The Effect of Information Technology (IT) on Organizational Structure in Governmental Banks of Iran

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Abstract

The aim of this study was to determine the relationship between information technology and organizational structure in governmental banks of Iran. This study was a correlative survey. Data were collected using two questionnaires. The standard questionnaire of information technology belonged to Zegardy and Ismaili (2007) and the standard organizational structure questionnaire belonged to Robbins were used. Reliability of the questionnaires using Cronbach's alpha method was questionnaire of the information technology was 0.866 and for the organizational structure questionnaire was 0.725. The ideas of a group of experts were looked for in order to determine the validity of the questionnaire. A sample size of 50 subjects was selected in Marivan city's governmental banks. Data were analyzed using SPSS17 and LISREL8.50 softwares. Pearson correlation and linear regression test were used to analyze the data. Results showed that there was a positive and direct correlation between using information technology and organizational structure in governmental banks. In other words, as the using of information technology increases, organizational formality, complexity, and centralization improve.

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Introduction

Organization is an intelligent system where in groups of people consciously cooperating with each other in order to achieve common goals. Organizational structures are considered as important components of organizations due to their significance on the effectiveness of operations and performing of goals (Conner and Douglas, 2005; Armstrong and Rasheed, 2013). Accordance with Business Dictionary (2009) definition, Organizational Structure is formal and informal framework of policies and rules, within which an organization arranges its lines of authority and communications, and allocates rights and duties. Organizational structure determines the manner and extent to which roles, power, and responsibilities are delegated, controlled, and coordinated, and shows how information flows between the levels of management. There are some factors that influence on Organizational structures such as environment, human resource and strategy but one of the most important factor is Information technology (IT).

Due to globalization, rapid changes, and diverse workforce, IT has become an important factor for organizations to gain competitive advantage. IT consists of tools, instruments equipment, knowledge, and skills which are used for collecting, storing, restoring, and transferring the information (Behan, 1999).Information technology is defined as a set of computer systems in the organisation including database hardware, information network's software, and other tools. In a general definition, it is defined as a set of information systems for the use of administrators and managers. It is the technological aspect of an information system (Shi-Ming, 2006) that using it can promote the communication with customers more effectively.

Therefore, both organizational structures and IT are seen to be unique mechanisms that affect organizations and individual performance directly   Organizational structure can be defined as a mechanism which links and co-ordinates individuals within the framework of their roles, authority and power. Organizational structure represents a useful tool that directs individuals' behaviors   through shared values, norms, and goals (O'Neill   et al., 2001; Liao et al., 2011).

For almost as long as computers have been used in human organizations, people have speculated about the effects these computers would have on organizational structures (Leavitt and Whisler, 1958).

Therefore, the main aim of this research is to find out whether there is a relationship between Information Technology (IT) and organizational structure regarding governmental banks of Iran or not.

Statement of problem

Now in many developing countries, including Iran, large organizations tend to take advantage and use of information technologies. Considering the fact that in the future no factor such as IT will not be able to change organizational designs. Research in this area would be necessary.

In addition, researchers and practitioners now turn focus to the question of how IT adds value to the organization (Sneller and Bots, 2006). This problem is approached here by an attempt to combine the traditional theory of organizational structures with more recent research on how aspects of IT might affect the structure or the workings of the organization. Dahlgren (Dahlgren, 2007) stresses that organizational structure has a defining role on how information flows within an organization and, as a consequence, how well processes are performed and resources are spent.

According to many experts, it is impossible to imagine organizations without IT in present conditions. Kestlz believes that a new phase of industrial revolution has been created by expanding and developing the internet and other communication devices in 1990s (Burke, 2002).

With regard to the cases in this study, the effects of the use of information technologies on organizational structure will be discussed and will answer to the fundamental question: the application of information technology on organizational structure is what effect?

Research theoretical basics

Information Technology (IT)

The benefits of information technology are: facilitating working processes, increasing efficiency and productivity, reducing costs and increasing accountability, increasing flexibility, creating new opportunities and presence in the global markets (Turban, 2004).

Martinez categorises information technology into six broad categories based on the purposes for which they are used. These categories are: information technology in administration, communication, support decision making, planning, product design, and production control operation. He summarized the measurement criteria of information technology applications in different organisational activities as follows (Sarrafizadeh, 2004). Since state banks' branches are administrative, the two last categories of information technology (product design and production control operation) are not applied in the present research. The other dimensions are as follows:

Administrative: It includes factoring system or bill exchange, inventory control systems, payroll system, databases, accounting systems. 2. Communication: It includes advertising through the organization's website, direct connection through the organization's website, the organization's intranet, electronic data exchange with suppliers or customers via EDI, group working through electronic exchange. 3. Decision making support: it includes DSS decision support system and data analysis techniques. 4. Planning: It includes computer-aided planning CAPP, raw material requirements planning MPR, and enterprise resource planning ERP.

