

doi: 10.5455/aim.2014.22.325-328

ACTA INFORM MED. 2014 OCT 22(5): 325-328

Received: 21 July 2014 • Accepted: 22 September 2014

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Published online: 29/10/2014

Published print: 10/2014

ORIGINAL PAPER

Organizational Factors that Affect the Implementation of Information Technology: Perspectives of Middle Managers in Iran

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ABSTRACT

Objective: to examine the organizational factors affecting the application of information technology in hospitals. Since the organizational factors are one of the most important determinants of successful projects, by understanding their impact and identifying them it can help planning a systematic IT implementation.

Methods: In this cross-sectional descriptive study 110 middle managers were chosen from teaching hospitals. Structured questionnaire was used for the data collection. **Results:** There was a significant relationship between organization resource, organizational knowledge, process, management structure and values and goals with implementation of information technology. **Conclusion:** Findings showed that organizational factors had a considerable impact on implementation of information technology. Top managers must consider the important aspects of effective organizational factors.

Key words: Organizational factors, Information technology, Managers, Implementation.

1. INTRODUCTION

Nowadays, organizations perform in an environment which the economy, politics and society constantly change. With such aggressive perspective, organizations should be adaptable in order to maintain the competitive market conditions, increase productivity and re-configure due to changing workforce, the global business environment and e-commerce development. Studies indicate that one of the most important reasons that differentiated organizations from each other is the degree of information technology application in their organizational activities (1). Accordingly, the organizations that use widespread and optimized information technology have sustainable competitive advantages, and in the view of stakeholders are more distinguished than the other organizations. Based on a research conducted between 100 companies between 1980 and 1995 the average cost to implement the changes has been estimated to be a million dollars (2). Since after 1980, almost %50 of the investments within the organizations are spent on development and deployment of information technology (3). It is believed that IT can increase the capabilities of organizations (4). Furthermore, Health system is not excluded from these changes, and many countries utilize Information Technology in order to enhance the health level and to improve the outcomes. Research shows that application of information technology in different countries brings various benefits to the health systems such as improving service delivery, reduction of medical errors, it supports the healthcare personnel in inpatient and outpatient units, enhances the effectiveness of healthcare (by reduction of waiting times for the patients and improving patient care)(5-6).

Successful implementation and use of IT in health care systems and any other system is influenced by various factors like economic, political, social, cultural, etc. Identifying the factors resulting in increased use of information technology leads to enhanced accuracy and it accelerates the application of this technology (7). Attention to organizational factors is one factor in the application of information technology that plays an important role in health systems. Nowadays organizations live in an active and dynamic environment which is influenced by internal and external factors of the organization. Some external factors affecting the performance of organizations include economic, political, social, cultural, etc (8). Implementation of Information Technology in Health Care systems often requires changes in work duties and processes either simultaneously or before application of the new technology (9). However, studies show that almost %70 of IT implementation projects failed. Mostly(3), failure to utilize and incompatibility with the needs of IT users were the reasons that IT projects failed (10). The present study sought to examine the organizational factors affecting the application of information technology in hospitals. Since the organizational factors are one of the most important determinants of successful projects, by understanding their impact and identifying them it can help planning a systematic IT implementation.

2. METHODS

This descriptive-analytic study is a cross-sectional kind and it is done in the second half of 2012. The study population included middle managers of the teaching hospitals of

Tehran University of Medical Sciences (hospital administrator, nursing services director, staffing and recruiting office, finance, medical records, laboratory and pathology, radiology and pharmacy). Total statistical population was 110 middle managers that 89 people answered to the questionnaire. The data collection was done by a questionnaire that its validity was confirmed by the experts and its reliability was examined by Cronbach's alpha coefficient of 20 samples that were selected randomly from the population. The questionnaire included an introduction at the beginning in order to show the goals of the research. The first section of the questionnaire was about demographic information of the population like age, sex, name of hospital, length of occupation, educational degree and organizational position. The second part consists of nine questions related to computer use. In the third part there are questions related to organizational factors and is composed of 5 parts: the first section includes organizational resources. The second section is regarding the organizational knowledge. The third section is about organizational processes. The fourth one is about managerial structure and the last section is about values and goal of the organization. The scores given to the responses are according to a five-option Likert-type ranking number one as "totally disagree" to number five as "totally agree". Overall, the degree of importance for each item was made and calculated. In order to determine a relationship between each of the variables with information technology the test of Pearson's correlation coefficient, independent T and analysis of one-way Variance was used and then multiple regressions was used to study all factors' effect on information technology usage. Also the data were analyzed using SPSS 16 software. At the beginning of the research the ethical consideration authorization was obtained from the Deputy office of research in the university. Afterwards, the goal of the research was explained and people were assured that their information stays confidential and it is only for the sake of doing the research.

