information System does not require a lot of mental effort
	EE4	My interaction with the Health Information System is clear and understandable
	EE5	Health Information System is flexible to use/interact with
	EE6	I find the Health Information System easy to use
Social Influence	SI1	People who influence my behavior think that I should use the Health Information System
	SI2	People who are important to me think that I should use the Health Information System
	SI3	My colleagues encourage me to use Health Information System
	SI4	My manager influences my intention to use Health Information System
	SI5	In general, my organization has supported the use of Health Information System
Facilitating Conditions	FC1	I have the resources necessary to use Health Information System
	FC2	I have the knowledge necessary to use Health Information System
	FC3	The Health Information System is compatible with other systems I use
	FC4	Health Information System has availability of technical assistance "a specific person (or group) is available for assistance with Health Information System difficulties"
	FC5	I have access to a computer/internet whenever I need it
Behavioral Intention	BI1	I intend to use Health Information System as often as necessary
	BI2	Given the opportunity, I would like to use Health Information System
	BI3	I would use the Health Information System in my work frequently
	BI4	I would prefer using the Health Information System for recording observations rather than using a paper form
	BI5	I expect that I will use Health Information System in the future
Perceived Need	PN1	My job frequently requires me to rely on the Health Information System.
	PN2	My everyday work tasks require me to frequently need the support of the Health Information System.
	PN3	I frequently have to use the Health Information System to meet my work obligations.
	PN4	I am expected to use the Health Information System all the time to meet my work obligations

The questionnaire contains 31 items which were needed to be answered based on a 5-point Likert scale ranging from 1-strongly disagree to 5-strongly agree to collect data regarding the research constructs. Based on the proposed model, a questionnaire was created with items validated in previous researches. The participants were chosen because this study aimed to investigate the factors that influence hospital staff's intentions to adopt IS. The hospitals were chosen because these two hospitals are amongst the ones that implement the health information system in a fragmented manner. The questionnaire was translated from English into the Arabic language. Following this was conducting a pilot study to ensure proper interpretation of the items by the targeted participants. A pilot study helps to

understand whether the respondents face any difficulties in interpreting and understanding the questionnaire and to determine if there any ambiguous or biased questions. Consequently, minor changes were made to reduce the ambiguity in wording. Then, it was translated back into English. The questionnaire items used to measure each construct are presented in Table 1.

DATA ANALYSIS

The respondents' data include education, area, age and gender. Therefore, the sample size of the existing study included two general hospitals in urban and rural areas in the Taiz province of Yemen with a frequency of 84.9 % and 15.1 %, respectively. Table 2 presents the sample size and the results of the respondents' data of public health sector employees. As shown in Table 2, the majority of the respondents were male as they represented 62.2%, and 37.8 % represented females. Over two out of three of the respondents are 40 years old and younger, and the results revealed that those who are between 30 and 39 years represented the highest percentage in the present study as this group was approximately 42.9 % of the respondents whereas the group of respondents between 20 and 29 years represented 31.4 %. Participants in the age of 40 -49 years represent 21.2 %. Those who are more than 50 years represent only 4.5 percent.

TABLE 2. Participants' Personal Data Analysis

Characteristic	Item	Frequency	Percentage	Valid Percentage
Area	Urban	265	84.9 %	84.9 %
	Rural	47	15.1 %	15.1 %
Gender	Male	194	62.2 %	62.2 %
	Female	118	37.8 %	37.8 %
Age	20-29 years	98	31.4 %	31.4 %
	30-39 years	134	42.9 %	42.9 %
	40-49 years	66	21.2 %	21.2 %
	More than 50 years	14	4.5 %	4.5 %
Level of education	Primary school	1	0.3 %	0.3 %
	Secondary school	18	5.8 %	5.8 %
	Diploma	142	45.5 %	45.5 %
	Bachelor	123	39.4 %	39.4 %
	Master	24	7.7 %	7.7 %
	PhD	4	1.3 %	1.3 %

Regarding the employees' educational levels, the results revealed that those employees who received diploma education accounted for 45.5 %, and this cluster showed the highest percentage rate in the present study. And those with bachelor degrees, they accounted for (39.4 %). For those who stated that they had postgraduate education represented almost 9.0 % (7.7 % of respondents are masters degrees, and 1.3 % of respondents are Ph.D. degrees). In addition, the results showed that those who had primary and secondary school education represented almost 6.1 % of the respondent, which is the lowest rate among others (primary school represents 0.3%, and secondary school represents 5.8).