Organizational structure

An organizational structure defines how activities such as task allocation, coordination, and supervision are directed toward the achievement of organizational aims (Pugh 1990). It can also be considered as the viewing glass or perspective through which individuals see their organization and its environment (Jacobides, 2007).

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Organization structure is a system of task, reporting, and authority relationships within which the work of the organization is done. Thus, structure defines the form and function of the organization's activities. Structure also defines how the parts of an organization fit together, as in an organization char

The purpose of organization structure is to order and coordinate the actions of employees to achieve organizational goals. The premise of organized effort is that people can accomplish more by working together than they can separately. If the potential gains of collective effort are to be realized, however, the work must be coordinated.

Organizational structure is a method or manner which organizational activities are divided, organized, and coordinated by it" (Aarabi, 2006, p.15)

according to Stephen Robbins's theory organizational structure has been defined in three dimensions include:1- Formality 2- Complexity 3- Centralization.

Formality

Formality is applied to regulations, methods, and written documents whereby are defined tasks description, instructions, and commands which employees and organization's members must observe and implement them (Daft, 2006, p.285). It is rules and regulations that organization enacts for doing works and is a part of thing which is named formalization (Hall, 2005, p.107).The indices of formality dimension of organizational structure are:

- Conformity of employee's performance with existing standards (existence of job description)

- Observance of regular task procedures

- Existence of annual policies and instructions for different tasks

- Being determined job procedures

- Compliance of administrative regulations, instructions, and standards

- Observance of administrative formal rules and regulations and standards in displacements

- Observing standards by employees

Complexity

Complexity refers to the degree of separation which exists in the organization; in fact, complexity means the number of tasks or sub-systems which are performed or existed inside an organization (Robbins, 2006). The indices of complexity dimension of organizational structure include:

- Surveying employees about new issues

- Employee involvement in organization's decision makings

- Information distribution between low ranks

- Survey of employees about new plan or project.

Centralization

Centralization is called the hierarchy of authority levels which can make decisions. In centralized organizations, senior managers and those who are at the head of organization have decision making right and in decentralized organizations, such decisions are made at lower levels.

Centralization can be described as a measure which individuals of units or organizational levels themselves have formal authority for choosing decision-making solutions and thus employees have minimum power to exercise their views (Robbins, 2006, p.100). The indices of centralization dimension of organizational structure are:

- Management levels between the lowest rank and the highest rank

- Number of existing department in the organization

- Total number of labor who are involved in the dispersed units

- Communication with high ranked management of organization

- Number of job titles
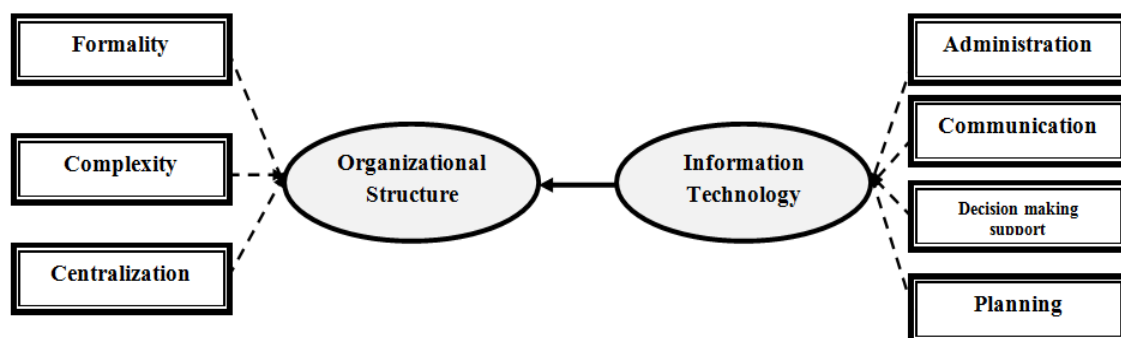
- Number of physical locations (units' dispersion).