3. RESULTS

From 110 questionnaires distributed, 89 questionnaires were returned that %37.1 was woman and %62.9 was men. The average age of the people participating in the study was 42±15.6 years old. %56.2 of the participants had a bachelor's degree, %12.4 had master's degree, %6.7 had a PhD and %24.7 was physicians. The average length of their occupation was 15±5.91 and more than %83 of them had more than 5 years working record. %82 of the participants used computer several times a day.

As shown in Table 1 there is a meaningful difference regarding the sex of the participants in case of average usage of computer ($t = -2.815, p < 0.05$) average scores gained from the usage of computer by men (33.58) and women (37.45) indicates this difference. Nevertheless, Variance analysis test shows that between the age of the participants with usage of computer ($F = 0.718$, and education with usage of computer ($F = 1.613$, there is no meaningful difference.

In table 2 the results of Pearson correlation test is provided about the relationship of resources of the organizations, organizational knowledge, processes, managerial structure, values and goals with use of computer. It can be seen that between each of these variables and use of computer there is a mean-

Variable	Group	Number	Average use of computer	Test result
Sex	Man	56 (%62.9)	33.58	P $t = -2.815$ df=1
	Woman	33 (%37.1)	37.45	
Age	<30 years old	3 (%3.4)	39.66	P $F = 0.978$ df=2
	31- 40 years old	35 (%39.3)	35.20	
	>40 years old	50 (%59.3)	34.45	
Education	Bachelor	50 (%56.2)	35.90	P $F = 1.613$ df=3
	Master	11 (%12.4)	33.63	
	PhD	6 (%6.7)	37.5	
	Physician	22 (24.7)	32.90	

Table 1. Middle managers use of computer according to age, sex and education

Variables	Abundance	Correlation Coefficient	P-Value
resources of the organizations	89	0.297	$p < 0.01$
organizational knowledge	89	0.297	$p < 0.01$
processes	89	0.409	$p < 0.01$
managerial structure	89	0.789	$p < 0.01$
values and goals	89	0.246	$p < 0.05$

Table 2. Correlation coefficient of middle managers' attitude toward each of the variables

Name of the Variables	B	Std.B	β	T	P-Value
Intercept	3.523	1.661	-	2.121	$p < 0.05$
Managerial structure	0.707	0.061	0.760	11.621	$p < 0.001$
The organizations' resources	0.141	0.060	0.153	2.334	$p < 0.05$

Table 3. Linear Regression for mass observation of the organizational factors associated with Information technology application

ingful relationship: resources of the organizations ($p < 0.01, r = 0.297$), organizational knowledge ($p < 0.01, r = 0.297$), processes ($p < 0.01, r = 0.409$), managerial structure ($p < 0.01, r = 0.789$), values and goals ($p < 0.05, r = 0.246$).

In table 3 Linear Regression was used for mass observation of the organizational factors about Information technology application. The results of the regression test showed a meaningful relationship between managerial structure and attitude ($p < 0.001, \beta = 0.760$), resources of the organizations and attitude ($p < 0.05, \beta = 0.153$); in this regression model the affect of the variables decreased and the only variables remained are managerial structure and the resources of the organization.

4. DISCUSSION

Information Technology application in health systems is associated with a variety of factors. Identifying these factors will result in faster implementation of the technology since they play a significant role in information technology application in health systems. Some factors to name are economic, social and cultural factors. Our goal in this study is to find

and review the organizational factors affecting the information technology implementation in the teaching hospitals of Tehran University of Medical Sciences.

This research shows that there is a significant and meaningful relationship between the sexes of users and using computer systems; thus, female middle manager show more utilization of the computer systems than male managers and this finding is consistent with the finding of Al-Gahtani, 2004 and Meade, et al., 2009 (11-12). In this research between the age and the education level of the participants with computer usage system did not show any meaningful relationship (13-14), while in the studies of Marchewka and Al-Gahtani it showed a significant relationship (11, 15).

