

The Effect of IT on Organizational Structure (Case study: Refah bank in Guilan)

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ABSTRACT

Undoubtedly, information technology (IT) has undergone extensive developments in various social and economic spheres; its effect on human society is in such a way that the world today is referred as information society. Besides, information technology, attributed as the main agent of global change, is to achieve meta- organization purposes. It also pertains to appropriate information formulated in the strategic policy of a given organization to achieve its ultimate organizational goals. Extensive research from different aspects is conducted on the impact of IT on organizational structure over the past three decades. Nevertheless, findings of the respective research are posited as inconsistent and incongruous. The sustained developments, enormous potential of information technology and its applicability in various domains have raised the question of the accuracy of earlier research findings. The study is to explain the results of previous research, based on modern information technology instances, including various information systems e.g., internet, intranet, extranet, etc in order to give coherence to the review of the related literature and to further identify the impact of IT on organizational structure of 'Refah' Bank in Guilan by tapping into 24-question Robbins standardized questionnaire distributed among

140 managers and heads of branches and experts of 'Refah' Bank in Guilan. The collected data was subsequently analyzed by using software SPSS 18 the propounded hypothesis based on research model were duly analyzed with t-test, which confirmed significant relationship in the impact of IT on organizational structure. The obtained results pinpointed the importance of IT in easing the complexity and Centralization and reducing bureaucracy (Formalization) in organizational structure of the 'Refah' Bank in Guilan.

Keywords

IT, Organizational structure, Complexity, Formalization

1. INTRODUCTION

In recent decades, information technology has significant effects performance and position on many societies, organizations and individuals. Following the dramatic advances in this field, the societies, organizations and individuals relied heavily on modern technology, which accentuated a deep understanding on the influence of information technology. It can be taken for granted that IT can be acknowledged of great importance, which can make a profound impact on status, performance and fate of communities, organizations and individuals. It can consequently lend service

to the organizations to strengthen boost their resources through adopting proper management in generation processes, storage exchange and utilization of information to derive competitive advantages.

Organizational transformation process is very complex, demanding long-term alterations. In order to apply the changes in the organization, information technology should play a fundamental role on the culture, strategies both in short and long-term goals of the organization. Accordingly, paving for original infrastructure comply with organizational culture and information technology is of paramount importance in fostering an appropriate change in business processes. Information technology supplies blood into the artery of the organization, facilitating the transfer of information through the lowest to the highest level no time. It can also accelerate the organization transformation process, which can eventually empower the organization to adopt an advisable business strategy compatible with the changing environment. Obviously, a booming business in an organization is feasible through application of information technology following fundamental transformations in its structure in compliance with the changing environment [1]. Alvin Toffler said that Present era would be called post-industrial or information era. Industrial revolution in the 1970s began based on power of information technology and information systems. It was the effective motor for this revolution and had changed everything, including method of management and framework of organizations. Most of organizations had hierarchical structure and governed by bureaucracy until 1370s. The elapse of time has proved that hierarchical structures and bureaucratic system are inflexible and inefficient. New forms of organization without borders, post-bureaucracy organization, knowledge-based organization, a network-oriented organization, cellular organization, spider's web organization and virtual organization have emerged since 1980s. Five major factors in shaping the organization can be enumerated: 1. Organizational structure is disfigured to be flexible, 2. Organizations will be assigned to create strategic network of companies, 3. Centralization in separation will act as a norm, and 4. Distribution of information fosters change in terms of authority in the organization and 5. It will dismantle technical jobs and standardization due to the permutation in individual roles. Organization's ability to respond to environmental changes and customer demands in today's competitive environment is seriously taken into consideration. However, many factors limit the possibility of matching organizations with environmental changes and provide pave the way for organizations to be posited as a threat.

The aforementioned concerns and aspirations indicate that the respective organizations equipped with this technology will be enabled to increase efficiency in their arrangements. Advances in information technology have reduced the need

for middle managers, officials and staff forces resulted in truncation of organizational levels in the pyramid of organization. Modern technology has led to strong electronic communication between the units and bodies; consequently, it has caused elimination of time and distance barriers. Increased use of credit cards instead of cash in banks and electronic business prompted the banks offer valuable service to customers. Information technology facilitated management process in terms of sharing the tools of production, processing and distribution of information to managers at various levels, raising the accuracy of monitoring on flow of information in the organization and managing technical measures. Hence, extensive researches are conducted in organizations and scientific circles to assess the impact of IT on various dimensions, including the structure of organization.