Fig 1: Conceptual model of research

Table 1. Literature review

Author (s)	Year	Subject/ Essence	Results
Yarmohammadzadeh et al	2011	The Analysis of the Relationship between Organizational Structure and Information Technology (IT): And the Barriers to Its Establishment at the University of Isfahan from the Faculty Member's Viewpoints	The findings showed that there was a significant and positive correlation between all organizational dimensions of structure and information technology.
Farhanghi et al	2013	The Effect of Information Technology on Organizational Structure and Firm Performance: An Analysis of Consultant Engineers Firms (CEF) in Iran	The results show that IT has a direct and indirect impact on FP. OS has found to have a direct effect on FP. Finally, the results of the current study show that IT has a direct effect on OS.
Mirmasoudi	2012	The Effect of IT on Organizational Structure (Case study: Refah bank in Guilan)	The obtained results pin- pointed the importance of IT in easing the complexity and Centralization and reducing bureaucracy (Formalization) in organizational structure of the 'Refah' Bank in Guilan.
Malone	1985	Organizational structure and Information technology: Elements of a formal theory	To investigate organizational structure and Information technology: Elements of a formal theory
Gholipour	2004	The effect of IT on organizational structure and the structure of the labor force	Con-clouded that IT will undergo change in terms of organizational structure. therefore, a flat structure with an emphasis on information technology rather than the high structure replace non-hierarchical with hierarchical and non-Centralization with Centralization
Khanlori	2002	The effects of information technology on organizational structure	Has examined the effect of information technology on organizational structure and its components, including complexity, centralization and formalization
Chen	2007	Information Technology, Organizational Structure, and New Product Development	To be concluded amount of investment on information technology and its application has positive and significant relation with in organization multi-functional groups interaction and when organizational structure be informal non- centralization, interact of these groups will more. Interaction

			of these groups has positive and significant relationship with developing new products. Therefore, whatever from amount of centralization and formalization organizational structure will be less, in result improved new products, services, and offering them.
Mingaleva et al	2013	Potential of the Network Concept for an Assessment of Organizational Structure	The article considers the possibility of application of the economic sociology concept in the process of institutional value creation at a management level of organizational structure.
Farahani et al	2014	The relationship between Information Technology (IT) and Organizational Structure in sport& young ministry in Iran	There is positive and direct relationship between Information Technology (IT) and organizational structure.
Saadatmandi	2010	investigate relationship between Information Technology (IT) and organizational structure and barriers to its deployment in FOLAD company of Iran	There is positive and direct relationship between Information Technology (IT) and organizational structure (formality, complexity, and centralization).
Mostafaei	2010	To investigate relationship between Information Technology (IT) and organizational structure at departments of Physical Education of the Islamic Republic of Iran	There is positive and direct relationship between Information Technology (IT) and formality and negative and indirect with complexity and centralization
Akkermans and Vanderhores	2002	Managing IT infrastructure standardization in the networked manufacturing firm international". Journal of production economies	There is negative and indirect relationship between Information Technology (IT) and organizational structure (formality, complexity, and centralization).
Gholam Zadeh	2003	Relationship between Information Technology (IT) and organizational structure, Master's thesis, University of Tehran	There is negative and indirect relationship between Information Technology (IT) and organizational structure.
Ibrahiminasa	2001	Relationship between Information Technology (IT) and organizational structure in Copper Company in Iran	There is not a significant relationship between Information Technology and Formality with centralization but there is not a significant relationship with complexity.
Dastranj	2000	The effect of IT on organizational structure	There is not a significant relationship between Information Technology and organizational structure dominations.
Dibrell and Miller	2002	Organization design: the continuing influence of IT	There is a significant relationship between Information Technology and organizational structure and IT can eliminate organizational complexity.

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Chang	2007	Information technology organization structure and new product development". The mediating effect of cross – functional team interaction, engineering management, IEEE, transaction	There is a significant relationship between organizational structure team works. Also, low formality and low concentration lead to better teamwork.

Main hypothesis of research

- There is a significant relationship between Information Technology and Organizational structure

Secondary hypothesis of research

- There is a significant relationship between Information Technology and Formality.

- There is a significant relationship between Information Technology and Complexity.

- There is a significant relationship between Information Technology and Centralization.

Methodology

Research Method

This is an applied study in terms of purpose, descriptive in nature and survey in terms of method; it is also a cross-sectional study in terms of collecting data. Time zone of the research is the winter of 2016.

Statistical Population & sample

The Statistical society in this study includes all managers, including departments' authorities, experts, and department directors of Marivan city's governmental banks that have been reported to have 50 people. The census method was chosen for selecting people.

Study Instruments

Data required for this study was collected in two ways: 1. Library method: The method has used books, thesis, articles and databases for collecting data related to the study literature and history, 2.Field method: In this method, using the questionnaires and distributing it among the statistical sample, required data was collected. To measure Information Technology and organizational structure two questionnaires were used.

