Designing a model of hospital information system acceptance: Organizational culture approach

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Abstract

  Background: The significance and influence of organizational culture on Information Technology acceptance, especially in healthcare field, has been recognized as a source of organizational inertia. This study aimed at developing a model of Hospital Information System (HIS) acceptance for non-teaching hospitals of Iran University of Medical Sciences to encourage the authorities to promote organizational culture and successful application of HIS.

  Methods: The proposed model was developed according to Michigan Organizational Assessment Questionnaire (MOAQ), Harrison, Hofstede models, and Comparative Values Framework (CVF). The questionnaires were designed based on the model and distributed among 400 HIS users in the hospitals under study, who were selected using stratified random sampling. The structural equation modeling method was used for data analysis in LISREL software.

  Results: According to the final model, the influences of developmental culture on perceived usefulness, the relationship of 4 types of organizational culture with mandatoriness according to CVF, and the relationships of hierarchical and developmental culture with system use were attested. The relationships between supervision and 4 variables of HIS acceptance were confirmed. Furthermore, the influence of process/ result oriented culture on user satisfaction was demonstrated. The normed chi square index (2.60) revealed that the final model was fitted to the data. The indices were as follow: GFI= 0.95, CFI= 0.97, AGFI= 0.88, RMSEA= 0.064.

  Conclusion: The components and structural relationships in the model of this study are applicable in the related hospitals, and using this model can promote organizational culture and acceptance of HIS by the users.

  Keywords: Hospital information system, Hospitals, Technology, Organizational culture

Introduction

Nowadays, information is considered as a source of power, as it plays an important role in timely and effective decision- making. In recent years, information technology has led to fundamental changes in several fields including healthcare by increasing the growth, spread, and utilization of computer facilities, data transmission, and creation of World Wide Web (such as internet, valuable information, and various services). To increase the quality of healthcare services and reduce their costs, healthcare or-ganizations invest heavily in the field of information technology (1). Hospitals utilize several information systems to prepare timely and accurate information, so that they could have an effective performance with a reasonable price (2). An information system can be defined as a combination of hardware, software, infrastructure, and trained personnel to facilitate planning, controlling, coordinating, and decision- making, as well as developing a mechanism for translating data into meaningful information to achieve

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↑What is "already known" in this topic:
Many studies have indicated that technology acceptance may be affected by various external factors; however, the influence of organizational culture on information system acceptance is still unclear according to some evidence.

→What this article adds:
This study developed a model that illustrates the role of organizational culture on users' acceptance of Hospital Information System. The research model can help the authorities to improve organizational culture aspects to achieve optimal and beneficial use of the information system, which may enhance the hospitals' performance.

specific objectives of an organization (3).

Several studies have shown that health information system increases access (4-12), improves the quality and efficiency of medical care and services (7-9, 13-17), increases the accuracy of information and activities (7, 8,14,18), and reduces work performed time, and increases the speed of work (14-16, 19). Hospital Information System (HIS) is a complex system that plays a key role in supporting hospital affairs through the proper use of hospital information technology (2). This system has been designed to manage clinical, financial, and administrative affairs in hospital. The proper and correct acceptance of information technology is significantly effective in the quality and performance of medical services. Studies conducted on the acceptance of information technology at individual and organizational levels revealed that TRA, TAM, TPB, and UTAUT are the most important theories used for predicting and explaining individual's' behavior about accepting the use of technology (20). Hospital Information System should provide authorized individuals with proper information at the right time, right place, and within a right format. HIS, based on managers' opinion, is of necessity for revolutionizing hospitals (21).

As Hospital Information Systems are still emerging and new in Iran and due to the rapid developments in information technology, health systems, and patient care, HIS should be strongly supported in economic, political, social, cultural, and legal aspects (19, 22). The results range of evaluation studies on Hospital Information Systems in many Iranian hospitals have been less than desirable (14, 22, 23), and considering the weaknesses and limitations of the current Hospital Information Systems, financial, human, and technical enhancements are needed in this area (24). Also, in several studies performed in Iran, the necessity of paying attention to the views and needs of all HIS users and involving them in designing, deploying, and implementing HIS have been emphasized to improve healthcare and hospital performance (8, 19, 22-25).

Davis, Bagozzi and Warshow (1989) stated that the capability of a technology acceptance models for explaining individuals' behaviors and attitudes towards an information technology system depends on external variables. These external variables are simultaneously effective in both the perceived ease of use as well as the perceived usefulness from the users' viewpoint. Particularly, what determines these variables depends on the setting in which the research is performed (26). Also, culture has been identified as a significant modifying variable for TAM (27).

Each profession has its own various characteristics for applicability, cultures, and structures. Thus, various instruments should be designed for accurate understanding of user acceptance in each profession. If the applicability of information technology is not taken into account seriously, all efforts made in this field and the procurement of a new technology may result in a vicious circle, in which information is gathered without any specific purpose and systematic organization (28). An organizational culture that does not support innovation and use of new technologies is considered as a barrier for the selection of electronic commerce. The existence of the congruence between organizational culture and electronic commerce has a great impact on the selection of electronic commerce by small and medium companies (29).

