The Relationship between the Use of Information Technology and the Structural Aspects of the Bushehr Municipality

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Abstract
The purpose of this study was to investigate the relation between the application of information technology with the structural aspects including organizational formalization, centralization in management decisions, professionalism and organizational height in Municipality Bushehr. The study was descriptive and correlational. The study population consists of all managers and workers of municipal departments in Bushehr that is somehow associated with IT systems that are over 157 persons. In the study sample size is equal to statistically population. In other words, the census method was used and 124 questionnaires were collected and processed for statistical analysis. Instrument used in this study was a questionnaire that is designed in two parts. A questionnaire is designed by researcher to collect information about the current status of implementation of IT systems in the study and B Questionnaire was used to assess the aspects of structural organization and the Robbins standard questionnaire of organizational structure is used here. Data analysis was performed in the both level of descriptive and illative and the findings showed that there is a significant relationship between information technology systems application and organizational formalization and professionalism. Also there is a significant inverse relationship between information technology systems application and centralization in management decisions, professionalism and organizational height.

Keywords: Organizational Height, Complexity, Centralization, Professionalism, Formalization, Organizational Structure, Information Technology System.

Introduction
In an age of increasing speed of revolution that complexity have crept in all areas of life and business practices and in an era where ICT leads to the emergence of new models of business and social interactions, organizations face with serious challenges. Organizations as social institutions affected by the changes and the increasing complexity of their systems and interactions and for adaptation or leadership in times of revolution need planning and revising. Organizations to survive in today’s competitive conditions have no choice but to use advanced information and communication technologies and it can be said that the organization without the use of information and communications technology systems cannot be visualized.

Organizations to use the technology must provide the necessary infrastructure and try to reengineer their organizational structure to adapt their structure to information technology systems. This process should be continued due to changes in information and communication technology is a continuous process. Nowadays organizations to stay ahead in the competitive world from their competitiveivity to use and benefit from advanced information technology systems because the use of information technology systems within the organization while maintaining a competitive advantage for the organization’s cause effectiveness and efficiency of an organization. On the other hand, the lack of understanding of the technology and failure to take advantages from them will endanger the organization seriously. Organizations with this new information and communication technologies will have some changes in their structure of the organization. Until the arrival of the information
age, structure of most organizations was inflexible, bureaucratic, hierarchical, and vertical. However, with the introduction of information technology as a change agent, organizational structure is changed as a flexible, flat, organic and virtual structure and new forms of organization such as network organization, cellular organization, infra-bureaucratic organization, the spider's web organization, boundary less organization, knowledge-based organization and a virtual organization appeared. Modern human society is a social network focused on high-tech communication and information systems. Information technology has changed the nature of management and organizations of communities. For the use of information technology, the new organizational structure should be modified to developed information technology systems so that members of the organization could have the best use from information technology. The use of information technology makes the organizational boundaries pale, all functions of the organizational design of information technology are based on information networks and employees do their work at home and do not need to be physically present at work. Employees become knowledge-oriented workers who are constantly learning and creativity and innovation learning will become their main task. The work is done online and organizational management will be in direct communication with customers. Decision making process become decentralized and the decision will be done with more quality, the number of managerial levels will reduce and the manager authority will increase.

Since the adoption of information technology in the organization will change the organizational structure, managers must, in addition of understanding the types of information systems and technology become more aware of information technology effects on organizational structure before the use of them in their organization. Therefore, this study try to investigate the effect of using the information technology in organizations with various aspects of the organizational structure.

**Literature Review**

The relationship between IT systems and structural aspects investigation has been done in the past that some of them are: Fatemi Nasab (2007) that analyzes the relationships between the structural dimensions of organizations and information technology systems of Railways Company in Iran. The findings showed that using IT systems increase formalization and reduce centralization in decision making and professional employment and organizational height but had no effect on the scope of the managers monitoring.

Nekoeimoghadam (2008) examined the relationship between the organizational structures of management information systems in public offices city of Kerman. Results indicated that the establishment of a management information system in public offices increased the centralization of decision-making in management levels, reduce organizational formalization and increase complexity and decrease the vertical organizational hierarchy. Findings of Esmaeilpour (2005) showed that if senior management has a supporting role to the IT / IS and his leadership style were partnership type, we can say with 95% confidence using IT / IS reduced concentration and increase coherence in the organizational structure. However, a significant relationship were not observed between the use of IT / IS and formalization and complexity. Also, it can be said with 95% confidence that if senior management has a supporting role to the IT / IS and his leadership style is the type of participative implementation of IT / IS in place cause work independence to the physical structure of organization and physical structure inclined towards virtual organization.