Concerning the use of IS, the majority of the respondents had not used IS in their work as they represented 60 %. The respondents were allowed to select more than one reason behind their non-use of IS. 23.3 % of them justified that they cannot access IS, and 8.3 % of

them reported that it does not satisfy their need. Moreover, 16.1 % pointed at the lack of assistance, and 16.4 % reported not knowing how to use IS. Others (4.4 %) said that the system is unreliable, and 3.3 % of the respondents were worried about privacy. Finally, 12.8 % of them related this to the difficulties in understanding the system, and 1.1 % of the respondents provided other reasons for not using IS.

RELIABILITY AND VALIDITY

Using the analysis tools of SPSS version 21, the proposed factors were tested for its validity by applying Kaiser Meyer Olkin (KMO) test for sampling adequacy. As suggested by (Hair et al., 2010), an assessment of the instrument has included reliability and validity aspects. While validity is concerned with the accuracy of the measurement instrument, reliability is about the measurement consistency. Regarding this, Cronbach's alpha is a measurement used for assessing internal consistency. According to (Hair et al., 2010), the value of Cronbach's alpha above 0.7 is acceptable. For this research, the values of the reliability test for Cronbach Alpha are shown in Table 3. As depicted in this table, the values of Cronbach Alpha are between 0.722 and 0.922. These values indicate a high degree of reliability. These results showed that there is a consistency among the questionnaire items. Furthermore, there is no any ambiguous or biased questions as prior pilot study has been conducted.

TABLE 3. Cronbach's Alpha and KMO tests for investigated factors

Model Constructs	Cronbach's Alpha	KMO
Performance Expectancy	. 922	.875
Effort Expectancy	. 722	.742
Social Influence	. 854	.765
Facilitating Conditions	. 899	.735
Perceived Need	. 886	.812
Behavioral Intention	858	.818

Moreover, KMO was used to determine the validity of the data to measure the appropriateness of the factor analysis by looking at the correlations among the factors. Usually, the values of the KMO test range between zero and one. Consequently, a higher value means a more suitable analysis as described in the following scale: 0.00 to 0.49 unacceptable; 0.50 to 0.59 miserable; 0.60 to 0.69 mediocre; 0.70 to 0.79 middling; 0.80 to 0.89 meritorious; 0.90 to 1.00 marvelous. Hair et al. (2010) stated that KMO should be equal to or higher than 0.60. Table 3 also shows the values of KMO for this research. All KMO values are higher than 0.60, which means that the data are suitable for further analysis.

TESTING THE MEASUREMENT MODEL

A confirmatory factor analysis using structural equation modelling (SEM) was applied to test the measurement model, as suggested by Byrne (2010). Looking at the comprehensive developed model before updating, sometimes were excluded from the model due to the model fit. These items are "EE5, FC4, FC5 and SI4". These items have either low regression weight or standardized residual covariance greater than 2.6. Item loadings with high values mean a better convenience of the item to the factor. The residual covariance between two items is the difference between the sample covariance and the model-implied covariance.

To assess the model's goodness-of-fit, several model fit measures were applied. This includes the ratio of Chi-square to degrees of freedom (X^2/df), comparative fit index (CFI), incremental fit indices (IFI), and Root Mean Square Error of Approximation (RMSEA). In regards to this, modification indices were applied in the covariance matrix, as shown in Figure 2. Table 4 shows that entire indices of model-fit are in the range of their respective

typical acceptance levels as recommended by previous research, thus demonstrating that the measurement model exhibited a good fit with the collected data, and it is acceptable.

TABLE 4. The measures of model fitness

Fit Measure	Recommended Value	Fitness Measure	Conclusion
x^2/df	<3	1.964	Acceptable
CFI	≥ 0.90	0.900	Acceptable
IFI	≥ 0.90	0.901	Acceptable
RMSEA	< 0.080	0.073	Acceptable

STRUCTURAL MODEL

Testing the success of the model was carried out following two steps. According to Byrne (2010), these two steps could determine the success of the structural model in two ways. First, they discover the overall goodness of the fit for the causal model. Secondly, they estimate the magnitude and statistical significance for each path coefficient as well as the variance explained for each endogenous latent construct.