Most studies revealed that elements of organizational culture have affected the acceptance of technology by the organization (26, 30-33). However, some studies showed inconsistent results; for example, Davies did not find any significant relationship between 2 major variables of organizational culture and acceptance of technology (34). Results of a study conducted by Shin also showed that the use of technology by teachers is not influenced by the institute culture (35). Accordingly, there are inconsistency and limitations in the findings of previous studies about the impact of organizational culture on the acceptance of technology. Therefore, this study aimed at investigating the Technology Acceptance Model (TAM) using the impact of organizational culture components in the setting of non-teaching hospitals affiliated to Iran University of Medical Sciences. It is expected that the final model of this study could help the managers and policymakers to improve the application of Hospital Information System.

Methods

This descriptive-analytical, cross- sectional survey was conducted with a practical aim. First, to achieve the study objectives, variables related to the technology acceptance and organizational culture were investigated through comparative study of research and models of previous research. Organizational culture components used in the current study are as follow:

The Harrison organizational culture model, the Michigan Organizational Assessment Questionnaire (MOAQ, 2 components including supervision and work group functioning), Hofstede organizational culture model (2 components including process/results-oriented and open system /closed system), and the Competing Values Framework (CVF). These 4 mentioned instruments were selected from among other organizational culture models because of the following reasons:

- Previous approval of the relationship between the models and the studied technology acceptance variables because of the data analysis method (36-40)

- Congruence with the healthcare domain based on the literature of the issue

- The frequent affirmation of their validity and reliability because of the use of these instruments by various researchers and experts

- The limited use of these 4 organizational culture models in Iran, in particular in healthcare organizations

Organizational culture is defined as the beliefs, values, and norms belonging to an organization's members and can be classified into different types (41). According to the literature, various models to identify and investigate organizational cultures have been provided by researchers and experts, and some of the important ones are as follow:

- In his typology model, Harrison identified 4 cultural dimensions: role-oriented culture, achievement-oriented culture, power-oriented culture, and support-oriented culture (42).

- The Competing Values Framework (CVF) is another cultural model describing 4 types of organizational culture: the group organizational culture, developmental organizational culture, hierarchical organizational culture, and rational organizational culture (43).

- Hofstede et al. measured observed activities under working circumstance among personnel in 20 organizational units and found 6 independent dimensions of organizational culture: process-oriented vs. results-oriented, job-oriented vs. employee-oriented, professional vs. parochial, open system vs. closed system, loose vs. tight control, and pragmatic vs. normative (40).

- Michigan Organizational Assessment Questionnaire (MOAQ) is an instrument to gather data regarding employees' perceptions and attitudes. This questionnaire considers several different aspects related to psychological characteristics, descriptions of the work environment, and employees' responses towards their organization (44).

This study incorporated some components of 4 organizational culture models. The combination of the instruments for measuring organizational culture in this study, which consist of completely different questions and measurement scales, may provide a better description of the organizational culture in the study population. Furthermore, it allows the possibility of comparing results from the impact of each of these models on HIS acceptance with respect to the intensity of created structural relations. Then, the obtained model was revised using experts' opinion, and finally a proposed conceptual model was provided.

Proposed model: In this study, a model was proposed for technology acceptance, in which 4 types of valid organizational culture models were considered as external independent variables. The studied variables extracted from the literature review within the framework of "conceptual model for HIS acceptance in the studied hospitals with an organizational culture approach" are as follow:

1. The studied variables regarding the status of the acceptance of the hospital information system by users: (perceived ease of use (PEU), perceived usefulness (PU), subjective norms (SN), users' satisfaction (SAT), behavioral intention (BI), mandatoriness of the hospital information system use (MAND), and the use (USE) of hospital information system by users (dependent variables))

2. The selected dimensions of organizational culture in this study based on the Michigan Organizational Assessment Questionnaire (MOAQ): (supervision and work group functioning)

3. The selected dimensions of organizational culture in this study based on the Hofstede model: (process /results-oriented and open system /closed system)

4. The selected dimensions of organizational culture in this study based on the Harrison model: (power, role, task, person culture)

5. Types of organizational culture based on the Competing Values Framework (CVF): group, developmental, hierarchical and rational culture

After identifying the main variables and components, direct and indirect relationships between the components were determined. Then, the proposed conceptual model of the research was drawn based on the previous literature review and after obtaining the approval of the experts (Fig. 1).

The setting for the research included 8 non-teaching hospitals affiliated to Iran University of Medical Sciences. The research statistical population consisted of all users of Hospital Information System (HIS) in non-teaching hospitals affiliated to Iran University of Medical Sciences. The number of users of the Hospital Information System (HIS) was calculated to be 1509 users through accurate investigation of the studied hospitals. According to Krejcie and Morgan table, the sample size of 309 is recommended for a given population of 1500. At least 15 to 20 observations for each variable should be made in linear regression (assuming that x_i is independent of each other). The conceptual framework of this study consisted of 13 latent variables and 20 paths. However, at least 15 samples (totally 195 persons) seemed sufficient per each variable given that in this study the path analysis of the model was desired. According to the Morgan table, the number of 300 samples was recommended. Finally, to ensure the sufficiency of sample size, 20 samples were considered for each path in the model, and eventually 400 persons were estimated as the final sample size.