Saadatmandi (2004) also concluded that the use of Information Technology in National Iranian Steel Company have significant relationship with the organizational structure. Pfeffer & Leblebici (1977) in their study regarded the relationship between information technology structure and organizational structure, in their study, 38 industrial companies were studied and data were...
collected by questionnaire. They assumed that information technology have relationship with the lack of centralization, formalization, and more segregation within organizations and suggested that IT increase the management's ability to manage the complexity of organization. Overall, they stated that the evidence showed that information technology significantly affect the organization's structure.

**Information Technology**

The latest information technology definition that a large number of scholars such as Andolsen (1999), Campbell (1999), Edwards (1999), Grahm (1999), Schober (1999), and Wildstrom (1999) have agreed on it is explained. Information technology involves a wide range of innovations and media communications and information systems that connect people to each other, including voice mail, electronic mail, audio conferencing, video conferencing, Internet, software and internet sharing, car phones, fax machines, Personal Digital assistants and etc. Information systems and information technologies are often interwoven and are used together with the name of ICTs (Dewett & Jones, 2001).

**Effects of information technology on the organization**

Organizational hierarchy: the application of information technology and information systems lead to facilitation the control and supervision of the organization and in this way the scope of supervision by managers can be extended so that the number of mid-level managers and experts will reduce by expanding the scope of surveillance and information technology through the reengineering process will reduce the time taken to complete the task and number of human resources and it ultimately will reduce staffing levels, while extending the scope of supervisory director through the use of automated systems, the performance of managers and organizations will dramatically improve and this eventually leads to flattening of the organization (Sarafi-Zadeh, 2004).

Changes in supervision: performing tasks as automated and their result storage possibility in system and the following the process of doing things will make supervisors enable to effectively carry out their monitoring duties. Remote job growth encounter past stewardship practices with challenges and in new institutional mechanisms methods, surveillance from a physical interactions through direct supervision and guidance of the people have converted to virtually unnoticeable and electronically supervision.

Power shift: the use of information technology leads to increase knowledge and awareness of employees and enrich the job content. Knowledge of employees lead to their mastery in their organization and eventually when technology becomes dominant in organizations, employees will find more power.

Job content: the content of the job determines conflict and challenges of person or the organization and the responsibility. Job content has significant impact on job satisfaction, the job performance, the individual position in the organization and his performance. Information technology through re-engineering affect job contents and repetitive and boring tasks will be assigned to machine and eliminate person from the process and also will cause new tasks creation that require knowledge and familiarity with computer technology.

Operational impacts: Perhaps the first and most tangible impact of technology can be seen in operational tasks. Design automation systems in operations systems such as payroll processing, inventory, accounting, sales, deployment automation leads to the operational process facilitation, operating processes reduction, labor time and cost reduction that the most important influences is the number of human resources reduction and increase the efficiency and productivity of the organization.
Impact on jobs and the role of organization: information technology facilitates the roles and responsibilities of managers. Access to information needed for decision-making, control and supervision of the organization and processes, the ability to analyze situations and analyze decisions in business planning and simulation can be dramatically impact of the availability of information technology in organizations. The response and decision-making time reduction and delegating power to the lower levels of the organization give this opportunity to managers to isolate from repetitive and daily tasks and more focus to their entrepreneurs and design role. Communication and coordination facilitation within and outside the organization is the significant impact of information technology.

**Organizational structure**

Organizational structure is the manner by which the activities of the organizations are divided and coordinated. Organizations create structures to synchronize work activities and control the acts of members. Organizational structure is shown in the chart. Organizational structure chart is a visible appearance from all activities of the organization.

**Organizational aspects**

According to the provided definitions, the identification of the constituents of organizations must determine. Organizational aspects can be classified into two groups:

A) Organizational aspects is the expression of characteristics within an organization that provide the basis by which we can compare organizations with each other that we explain some of them here:

1. **Formalization**

   It refers to the extent that the business or organization is standardized. If a job has the high recognition rate, his operator has the least freedom to carry out activities related to the job and to decide what must be done and how it should be done (Robbins, 1983).