Robbins's standard questionnaire (1987) was used to measure the organizational structure of the statistical population of research.

Also, standard questionnaire of Zegardy and Ismaili (2007) was used to measure the level of applying information technology. This questionnaire includes the Likert's five scale (1= minimum use of information technology, 5= maximum use of information technology).

Study Validity

Face Validity for the questionnaire was obtained from a group of experts' idea

Study Reliability

For the reliability of study tools, Cronbach's alpha method was used which its value was 0.866 for the questionnaire of Information Technology and 0.725 for the questionnaire of organizational structure, indicating that the questionnaires have required reliability (because the value obtained is more than 0.70 the measurement tools reliability is considered acceptable (Kalantari, 2008). Using LISREL 8.80 software's, the collected data was analyzed

Findings

To investigate the hypothesis, Pearson correlation and linear regression were used to examine the impact of each variable. As it's presented in Table 2, according to the significance level of 0.000 and variables correlation that's close to 1 indicate there is a direct and positive relationship between the variables of information technology and organizational structure. On the other hand, the relationship is significant at the level of one percent. It should be noted that in this study organizational structure and information technology variables have been considered as dependent and independent variables, respectively.

Table 2: Pearson correlation between the variables of Information Technology and Organizational structure

N	Sig	R	The relationship between variables
50	0.000	0.433**	The first hypothesis: There is a significant relationship between Information Technology and Formality.
50	0.000	0.424**	The second hypothesis: There is a significant relationship between Information Technology and Complexity.
50	0.000	0.575**	The third hypothesis: There is a significant relationship between Information Technology and Centralization.
50	0.000	0.523**	Main hypothesis of research: There is a significant relationship between Information Technology and Organizational structure

Also, R Square(Table 3) with the value of 0.502 and F with the value of 18322.317value and significance level (Sig) 0.000indicates that 0.502 of the variance by

the predictive variable is significantly explained or standardized coefficient R, with the value of 0.523 shows the effective role of independent variable in predicting a regression equation.

Table 3: liner Regression the variables of Information Technology and Organizational Structure

R Square	R		F	Sig	R	Std. Error of the Estimate
0.502	0.523		18322.317	0.000	0.510	.01826
Y= organizational structure				X= information technology		
Y=.062 +.246(IT in administrative sector) +.201(IT in Communication sector) +.085(IT in Decision making sector) +.106(IT in Planning sector)						

Confirmatory Factor Analysis of the Conceptual Framework of Research

The main purpose of this part is replying to the question that whether research model have appropriate fitting totally or not? In order to respond to this question could consider to different critical like (The goodness-of-fit was evaluated with indicators):Chi-square/degrees of freedom (x2/df); comparative fit index (CFI); non-nor med fit index (NNFI); goodness-of-fit index (GFI) criteria, among others. The observed variables or indicators were used to predict the latent variables (Information Technology and organizational structure).

Table 4: fit indexes of overall and complete research model

Fit assessment index	Utility critic	Accept, critic	Research model
X2 = (Chi Square)	$0 \leq X2 \leq 3df$	$X2 \leq 3df$	X2≤ 3*df= 39(Df=13)
X2 / df	$0 \leq X2 / df \leq 2$	$2 \leq X2 / df \leq 3$	1.76
RMSEA	$0 \leq RMSEA \leq 0.05$	$RMSEA \leq 0.08$	0.053
SRMR	$0 \leq SRMR \leq 0.05$	$SRMR \leq 0.10$	0.081
NNFI	$0.95 \leq NNFI \leq 1.00$	$0.90 \leq NNFI$	0.90
CFI	$0.95 \leq CFI \leq 1.00$	$0.90 \leq CFI$	0.88
GFI	$0.90 \leq GFI \leq 1.00$	$0.80 \leq GFI$	0.82
AGFI	$0.90 \leq AGFI \leq 1.00$	Close to GFI	0.80