Also, stratified random sampling method was used in this study. Data collection tool was a questionnaire designed and developed in the 3 following parts based on the results of the literature review, investigation of instruments used in previous studies, and discussion with experts:

1) Personal and personnel demographic information

2) Hospital Information System (HIS) questionnaire (consisting of 84 questions)

3) The organizational culture questionnaire (consisting of 104 questions) including organizational culture based on the MOAQ (the supervision dimension: 36 questions and the teamwork performance dimension: 22 questions), organizational culture according to Hofstede (24 questions), organizational culture according to Harrison typology (16 questions), and organizational culture based on the competing values framework (6 questions)

The validity of research tool was considered in terms of content validity and construct validity. To ensure the construct validity of the questionnaire, we used the available scales whose validity has previously been proved. Each question of the initial questionnaire in this study was extracted from the literature review, various studies as well as theses, and from valid and various academic papers, in accordance with the status of the studied society.

The 5-7 point Likert scale was used to score the HIS acceptance questionnaire.

Each item related to the Hofstede organizational culture was in the format of bipolar scales, ranging from 1 to 5, and the respondents assessed each bipolar questions using 1 to 5 score.

The rating scale for 4 choice questions in Harrison organizational culture ranges from 1 to 4. Accordingly, Score 1 is assigned to an option with the highest similarity with the organization, while Score 4 reflects the lowest
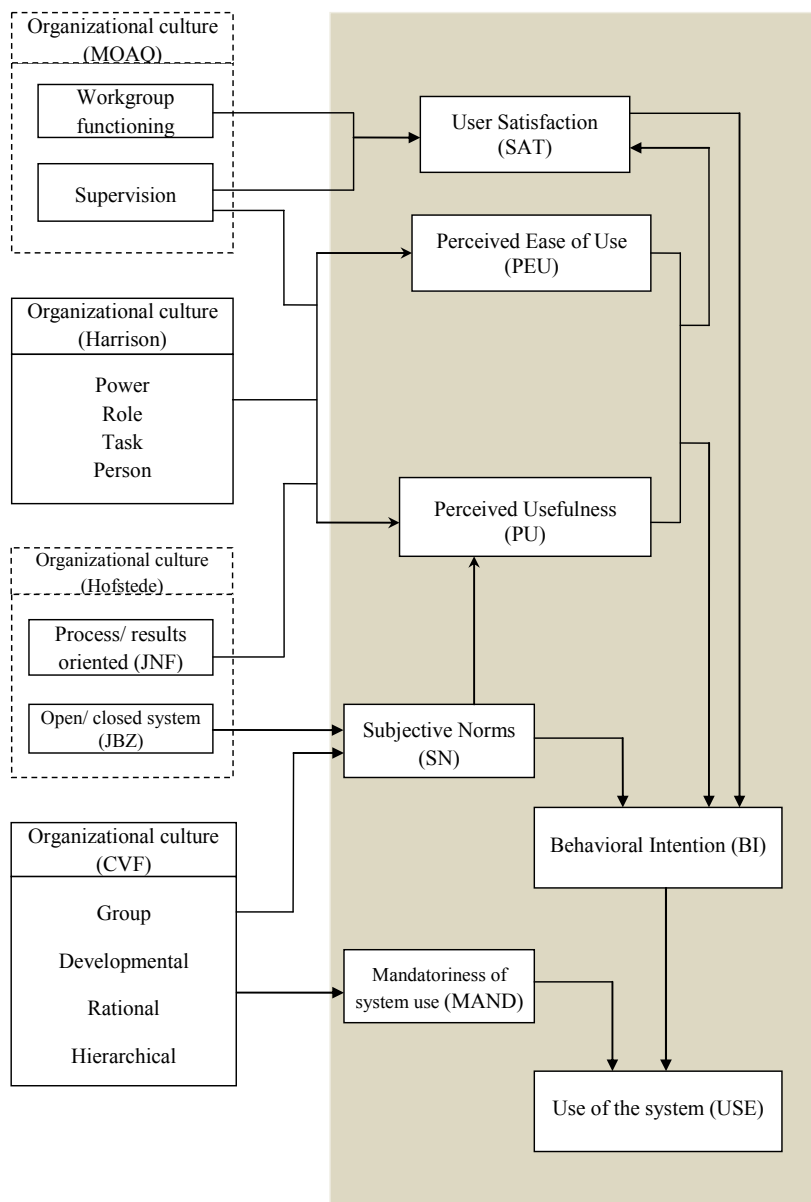
Fig. 1. The proposed model of HIS acceptance with organizational culture approach

similarity.

In the Competing Values Framework (CVF) questionnaire, each question has 4 choices and the respondents should divide 100 scores between these 4 choices. The highest score is assigned to the option that is more similar to the organization from the respondent's viewpoint. The scores assigned to 4 choices of each question in this questionnaire should be equal to 100.

The expert judgment method using content validity ratio (CVR) was employed to investigate and approve the validity of questions of the questionnaire. Given that in this study, 14 persons constituted the expert panel, therefore, items with CVR values of less than 0.51 were omitted from the set of questions in the questionnaire. Also, some questions were amended and corrected using experts' opinion. After this step, to increase the reliability of the designed questionnaire, it was given to 41 users in the 6 studied hospitals, who were similar to the research population in terms of specificity. At this step, the test was per-

formed in a way that the respondents did not know that it was a pilot test, and accordingly, the test conditions were as the same as the real conditions. All distributed questionnaire, except one, were given back to the researcher.