   Formalization refers to the extent that the organization is stressed on the roles and processes to predict the behavior of the staff. In other words, Formalization reflects the extent in which expectations are clear and written. A formal organizational structure is a structure in which roles and processes are in a manner that identifies for each person what to do. Such an organization has written standard operating procedures, with clearly marked guidelines and systems (Gibson et al., 1976).

2. **Complexity**

   Complexity can be imagined reaction to the complexity of the environment or be the result of a core breakdown.

   Complexity refers to the separation in both vertical and horizontal segregation. Of course, size is a major factor in the complexity of the organization, so that the larger organization will become more complex, however, two of the same size organizations would not necessarily have the same complexity (Hatch, 2012).

3. **Centralization**

   Centralization is decision-making authority within an organization. As more decisions are taken based on the hierarchy of authority, a single unit of organization or comes into focus. Usually a decentralized unit means that the privileges of decision-making are replaced to the several centers. Corporate managers and their staffs are benefiting from this site. (Hall, 1977).

4. **Specialization**

   Specialization of an organization means that how the organization has separated its work and activities professionally. If the organization is highly specialized, each worker only does a limited range of tasks. If the specialization is low, each employee performs several tasks. Specialization is sometimes called job division (Daft, 2006).
5. **Professionalism**

Professionalism is referred to the level of formal education and training of staff. If in an organization, staff have trained more to get a job in the long term, the organization will be recognized very professionally. To determine the level of professionalism, the average years of education of the staff is calculated. (Daft, 2006).

B) Content aspects: representing the total organization, they are representing the position of structural and influence on structural aspects.

**Hypotheses**

1. There is a significant relationship between the use of IT systems and formalization in organization.
2. There is a significant relationship between the use of IT systems and centralization in management decision making.
3. There is a significant relationship between the use of IT systems and professionalism in employees.
4. There is a significant relationship between the use of IT systems and organizational height.
5. There is a significant relationship between the use of IT systems and structural aspects.

**Methodology**

Because this study does not interfere in position and the situation of the variables and just describe the current state, its type is a descriptive study, and since, it explores the relationship between two variables, i.e., structural organization aspect and information technology is the correlation type. Therefore, this study was a descriptive and correlational research.

**Statistical Population**

According to information received from the job department of Bushehr Municipality, 847 people are employed there, among these people, 690 people are workers that are not related to information technology systems. So the study population included all Bushehr municipal administration personnel such as managers and staffs that somehow use IT systems that are about 157 people.

**Statistical Sample**

In the study sample size is equal to statistically population. In other words, the census method were used. Instrument used in this study was a questionnaire that is designed in two parts. The questionnaires were delivered to 157 employees and managers in organizations that are somehow associated with IT. And 124 questionnaires were collected and processed for statistical analysis.

**Tools for Data Collection**

In this study, a questionnaire is used to collect, measure, and record the features that have been answered by participants. In this study, the questionnaire was designed in two parts. A questionnaire to collect information on the current status of implementation of IT systems in the study that consisted of eleven questions as the questionnaire of the application of IT systems.

**Table 1: Distribution of questions related to the variables**

<table>
<thead>
<tr>
<th>Research Variables</th>
<th>The number of questions</th>
<th>No. of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formalization</td>
<td>6</td>
<td>2,3,4,5,6</td>
</tr>
<tr>
<td>Centralization</td>
<td>10</td>
<td>7,11,12,13,14,15,16,8,9</td>
</tr>
<tr>
<td>Professionalism</td>
<td>3</td>
<td>17,18,19</td>
</tr>
<tr>
<td>Organizational height</td>
<td>2</td>
<td>20,21</td>
</tr>
</tbody>
</table>
The questionnaire was developed by researcher after extensive study of reliable and valid resources. Questionnaire was used to assess the aspects of structural organization that Robbins questionnaire is used in it (Robbins, 2008) and consists of 21 items and the Likert scale questionnaire was used to scale responses. Distribution of questions related to the variables listed in Table 1.