The first part of the process of developing the model was obtaining the fitness of the model with the empirical data or the validation process. Validating the model was realized by measuring the goodness of fit, as shown in Table 5.

Regarding the second part, Figure 2 presents the results of the structural model and the standardized path coefficients among the constructs. From the path analysis, four hypotheses were supported, and their influence on BI was significant. However, only the influence of FC on BI was insignificant, and therefore, this hypothesis was rejected at the level > 0.05.

TABLE 5. Results of hypotheses testing

			Estimate	S.E.	C.R.	P	Results
PE	--->	BI	.217	.081	2.659	.008	Supported
EE	--->	BI	.266	.133	1.995	.046	Supported
SI	--->	BI	.242	.084	2.901	.004	Supported
PN	--->	BI	.232	.082	2.834	.005	Supported
FC	--->	BI	-.009	.067	-.134	.894	Not supported

For the hypothesis stating that the perceived need will positively affect the physicians' and nurses' behavioural intentions, it was supported because the path from the perceived need to behavioural intention is 0.22, which is significant at the 0.01 level. With the same results, the path from effort expectancy to behavioural intentions is 0.22, which is also significant at the same level. Moreover, it was found that the path from performance expectancy to behavioural intentions is 0,24%, and that from the social influence to behavioural intentions is 0.27.

FIGURE 2. Hypotheses Testing Results.
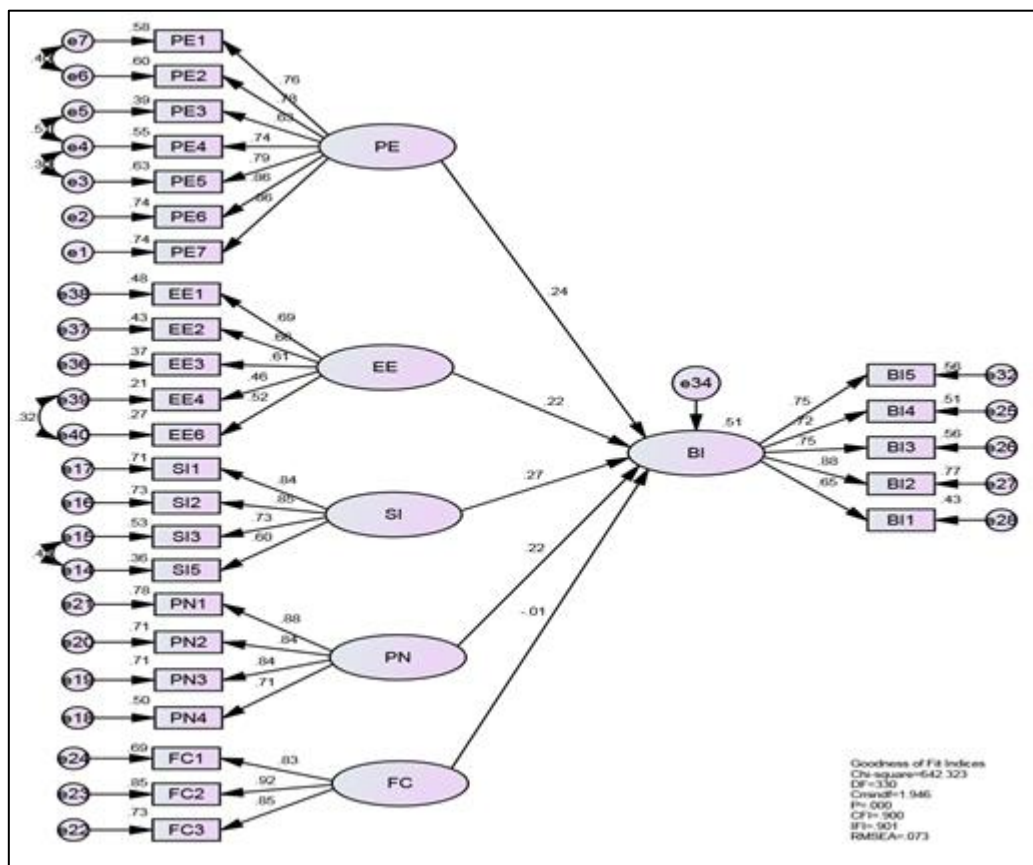
The final model, as in Figure 2 shows the degree to which the investigated constructs influence the physicians' and nurses' intention to use IS. The model contains four paths between behavioural intentions and the independent variables. The independent variables: PE, EE, SI, and PN account for significant variance in the dependent construct of behavioural intentions. The results indicated that the variance of physicians' well as nurses' intention is 0.51. The model has the potential to predict physicians' and nurses' intention to use IS in public hospitals. The developed model revealed that the individual's need for information significantly contributes to his/her intention to adopt IS in the context of the current study.