Then, the Cronbach's alpha coefficient for data of the pilot study (40 questionnaires) was calculated after suggesting the omission of 6 questions; it was 0.9 for all questions with 5-point Likert scale, and it was more than 0.7 for some tests; as a result, the reliability of the research tool in the pilot phase was approved. The Cronbach's alpha coefficient for all studied variables was calculated to be more than 0.6, indicating the reliability of the research tool.

The process of data collection in this study included 3 steps as below:

Using an organizational culture approach to adapt the conceptual model of information system acceptance with specific characteristics of the healthcare industry, main research variables and components of this model were

determined based on the literature review and through obtaining supervisors, advisors, observers and experts' opinions. In the next step, to investigate users' opinion about the studied components and to identify the current status of organizational culture and hospital information system acceptance, the designed questionnaires were delivered to the users in person in the 8 studied hospitals. After completion of the questionnaires, they were given back to the researcher within the set deadline.

Out of a total of more than 450 distributed questionnaires, about 409 questionnaires were gathered, which after excluding the incomplete ones from this set, a number of 400 questionnaires were regarded to be complete and considerable.

In this study, first, data from the questionnaires were inserted into the Microsoft Office Excel. The graphs of descriptive statistics and organizational culture profile were drawn based on the CVF using the Microsoft Office Excel. Data description and analysis were conducted using SPSS 16.0 software and LISREL 8.7 software.

The gathered data on users' demographic information and on the independent and dependent variables of the research model (including the HIS acceptance, organizational culture based on the MOAQ, Hofstede, Harrison, and CVF) were analyzed using descriptive statistics (calculating the mean and standard deviation as well as the frequency the percentage of frequency).

In descriptive statistics, the comparison of the means was used to measure the difference of cultures between organizations. Then, skewness and kurtosis tests were utilized to test the normality of the distribution data related to each variable. The reliability of the questionnaire was also measured using the calculation of the Cronbach's alpha coefficient for each variable.

For the fitness test of the proposed model in this study, which was designed based on theoretical foundations with research data, the path analysis and structural equation modeling (SEM) were used, which included the confirmatory factor analysis method. Fitness indices included chi square index, goodness of fit index, comparative fit index, adjusted goodness of fit index, and root mean square error of approximation.

To conduct this study, necessary coordination was made with Iran University of Medical Sciences including introducing the researcher and explaining the study objectives as well as emphasizing the importance and necessity of conducting this study. Moreover, all participants in this study were assured of the confidentiality of information.

Results

Based on the gathered data, the highest frequency belonged to 26-30 age groups (35.5%). Women (78.25%) and married persons (67.5%) constituted the majority of the participants. About half of participants (58.8%) had the Bachelor of Science degree (BS).

The investigation of data related to organizational culture based on the Michigan Organizational Assessment Questionnaire (MOAQ) generally showed that the mean±SD of the supervision variable (MOAQH) and the teamwork performance variable (MOAQI) were

3.70±0.60 and 3.49±0.50, respectively.

In data analysis related to the variable of Hofstede organizational culture, Score 5 was considered for results-oriented culture and the mean of 3.16 was calculated for process/ results-oriented latent variable in the studied hospitals, indicating that the hospitals generally approach to results-oriented culture. Furthermore, assuming the Score 5 for the open system culture in all the studied hospitals, the mean of 2.77 was calculated for the open system / closed system latent variable, indicating relative tendency of the studied hospitals to the open system culture.

The level of organizational culture based on 4 cultural types of Harrison model in all the studied hospitals in order of preference included role culture with the mean of 36.21, power culture with the mean of 39.08, task culture with the mean of 40.08, and person culture with the mean of 44.63.

The current status of organizational culture based on the 4 cultural types of Competing Values Framework (CVF) in all the studied hospitals in order of preference included hierarchical culture with the mean of 30.56, rational culture with the mean of 28.54, group culture with the mean of 22.15, and developmental culture with the mean of 18.75.

One of the conditions for structural equation modeling is the normality of data. The results of the SPSS software for testing the normality of the model variables showed that the data were normal.

Test of the research model: To determine the dimensions of the HIS acceptance model with an organizational culture approach, the fit test of the model was conducted using the LISREL Version 8.7 software. First, the math model schema was developed using drawing direct and indirect relationships between the research variables based on the proposed conceptual model. Then, after testing the model, the LISREL software displayed new relationships in the model, which were theoretically appropriate for the model. To determine the fit of developed structural relations, fit indices were calculated, whose appropriateness and acceptability of values confirmed the structural relationships of the model.

The studied fit indices showed that normed chi square for measuring the model in this study was 2.60, which indicated an acceptable research model fit to the data. The calculation of other fit indices showed that the comparative fit index (CFI) and goodness of fit index (GFI) were more than 0.9 and also the adjusted goodness of fit index (AGFI) was 0.88; in addition, the root mean square error of approximation (RMSEA) was equal to 0.064. Given that all the mentioned values were within the acceptable range, the HIS acceptance model fit was, therefore, approved and it could be said that the model of the current study provides good fit to the data (Table 1).

The explanation of the final model of the research: According to the final model of the research, the impact of 4 organizational culture models on the Hospital Information System acceptance was tested (Fig. 2).