**Validity and Reliability of the Study Tools**

To test the validity of the questionnaire, it delivered to 5 professionals and academic researchers and they were asked to consider the questions and specify the questions validity to measure variables using the five options of perfectly adequate, adequate, fair, poor and very poor. After delivery of questionnaires, they were investigated using statistical techniques and the validity of the questionnaire was confirmed by experts and academic researchers. Reliability was measured using Cranach’s alpha that the results are as follows. Whatever the percentage obtained is close to 100% indicate more reliable questionnaire. As can be seen in table, Cranach’s alpha values for all parts of the questionnaire are greater than 0.75 which demonstrates the validity of the questionnaire.

### Table 2: The reliability of research variables

<table>
<thead>
<tr>
<th>research variables</th>
<th>The number of questions</th>
<th>Cranach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment of IT systems</td>
<td>11</td>
<td>0.755</td>
</tr>
<tr>
<td>Formalization</td>
<td>6</td>
<td>0.781</td>
</tr>
<tr>
<td>Centralization</td>
<td>10</td>
<td>0.867</td>
</tr>
<tr>
<td>Professionalism</td>
<td>3</td>
<td>0.842</td>
</tr>
<tr>
<td>Organizational height</td>
<td>2</td>
<td>0.806</td>
</tr>
</tbody>
</table>

**Research Findings**

The data from the questionnaires were analyzed by SPSS software. The first hypothesis assumes that there is a significant relationship between the use of IT systems and formalization in organization. For this purpose, Kendall's tau-b correlation coefficient, Kendall's tau-c and Gamma were used.

### Table 3. The first hypothesis test

<table>
<thead>
<tr>
<th>value</th>
<th>Asymp. Std. Error(a)</th>
<th>Approx. T(b)</th>
<th>Significance level Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal by Ordinal</td>
<td>Kendall's tau-b</td>
<td>0.268</td>
<td>0.080</td>
</tr>
<tr>
<td></td>
<td>Kendall's tau-c</td>
<td>0.187</td>
<td>0.959</td>
</tr>
<tr>
<td></td>
<td>Gamma</td>
<td>0.537</td>
<td>0.131</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>124</td>
<td></td>
</tr>
</tbody>
</table>

Because the significance level of each test is sig = 0.002 and the criteria for confirming the hypothesis is sig ≤ 0.05, so the hypothesis H1, which indicate the relationship between two variables, i.e. information technology and organizational formalization is approved in 95 percentage confidence. The H0 is not approved, and then we can say that communication and consensus is not achieved by accident. The values obtained in p value column that reflects the type of relationship between two variables is positive that reflects the direct relationship between the use of IT systems and the formalization of the organization. So we can say that better equip organizations with information technology systems facilitate the setting agendas, provide more detailed employment laws and regulations by biter records seeking information extraction and retrieval of very large volumes in very little time. As a result the formalization of the organization will increases.
The second hypothesis assumes that there is a significant relationship between the use of IT systems management and centralization in decision making. To test this hypothesis, Kendall's tau-b correlation coefficient, Kendall's tau-c and Gamma is used. The results of this test are given in Table 4.

**Table 4. The second hypothesis test**

<table>
<thead>
<tr>
<th>value</th>
<th>Asymp. Std. Error(a)</th>
<th>Approx. T(b)</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal by Kendall's tau-b</td>
<td>-0.215</td>
<td>0.088</td>
<td>-2.413</td>
</tr>
<tr>
<td>Ordinal Kendall's tau-c</td>
<td>-0.157</td>
<td>0.065</td>
<td>-2.413</td>
</tr>
<tr>
<td>Kendall's tau-c</td>
<td>-0.412</td>
<td>0.160</td>
<td>-2.413</td>
</tr>
</tbody>
</table>

The obtained results show that by utilizing information technology systems, information is distributed throughout the organization with greater speed and the possibility of processing a huge volume of information provided for decision-makers. As a result, organizations can empower lower-level employees and managers reduce their focus on decision-making to and the delegate it to the lower levels employees and it eventually will lead to the decentralization of management decisions.

The third hypothesis assumes that there is a significant relationship between the use of IT systems and professionalism in employees. The results of this test are shown in Table 5.