As Table 4 shows X2 / df , RMSEA, GFI and AGFI are 1.76,0.053,0.82 and 0.80 respectively. In practice, since the amount of X2 / df is less than 2, RMSEA is less than 0.08, GFI is more than 0.80 and AGFI is less than 1.00 or close to GFI generally indicates acceptable model. Other results in Table 3 show that the variable of the model are in acceptable condition. As it is also evident in Figure 2, all the factors above 30 percent indicate that the model is in suitable condition.
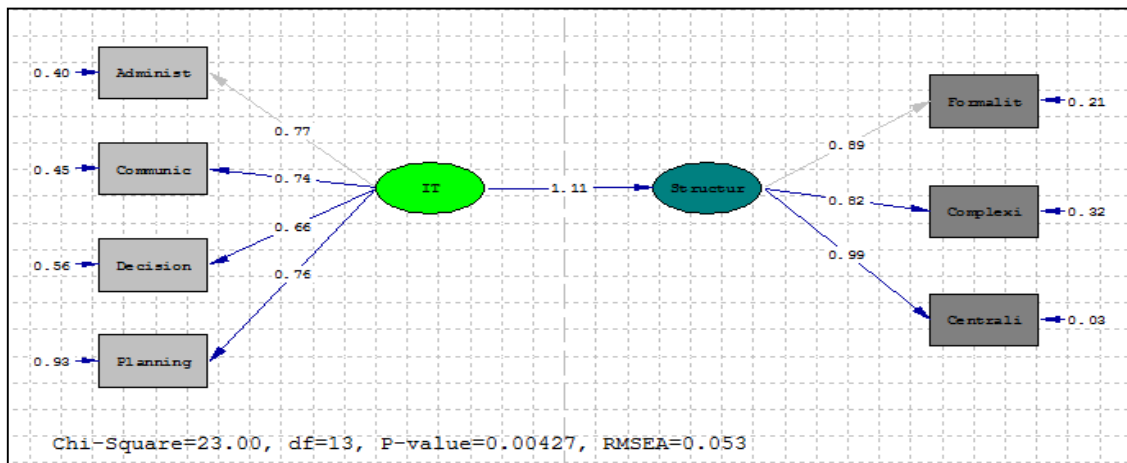
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Figure 2: LISREL test of Research Model (Standardized solution)

Also according to the table 5 the number is meaningful that larger than 2 or smaller than 2. As shown in Table 5, all factors larger than 2 that Show a positive relationship between information technology and organizational structure.

Table5: Path Coefficients in T- Value state

Row	Variables Path	T- Value
1	IT ⟶ Administrative	11.51
2	IT ⟶ Communication	9.08
3	IT ⟶ Decision making support	8.05
4	IT ⟶ Planning	7.23
5	Organizational Structure ⟶ Formality	8.58
6	Organizational Structure ⟶ Complexity	9.44
7	Organizational Structure ⟶ Centralization	10.11
8	IT ⟶ Organizational Structure	11.34

Conclusions

Applying IT in organizations results in changes which have influence on various aspects of organization including organizational structure so we investigated the relationships between information technology and organizational structure .In this study three hypotheses were proposed.

In first hypothesis, the relationship between information technology and formality was investigated. Results showed that there is a direct and positive relationship between information technology and formality. IT facilitates record and retrieve of information that related to corporate events and controlling of behavior activities (Dewett T, Gareth R G, 2001). It seems that IT helps to manager more controls organizational employees. Due to the employees sensitive activities and responsibility of employees in governmental banks, managers and employees like decision-making process and the organizational hierarchy be followed very well and IT can help to this problem.

The results from the first hypothesis's answer are compatible with Saadatmandi(2010), Mostafaei (2010), Yarmohammadzadeh et al (2011) ,Khanlori (2002) and Farahani et al(2014). On the contrary, they were incompatible with Akkermans, Vanderhorest (2002), Gholam Zadeh. (2003), Ibrahiminasab (2001), Dastranj,(2000), Dibrell and Miller (2002) , Chang (2007) and Mirmasoudi et al (2012).

Second hypothesis is about relationship between information technology and Complexity. Results showed that there is a direct and positive relationship between information technology and complexity. It can be concluded that because of governmental banks have a lot of information or data about administrative issues and customers , managers can access more information by using information technology, in result the role of middle managers in regular of information for top managers well be increased in governmental banks.

The results from the second hypothesis's answer are compatible with Saadatmandi(2010), Ibrahiminasab (2001), Akkermans, Vanderhorest (2002) Yarmohammadzadeh et al (2011), Khanlori (2002) and Farahani et al(2014). On the contrary, they were incompatible with Dastranj,(2000) and Mostafaei (2010) and Mirmasoudi et al (2012).

Third hypothesis is about relationship between information technology and Centralization. Results showed that there is a direct and positive relationship between information technology and Centralization. Information technology with fast data processing for top managers can increase more controlling on organization. According to the results, top managers prefer to decide alone about organization issues.

The results from the third hypothesis's answer are compatible with Saadatmandi (2010), Yarmohammadzadeh et al (2011), Khanlori (2002) and Farahani et al (2014). On the contrary, they were incompatible with Dastranj (2000) Akkermans, Vanderhorest (2002) and Mirmasoudi et al (2012)

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