Based on the calculated values, Hospital Information System (HIS) acceptance model with an organizational culture approach was approved. There was a significant

Table 1. Fitting indices of HIS acceptance model with organizational approach in the hospitals under study

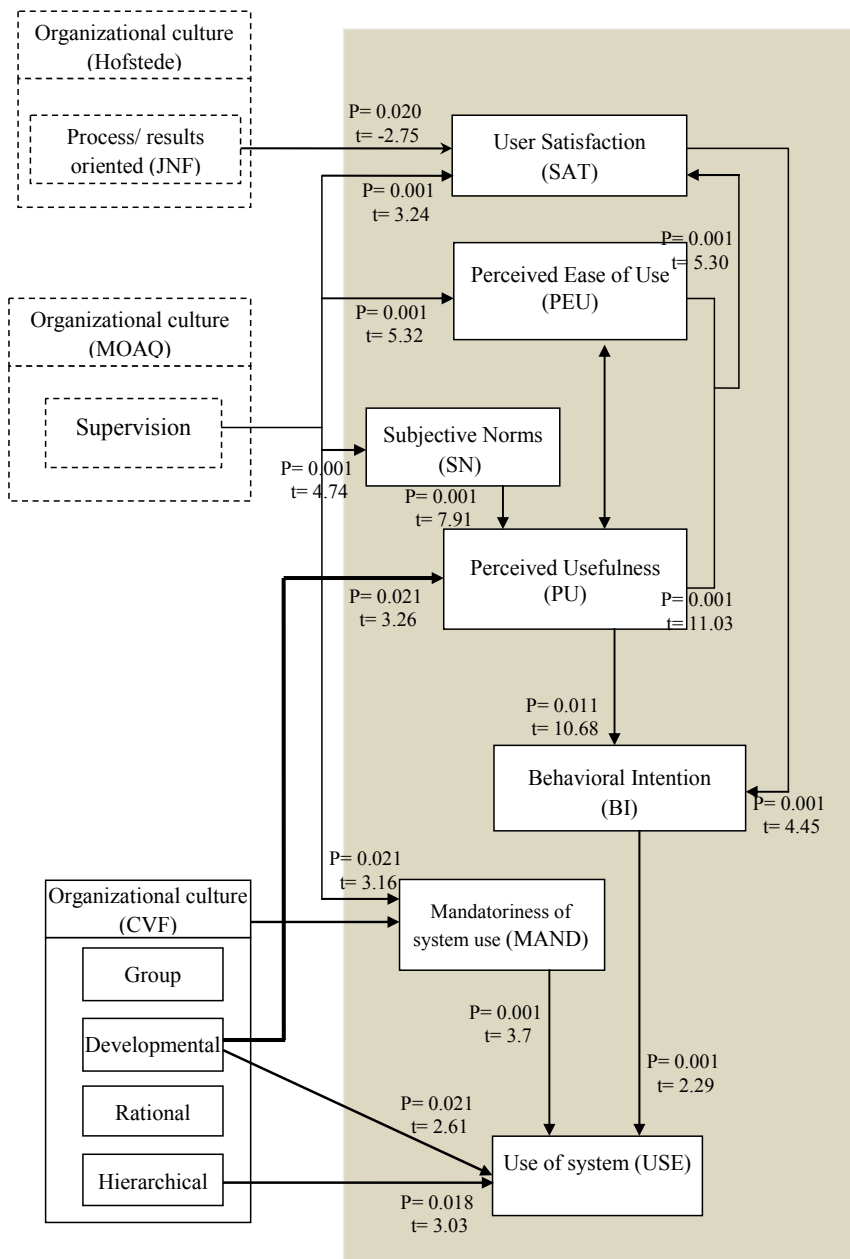| Fit Indices	$\chi^2/$ df	RMSEA	GFI	AGFI	CFI
Indices figures	2.60	0.064	0.95	0.88	0.97
Recommended figures	$3\leq$	$0.08\leq$	$0.8\geq$	$0.8\geq$	$0.9\geq$

Fig. 2. The simplified model of HIS acceptance with organizational culture approach for the hospitals

reciprocal relationship between perceived usefulness (PU) and perceived ease of use (PEU); and the covariance of this relationship was 27.40.

In this model, in particular, the component of developmental culture (with characteristics of emphasizing innovation, entrepreneurship, and flexibility) was identified as the most important factor affecting perceived usefulness (PU) of the system. In addition, 2 components of developmental culture and hierarchical culture (with characteristics of emphasizing bureaucratic directives, rules and regulations, and predictability) were found effective in using (USE) the system. Furthermore, the mentioned model showed that 4 organizational culture components based on CVF including group, developmental, rational, and hierarchical components were among factors affecting the mandatoriness of the system use (MAND). Therefore, based on the path coefficients, the competing values framework (CVF) within the final model of the research can be considered as the strongest factor predicting the acceptance and usage of HIS by users.