**Table 5. The third hypothesis test**

<table>
<thead>
<tr>
<th>value</th>
<th>Asymp. Std. Error(a)</th>
<th>Approx. T(b)</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal by Kendall’s tau-b</td>
<td>0.445</td>
<td>0.079</td>
<td>5.177</td>
</tr>
<tr>
<td>Ordinal Kendall’s tau-c</td>
<td>0.328</td>
<td>0.063</td>
<td>5.177</td>
</tr>
<tr>
<td>Kendall’s tau-c</td>
<td>0.731</td>
<td>0.098</td>
<td>5.177</td>
</tr>
</tbody>
</table>

Findings show it can be said that with the increasing use of IT systems in organizations because the job contents and the nature of the data is changed, the need for highly skilled professionally workers has grown and through staff training and rehabilitation of old skills and professional skills and replacing unskilled workers with skilled ones, the organization will go toward careerism.

The fourth hypothesis assumes that there is a significant relationship between the use of IT systems and organizational height. The results of this test are shown in Table 6.

**Table 6. The fourth hypothesis test**

<table>
<thead>
<tr>
<th>value</th>
<th>Asymp. Std. Error(a)</th>
<th>Approx. T(b)</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal by Kendall’s tau-b</td>
<td>-0.119</td>
<td>0.082</td>
<td>-1.441</td>
</tr>
<tr>
<td>Ordinal Kendall’s tau-c</td>
<td>-0.091</td>
<td>0.063</td>
<td>-1.441</td>
</tr>
<tr>
<td>Kendall’s tau-c</td>
<td>-0.236</td>
<td>0.161</td>
<td>-1.441</td>
</tr>
</tbody>
</table>

Values obtained in p value column reflect the type of relationship between two variables. Its negative sign indicated an inverse relationship between the use of IT systems and organizations.
height, so we can say, with the increasing use of IT systems in the organization because of effective coordination and control of these systems, the control of organizations will be fascinated, and managers need for control will reduce, as a result by reducing middle management staff, thereby the organization will become flatter and the hierarchy height will reduce.

The fifth hypothesis assumes that there is a significant relationship between the use of IT systems and structural aspects. The results of this test are shown in the table below.

<table>
<thead>
<tr>
<th>Table 7. The fifth hypothesis test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal byOrdinal</td>
</tr>
<tr>
<td>Kendall's tau-c</td>
</tr>
<tr>
<td>Gamma</td>
</tr>
<tr>
<td>0.422</td>
</tr>
<tr>
<td>N of Valid Cases</td>
</tr>
</tbody>
</table>

Findings showed that it can be said because the increasing use of IT systems in the organization, all four aspects of organizational structure and the structure of the organization have changed, so that IT increased the organizational formalization (formal organization), and professional employees (career-oriented) and decreased the conceptualization (non-centralized) and institutional height (flat and horizontal organization) of organization and in Overall, organizational structure has changed.

**Discussion and Conclusions**

Information technology systems make mass storage and retrieval capabilities and distribution in network across the organization easier and by reducing search time and interruptions in work flow and the negative effects of formalization makes it possible to create huge volume of official documents, such as agendas, detailed job descriptions of laws and regulations to significantly increase access to information and documents in the small time and finally it help managers in the implementation of laws and regulations. As a result, organizations can facilitate and enhance the formalization rate. Also because information technology reduces oral communications systems, the level of official written communication increase that will lead to the organization become more formalized. Information technology systems provided the use of the same information to all levels of the organization and increase participation in information access and processing large volumes of created information. It also provides faster feedback on the operation of the organization and leads delegation to mid-level employees of the organization. As a result, this has led to the decentralization of the organization.

With the advent of information technology systems to work with these systems and maintain them, trained and professional staff will be needed. Because information technology systems continuously changes in the content and methodology of doing business, the skills must continuously rebuild the old and replace with new skills. Therefore, with the increasing use of IT systems in organization, the professional organization increase. Because these systems directly connect to senior management, the need for staff and workers of the large group as middle managers in organizations decrease. These systems also facilitate control through effective coordination within the organization and managers, need for coordination and control, decrease. As a result of the reduction in middle managers and staff, the hierarchy height reduce so we can say by increasing use of IT systems in the organization, all four aspects of organizational structure and structure of the organization have changed, it increases the organizational formalization (formal organization), and
professionalism (career-oriented) and it decrease conceptualization (non-centralized) and institutional height (level of agreement) and in overall organizational structure has changed.

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