DISCUSSION

This study aimed to propose a model that examined the influence of perceived need factor through the UTAUT model on the adoption of IS among physicians and nurses in two public hospitals in Yemen. Based on the participants' responses, the implementation of IS should be driven by the perceived need for information and availability of resources. Such a perceived need for IS, as often mentioned, is regarded as a reason for its adoption. In this study, the physicians and nurses positively perceived the need for an information system in performing their daily work-related tasks. Thus, the perceived need was considered as an enabler for IS adoption, and it assisted them in accomplishing daily tasks.

From the above findings, the participating physicians and nurses are most likely to adopt an information system if these systems can support their work needs. The individual's ability to determine her/his information need and use it effectively is considered as a high level of the awareness of information. The results showed that there is a need for an

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information system that delivers relevant information to fulfill the needs of physicians and nurses in public hospitals in Yemen.

The findings also revealed that effort expectancy strongly affects the physicians' and nurses' intentions to adopt IS. The physicians' and nurses' little effort to use the IS implies that they have more positive behaviour towards using the system.

Although performance expectancy and social influence were shown to influence the intention to adopt IS directly, facilitating conditions did not show any significant effect on behavioral intention (Bawack & Kala Kamdjoug, 2018). The influence of the performance expectancy on the adoption of information systems suggests that the benefits offered by the system user should be recognized. The expectation of the assistance of IS toward accomplishing specific tasks by the physicians and nurses affects their intention. The results are consistent with previous studies' results (Chang et al., 2007, Holtz, 2010).

The effect of social influence on physicians' and nurses' behavioral intention is significant. Based on the above results, the more important the physicians and nurses perceived the opinions of their colleagues, such as managers or other important people, the more intention they have to adopt the system. Therefore, the recognition of other people who can strongly influence users is important to accelerate and facilitate the implementation process. Whilst there is a broad understanding of the importance of IS, organizational support is yet insufficient in public hospitals in Yemen. Such a result confirms similar results in previous studies that emphasize on internal factors for IS adoption in the healthcare sector (Perez, Popadiuk & Cesar 2017).

IMPLICATIONS

This study could be a basis for further rigorous research into IS adoption in public healthcare of developing countries such as Yemen. Although strengthening information system in the health sector is crucial, health facility, district, province, and national levels, it has been recognized that the adoption of information system in the public health sector of Yemen as one of the developing counties is still in its infancy and has not been studied widely. As stated by the World Health Organization (WHO), a robust information system is vital to the success of a given health sector program implementation plan. This study is among the few studies that deal with the adoption of information systems in the health sector at the provincial level in Yemen.

Understanding the problem requires identifying the factors that determine employees' acceptance or rejection of the information system. Moreover, achieving maximum efficiency in information system performance is a function of technological capabilities and the extent to which an individual adopts and uses the information system. Thus, the results of this study could be beneficial for policymakers in the health sector of Yemen in that they indicate that implementing information systems in the public health sector may be less difficult than earlier. The results also revealed that physicians and nurses in the public sector demonstrate a high level of receptiveness to the adoption of an information system. Therefore, the adoption tendencies of physicians and nurses can lead to a faster deployment of information system implementation, which in turn, leads to improved healthcare services.