On the hand, the supervision factor from organizational culture dimensions based on MOAQ was identified as the second component affecting Hospital Information System acceptance through a relationship with 4 variables including users' satisfaction (SAT), perceived ease of use (PEU), subjective norms (SN), and mandatoriness of the

Table 2. Path coefficients of HIS acceptance model with organizational culture approach in the hospitals under study

Latent variables	Path coefficient	Standard error	t	P	Hypotheses results
MOAQH -PEU	0.090	0.017	5.32	0.001	Supported
POWER - PEU	0.30	1.09	0.27	0.67	-
ROLE - PEU	0.23	1.09	0.21	0.71	-
TASK - PEU	0.32	1.09	0.29	0.65	-
PERSON -PEU	0.18	1.09	0.17	0.52	-
SN - PU	0.51	0.064	7.91	0.001	Supported
MOAQH -PU	0.035	0.026	1.36	0.078	-
POWER - PU	0.087	0.092	0.94	0.22	-
ROLE - PU	0.13	0.10	1.25	0.071	-
TASK - PU	0.12	0.16	0.74	0.24	-
DEVELOPM -PU	0.045	0.014	3.26	0.021	Supported
JBZ - SN	-0.039	0.064	-0.62	0.35	-
MOAQH - SN	0.090	0.019	4.74	0.001	Supported
PEU - SAT	0.55	0.10	5.30	0.001	Supported
PU - SAT	0.72	0.065	11.03	0.001	Supported
JNF - SAT	-0.31	0.11	-2.75	0.020	Supported
JBZ - SAT	-0.095	0.12	-0.76	0.22	-
MOAQH - SAT	0.11	0.035	3.24	0.001	Supported
PU - BI	0.27	0.025	10.68	0.011	Supported
SAT - BI	0.073	0.016	4.45	0.001	Supported
MOAQH - BI	0.020	0.011	1.84	0.001	-
MOAQH - MAND	0.045	0.014	3.16	0.021	Supported
GROUP - MAND	-0.11	0.042	-2.59	0.018	Supported
DEVELOPM -MAND	-0.083	0.041	-2.04	0.021	Supported
RATIONAL - MAND	-0.10	0.042	-2.47	0.019	Supported
HIERARCH -MAND	-0.10	0.041	-2.47	0.012	Supported
DEVELOPM - USE	0.020	0.0077	2.61	0.021	Supported
HIERARCH - USE	0.014	0.0046	3.03	0.018	Supported
BI - USE	0.083	0.036	2.29	0.001	Supported
MAND - USE	0.13	0.035	3.75	0.001	Supported

system use (MAND) in non-teaching hospitals affiliated to Iran University of Medical Sciences.

In addition, there was a negative relationship between process/results-oriented dimension based on the Hofstede organizational culture and the variable of the users' satisfaction (SAT) with the system, which can be considered as the third cultural factor affecting HIS acceptance.

No relationship was found between components of Harrison organizational culture and variables of HIS acceptance in the final model of the current research (Table 2).

Discussion

In the present study, it was found that there are direct or indirect relationships between some components of organizational culture and factors of the acceptance of Hospital Information System (HIS). Thus, it can be generally concluded that based on the results of the investigations and analyses of data and testing the model in the current study, organizational culture can be considered as a factor affecting the acceptance of the system.

In his study, Kang (33) found a relationship between prominent organizational culture and technology acceptance, which is consistent with the results of the current study. In a study conducted by Shin (35), unlike previous studies, the relationship between school culture and use of technology by teachers was not confirmed; this result is inconsistent with the findings of the present study on the impact of organizational culture on the technology acceptance. It seems that the difference observed in these 2 studies is due to different setting and statistical population of the research.

In their study, Keramati, et al. (45) showed that cultural factor (including computer knowledge and travel behavior) including usefulness, adaptability, learnability, and technical quality and factors have the highest impact on Iranian customers' decision regarding the acceptance of electronic payment services. According to the model in the present study, the relationships between organizational culture and variables of the system acceptance were confirmed.

In their study, Hung et al. (46) suggested a framework for decision- making for the selection of an electronic learning system in hospitals. They found that an organizational culture congruent with innovation has a positive impact on a decision about the selection of electronic learning systems; and the results of the study proved the hypothesis. Thus, the result of the above- mentioned study is another proof for supporting the general result of the current study, i.e. the impact of organizational culture on the technology acceptance. A study conducted by Dugan et al. (47) also revealed that organizational cultures have a significant impact on the use of systems for clinical information, improvement and assessment of clinical quality, and clinical reminders, which is consistent with the current study. Handayani, et al., in their studies (48, 49), found that human and organizational factors may affect the acceptance of Hospital Information System more than technological factors.

In a study, Davies (34) aimed at investigating the relationship between organizational culture types and the technology acceptance in higher education, but did not observe any significant relationship between the 2 main variables of organizational culture and the technology

acceptance, which was inconsistent with the findings of the current study. Consistent with the current study, results of studies conducted by Lopez-Nicholas and Merono-Cerdan (30), Silic and Back (31), and Alajlani (32) showed that organizational culture has an impact on the level of the usage and acceptance of an information system.

Given that the literature resulted from the studies conducted on the role of organizational culture based on various models in the technology acceptance, most of these studies have introduced the culture as a ground for technology.

Conclusion

According to the consistency of the current research findings with those of many related studies, it can be inferred that identifying organizational culture factors affect users' willingness to use Hospital Information System, and this point can help managers and decision-makers in the studied hospitals to use the system more comprehensively and successfully. It is hoped that the optimal use of Hospital Information System could have a positive impact on the treatment of patients and decision- making in healthcare domain and could improve hospitals' performance. The research model is applicable for non-teaching hospitals affiliated to Iran University of Medical Sciences and may help improve the organizational culture and acceptance of Hospital Information System. Therefore, there are limitations in using this model, and it can be used merely by organizations similar to those presented in this study in terms of situation, organizational culture, and type of technology.