In a Level of %95 between organizational resources and IT implementation there is a significant relationship which showed a correlation intensity of $r=0.297$. Regarding the relationship between these two variables it can be said that due to some facts like accessible financial and human resources, enough budget for the application of new technologies, strategic planning of the organizations' resources that can lead the managers to realize the mission and targets of the organizational resources, the attitude of the users might be influenced and it is concluded that the more available resources is provided for the users, the more tendency they show in application of Information technology (16-17).

The above theory is confirmed due to a significant relationship between the users' attitude toward IT application and organizational knowledge with a level of %99 and a correlation coefficient of ($r=0.297$). Therefore, it can be inferred however the organizational knowledge is not in a technology oriented category, information technology application is a necessity for knowledge management projects to succeed. Hence some organizations seek knowledge management systems for executing their organizational knowledge management projects. In this way they might become confused because of lack of deep and correct understanding of capabilities and abilities of the organizations and susceptible areas for knowledge technology products. Considering the main three factors of knowledge management (individuals, contents, processes) an organization should identify the proper technology for itself. Accordingly, the tools for knowledge management should be determined based on the needs of the organization. Thus, it can be generally stated that when organizational knowledge in an organizations is used properly, people tend to use more of information technology because it facilitates the access and management of this knowledge. These findings are in agreement with previous researches like Armenakis & Bernerth in 2007 and Bartunek & Rousseau in 2006 (18-19).

The relationship between processes and the attitude toward application of information technology is confirmed with a level of %99 and a correlation coefficient of ($r=0.409$) that approves the above theory. Therefore, it can be concluded that in organizations in which processes are shorter and easier beside shorter organizational communication and fewer organizational levels, they show more flexibility in case of facing with environmental and technological changes. In other words, staff in organizations with horizontal structure can communicate with managers easier and they participate in decision makings more effectively. So, organizations with the least division of responsibilities and informal processes have

an organic structure in which people tend to use information technology more (2). This finding is also in consistent with Armenakis Schraeder & Tsiknakis & Kouroubali, 2009 and Yu li H, P, 2009 (18, 20).

Between managerial structure and attitude toward using IT there is a correlation of ($r=0.789$) with a level of 99%. However management is similar to leadership, on the whole in any organization they have similar strategies and they can be different in some specifications. It is clear that although all managers cope with leading a small or large group for reaching determined goals, this trend can be performed through various methods which each of them counts as a specific kind of management style (21). Results indicate that the managerial structure and leadership method that top managers practice can greatly effective in the level of using IT as one of high technologies of nowadays (22). In turn, the results of this study is compatible with the previous studies of Marchewka Liu 2007 and Jimmieson 2008 (15, 23).

The relationship between values and goals and the attitude toward application of information technology is confirmed with a level of %95 and a correlation coefficient of ($r=0.246$) in this regard, it can be stated that goals and strategies are as the main framework of planning. Any plan requires a goal which explains the philosophy of existence and it also elaborates the needs, the objectives and the final results in order to support the subordinate goals of the organization (24). In fact, the goals create a kind of network or a hierarchy system. In addition, just like the need to know the tradition for a better understanding of organizational behavior, noting the values would be another aspect that can affect people's behavior in the organizations. Values have great influence on career decision makings, directions, behaviors, relationships and the attitudes of the staffs (25). According to the findings in this research, when implementation and application of information technology becomes a priority in the organizations' goals, there should be a strategy and it also ought to be valued in order to be relatively effective in application of information technology. This is in accordance with Simpson & Dansereau, 2007 (26).

Among the variables included in the equation, managerial structure ($\beta=0.760$) and then human resources ($\beta=0.153$) have the strongest affect on information technology application, so it is concluded that senior managers should focus more attention to these variables since they are the main important variables.

5. CONCLUSION

In order to improve the measures to successful implementation of information technology in health systems, identification of effective and various factors such as social factors, humanitarian factors, organizational culture, simplification of occupational relationships, enhancing the communication and reduction of bureaucracy, designing a strategic plan for implementation of information technology in the organization for its correct application is of a great importance.

CONFLICT OF INTEREST: NONE DECLARED.

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