THEORETICAL IMPLICATIONS

The proposed model provides a better understanding of Information System adoption. The validity of the model was confirmed in the context of the public sector in Yemen. Moreover, in this research, the construct validity and reliability of the core constructs were demonstrated adequately. For this, SEM was used to test and validate the model. Understanding the relationships between the factors and the employees of the public health sector behavioural

intention to use information system was provided by the model. The predictors of behavioural intention are performance expectancy, social influence, attitude, self-efficacy, perceived awareness, and perceived access. Furthermore, the attitude was predicted by effort expectancy, perceived need and perceived information sharing. It was proved that the combined model of this research explains 65% of the variance of behavioural intention.

PRACTICAL IMPLICATIONS

The current study had several significant practical implications for health sector decision-makers before and during the implementation of the information system. The inclusion of the perceived need factor in the UTAUT model could provide practitioners with a better assessment of IS in public hospitals, especially in developing countries (Bawack & Kala Kamdjoug, 2018). Furthermore, the results of this study are expected to help decision-makers to structure their priorities in the adoption of information systems in the public health sector according to the degree of importance of the investigated factors. In order to increase the success of information system implementation, it is necessary to increase the adoption level among the employees in the public sector. Therefore, the current study provides significant benefits for employees in the public health sector. Such benefits are represented by increasing the adoption rate and promoting employees to use of information systems. The implications of using an information system adoption model based on the proposed factors will promote the implementation of an information system in public and private sectors in Yemen or other developing countries with the same conditions.

LIMITATIONS AND FUTURE RESEARCH

This study, like other studies, has some constraints and limitations related to the interpretation of the results. The present study was designed based on the extensive literature and the sample size within the reasonable limits from two urban and rural hospitals in the Taiz province of Yemen. Although the perceived results were obtained, there are still some constraints and limitations in the current study. It is a research work that inherits the predictive limitations of cross-sectional studies. The main constraint concerned with this research is its focus on perceived need and UTAUT factors only. Therefore, more factors should be taken into consideration in investigating this in future research. Moreover, the instruments for collecting the data were limited to the paper-based survey distributed to the physicians and nurses. In contrast, other qualitative methods that may have enriched the data were not used in this research since the investigated area is complex and wide.

In Yemen, more research with health staff in different levels, such as health units, health centres, dispensaries, health officials in the province and top health authority, should offer a clear picture of information system adoption in the Yemeni public health sector. This research can be the basis for future research in several levels of the health sector of the country in investigating the barriers and enablers of the adoption of an information system in this population.

CONCLUSION

This study contributes to the theoretical basis of IS adoption studies by proposing and validating the IS adoption model in the Yemeni public hospitals. The adoption of IS in the public health sector of Yemen is, like in many other developing countries, has not been extensively investigated. This is even though it is recognized to be crucial since it plays an important role in the healthcare system reform. The results obtained and discussed by this research reveal a significant and positive relationship among most of the investigated factors

and behavioural intention to the adoption of IS among physicians and nurses within the public hospitals of Yemen. The model was investigated and validated using the strategy self-administered questionnaire to collect the necessary data. Based on the data analysis, the majority of physicians and nurses in Yemen do not use IS. The reasons for this were discussed early. Therefore, to increase both knowledge and understanding of the benefits of IS within public hospitals in developing countries, the government should influence the organizational, individual and technical issues.

This study presents implications for information system adoption in the public health of Yemen. Thus, to encourage the employees' adoption and use of information systems, the management of the public sector needs to emphasize the usefulness of the information system. On the other hand, management needs to improve the employees' attitude toward using the information system through the acquisition of the appropriate skills and identified physicians' and nurses' needs.

It is clear that the employees of the public health sector showed a high degree of acceptance and a positive attitude toward the adoption of an information system. This was supported by the high ratings on most of the investigated factors. The results of this study could be beneficial for policymakers in the health sector of Yemen in implementing information systems among employees more easily than before. However, they need to consider the factors that could promote the use of information systems in the public health sector. Understanding the influence of these factors on the adoption can help in developing and accelerating the implementation process of IS in the health sector of the country. Finally, the influence of perceived need factor was extensively studied in this research, and the outcome of this study supports the importance of this factor in the adoption of information systems in the public health sector of Yemen.

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