Acknowledgement

Conflict of Interests

The authors declare that they have no competing interests.

References

1. Ahmadian L, Salehi Nejad S, Khajouei R. Evaluation methods used on health information systems (HISs) in Iran and the effects of HISs on Iranian healthcare: A systematic review. Int J Med Inform 2015;84(6):444-53.
2. Chen RF, Hsiao JL. An investigation on physicians' acceptance of hospital information systems: A case study. Int J Med Inform 2012;81(12):810-20.
3. Wahed MMA. Requirements for establishing an information system to manage issuing building permits. HBRC J. 2015;13(1):83-88.
4. Ebadi Azar F, Kahooei M, Soleimani M, Ghazavi S, Ghods A, Alaei S, et al. The impact of hospital information computerized network on clinical departments curative services personnel (Semnan University of Medical Sciences-Amir Al-Momenin hospital). J Health Adminis. 2008;11(31):7-16.
5. Kimiyafar K, Moradi G, Sadooghi F, Sarbaz M. Views of users towards the quality of hospital information system in training hospitals affiliated to Mashhad University of Medical Sciences-2006. Health Inform Manag. 2008;4(1):43-50.
6. Kahouei M, Soleymani M, Ghazavi S, Aalaei S. Views, behavior and satisfaction of the nurses and other hospital ward personnel about the effectiveness of computer systems of hospital information on caring process. Health Inform Manag. 2007;4(2):193-202.
7. Jebraeily M, Raheimi B, Zareh Z, Dolani A. Advantages and disadvantages of Hospital Information Systems in teaching hospitals of Urmia University of Medical Sciences. J Urmia Nurs Midwif. Faculty 2012;10(3):1-6.
8. Hayavi Haghighi MH, Dehghani M, Hosseni Teshizi S, Asgari B, Reisi M. Attitudes of medical record department staff in hospitals affiliated to Hormozgan University of Medical Sciences about the importance of Hospital Information System and its implementation prerequisites and selection criteria. Health Inform Manag. 2012;9(4):471-478.
9. Ariaei M, Sarafi Nejad A, Kouti J, Mehdipour Z, Bahaadinbeigy K. Role of clinical Decision Supporting Systems in prevention of medical errors from the perspective of health care staff in university hospitals of Kerman University of Medical Sciences, Iran. Health Inform Manag.2012;9(5):712-723.
10. Vafaee A, Vahedian M, Esmaeily H, Kimiafar K. Views of users towards the quality of hospital information system in training hospitals. J Res Health Sci 2010;10(1):47-53.
11. Imani E, Khademi Z, Yusefi P, Bahrami Z, Naghizadeh F. Experiences of nursing managers about hospital information system: a qualitative study. Bi J Hormozgan Uni Med Sci. 2012;16(3):223-32.
12. Ahmadi M, Habibi Koolaee M. Nursing Information Systems in Iran. Hakim Health Sys Res 2010;13(3):185-191.
13. Ahmadian L, Nejad SS, Khajouei R. Evaluation methods used on health information systems (HISs) in Iran and the effects of HISs on Iranian healthcare: A systematic review. Int J Med Inform. 2015;84(6):444-53.
14. Rouzbahani R, Mozaffarian M, Kazempour Dizadji M. The effect of Hospital Information System application on healthcare services promotion at Masih-Daneshvari hospital. Payavard 2012;6(2):128-137.
15. Nematollahi M, Sharifian R, Sakineh S. Evaluating the Hospital Information System at Nemazee hospital, Shiraz, from the users' viewpoints. Magazine of E-learning Distribution In academy (MEDIA) 2012;3(2):2-9.
16. Kahouei M, Babamohamadi H, Sadat Ghazavi Shariat Panahi S. Use of information resources for clinical decisions by nurses and nursing students, and its barriers after introducing information technology. Iranian J Med Edu. 2013;13(3):244-53.
17. Tolabi T, Vanaki Z, Memarian R, Namdari M. Quality of nursing documentations in CCU by hospital information system (HIS). Iranian J Crit Care Nurs.2012;5(2):53-62.
18. Pourasghar F, Malekafzali H, Koch S, Fors U. Factors influencing the quality of medical documentation when a paper-based medical records system is replaced with an electronic medical records system: an Iranian case study. Int J Technol Assess Health Care. 2008;24(4):445-51.
19. Amiri M, Sadeghi E, Khosravi A, Chaman R. Self-assessment of the managers and network operators about the effect of Hospital Information System on the performance and processes of Imam Hossein Hospital in Shahroud. Health Inform Manag. 2011;8(4): 490-499.
20. Ahmadi H, Nilashi M, Ibrahim O. Organizational decision to adopt hospital information system: An empirical investigation in the case of Malaysian public hospitals. Int J Med Inform. 2015;84(3):166-88.
21. Shojaei Baghini M, Naseri Boori Abadi T, Joodaki M, Mollaee S. Progress of hospital information systems in Kerman teaching general hospitals in 2012. J Modern Med Inform Sci. 2015;1(1):42-50.
22. Delavi MR, Ghorbani H, Simakani F. Assessment of Hospital Information System: Ten governmental hospitals under supervision of Isfahan University of Medical Sciences in 2012. Health Inform Manag. 2013;10(1):1-11.
23. Ghazi Saeedi M, Safdari R, Sharifian R, Mohammadzadeh N. Evaluation of Hospital Information Systems (HIS) in general hospitals of Tehran University of Medical Sciences (Perspective of physician and nurses). Payavard 2013;7(5):447-456.
24. Ebadi Fard Azar F, Ansari H, Zohour AR, Marashi SS. Views of users on Hospital Information System in hospitals in Tehran. Payesh 2007;6(1):12-19.
25. Zare Fazlollahi Z, Lotfnezhad Afshar H, Jabraili M, Maleki M. An evaluation of Hospital Information System implementation in Imam Hospital in Urmia. Health Information Management 2011;8(5):731-

737.
26. Twati, Jamal M. The influence of societal culture on the adoption of information systems: The Case of Libya. Communications of the IIMA 2008;8(1):1-7.
27. Chen Q, Chen HM, Kazman R. Investigating antecedents of technology acceptance of initial eCRM users beyond generation X and the role of self-construal. E-Commerce Research 2007;7(3-4):315-39.
28. Yalcinkaya R. Police officers' adoption of information technology: A case study of the Turkish POLNET system [dissertation]. Denton: University of North Texas; 2007.
29. Senarathna I, Warren M, Yeoh W, Salzman S. The influence of organization culture on E-commerce adoption. Industrial Management & Data Systems (IMDS) 2014;114(7):1007-1021.
30. Lopez-Nicolas C, Meroño-Cerdán Á. The impact of organizational culture on the use of ICT for knowledge management. Electronic Markets 2009;19(4):211-9.
31. Silic M, Back A. Organizational culture impact on acceptance and use of unified communications & collaboration technology in organizations. Proceedings of the 26th Bled eConference eInnovations: Challenges and Impacts for Individuals, Organizations and Society; 2013 June 9-13; Bled, Slovenia. AIS Electronic Library (AISeL); 2013.
32. Alajlani M, Clarke M. Effect of culture on acceptance of telemedicine in Middle Eastern countries: case study of Jordan and Syria. Telemed J E Health 2013;19(4):305-11.
33. Kang, H, Critical success factors in implementing process-oriented knowledge management systems (PKMS) in the public sector in Korea [Thesis] Ames: Iowa State Univ.; 2011.
34. Davies LB. An exploration of the relationship between organizational culture types and technology acceptance in higher education [Dissertation]. Miami: St. Thomas Univ.; 2010.
35. Shin WS. Individual and organizational factors influencing Korean teachers' use of technology [Dissertation]. Manhattan: Columbia Univ.; 2010.
36. Livari J., Huisman M. The relationship between organizational culture & the deployment of systems development methodologies. MIS Quarterly 2007;31(1):35-58.
37. Merchant S. Exploring the influence of cultural values on the acceptance of Information Technology: An application of the Technology Acceptance Model. Informing Science & Information Technology (IISIT) 2007; 4:431-443.
38. Kowalczyk NK. The impact of voluntariness, gender, and age on subjective norm and intention to use digital imaging technology in a healthcare environment: Testing a theoretical model [Dissertation]. Columbus: The Ohio State Univ.; 2008.
39. Yarbrough AK, Smith TB. Technology acceptance among physicians: A new take on TAM. Med. Care Res. Rev 2007;64(6),650-672.
40. Ciganek AP, Mao E, Srite M. Organizational culture for Knowledge Management Systems: a study of corporate users. International Journal of Knowledge Management (IJKM) 2008;4(1):1-15.
41. An Y, Kang J. Relationship between organizational culture and workplace bullying among Korean nurses. Asian Nurs Res 2016, 10(3): 234–239.
42. Taştan SB, Türker MV. A Study of the relationship between organizational culture and job involvement: The moderating role of psychological conditions of meaningfulness and safety. Procedia Soc Behav Sci 2014;149:943-947.
43. Mabry SE. Adopting a service-oriented architecture (SOA) strategy: The forces of organizational culture and the moderating role of senior managers [Dissertation]. Minneapolis: Capella Univ.; 2008.
44. Bowling NA, Hammond GD. A meta-analytic examination of the construct validity of the Michigan organizational assessment questionnaire job satisfaction subscale. J Vocat Behav 2008;73(1):63-77.
45. Keramati A, Hadjiha B, Taeb R, Mojir N. Adoption of electronic payment services by Iranian customers. In: Eid R, editor. Successful Customer Relationship Management Programs and Technologies: Issues and Trends. Pennsylvania: IGI Global; 2012. pp. 268- 285.
46. Hung SY, Chen CC, Lee WJ. Moving hospitals toward e-learning adoption: an empirical investigation. Journal of Organizational Change Management 2009;22(3):239-256.
47. Dugan DP, Mick SS, Scholle SH, Steidle EF, Goldberg DG. The relationship between organizational culture and practice systems in primary care. J Ambul Care Manage 2011;34(1):47-56.
48. Handayani PW, Hidayanto AN, Pinem AA, Sandhyaduhita PI, Budi I. Hospital information system user acceptance factors: User group perspectives. Inform Health Soc Care 2017;31:84-107.
49. Handayani PW, Hidayanto AN, Pinem AA, Hapsari IC, Sandhyaduhita PI, Budi I. Acceptance model of a Hospital Information System. Int J Med Inform 2017;99:11-28.