2. LITERATURE REVIEW

Experts in 'management and organization' are fully aware that information technology can be defined in terms of a set of tools, which enable the customers of an a given organization to spend their quality time to reach a landmark decision by getting access to accurate data. The experts endowed with science and technology knowledge will save time utilizing a wide range of resources. It can eventually improve working processes and raise quality in the respective field.

According to 'Information Technology Association of America', information technology is defined as the study, which paves the way for designing, development, implementation, support and management of computer information systems with both hardware and software applications. Accordingly, information technology can encompass three main components: hardware, software and database [2].

Organizational structure is defined in terms of distinct dimensions in which the investigators paid heed to three aspects, namely 'Centralization', 'Formalization' and the 'Complexity'. "The complexity components are respectively formed from three integral parts in terms of the division of tasks, determining the hierarchical number, and distribution of organization in different regions" [3].

Since information technology in the same mould of other technologies plays a paramount role in the structure of an organization, it should proportionally undergo appropriate change. To determine the relationship between organizational structure and technology, scholars such as Woodward, James Thompson, Charles Peru, etc., have done numerous studies on contingency management school, concluding that "the technology has a direct effect on organizational structure" [3].

The relationship between technology and organization structure, in a classical study in 1960 was reviewed by John Woodward. It also continued by people like Peru and Thompson

within the framework of 'Effective of information technology on organizational hierarchy', 'Centralization', and 'Lack of organizational centralization, which diminished the complexity governing bureaucratic organizations. Robbins believes that IT allows organizations to achieve simultaneous centralization and decentralization [2].

Gholipour in a study entitled «The effect of IT on organizational structure and the structure of the labor force» concluded 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 [2].

Khanlari in an article entitled «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 [3].

Ortakhani in a study entitled "Effect of information technology and information systems on organizational communication" that made in Melli Bank of Tehran University concluded that Effects of applying information technology on various dimensions of organizational communication is evident Including facilitated communication, thereby increasing the volume of information exchanged with regard to index of accuracy and timeliness and informal communication has also reduced in Melli Bank [4].

Chen in a study entitled «Information technology, organizational structure and new product development through the interaction of multi-functional teams» 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. So whatever from amount of Centralization and Formalization organizational structure will be less, in result improved new products and services and offering them [5].

Wang in his study entitled «Effect of information technology on the structure of Hygiene & Health centers and networks» discovered the relationship between the three dimensions of organizational structure including formalization - complexity and centralization by using information technology and best of theory for this relationship was detected contingency theory [6].

Wave of applying the information technology process has also taken into consideration in our country and various organizations in recent years to show the consequent benefits of the respective field. To achieve the goal, being aware of the forthcoming decision on the application of information

technology in a given organization seems inevitable . Today's organizations tendency in eliminating the hierarchical structure in Information Technology is a tool that can play an important role in this way [7].

The recent research-oriented study is to provide a profound insight on examining the effects of applying the information technology on organizational structure in 'Kargaran Refah' bank in 'Guilan' province (Figure 1). Accordingly, information technology and information systems are considered as independent variables and organizational structure, formed from three dimensions (Complexity, Centralization and Formalization) as the dependent variable are taken into consideration in the investigation.



Figure 1. Conceptual model of research

Organization: An organization encompasses collection of human and material resources. The organization is a social phenomenon in which augmenting a social institution can be studied as a physical phenomenon. It is consciously coordinated within relatively specific limits to achieve common goals. Social phenomenon implies that an organization is composed of interacting individuals or groups. Since an organization is a social phenomenon, the ensuing interactive patterns follow by members should be duly harmonized and coordinated.

Organizational structure: It is defined as the mode of function in individuals. Controlling the structure created in process of members' interrelationship and grown extensively is highly complex [8]. Organizational structure is the manifestation of a systematic think tank. The organization includes the elements, their relationship and a unit propounded as an integrated structure.

Formalization: Formalization refers to the amount or standard level of organizational jobs. In formal organization, organizational relationship is described accurately in written form in accordance with the organizational chart, which is suitable for the staff and if necessary, later changes will be notified formally by the director; whereas, in informal organization, organizational relationship is expressed verbally for the staff and if necessary it will naturally change [9].

Centralization: The centralization concept connotes making decision. A fully-fledged system implies top management in decision making in centralization, while delegation of authority creates a list of decision making at the operational levels of an organization is called non-centralization system [3].

Complexity: Complexity is defined in terms of the number of tasks or sub-systems within an organization.

Information Technology: It is referred to a set of tools, equipment, knowledge and skills applied in collection, storage, marketing and data [2]. Information technology set includes one of following components: hardware, software, communication, systems, work stations, automation systems, and intelligent products.

The information technology also includes at least one of the following operations: converting information, processing information, exchanging of information, analyzing and integrating information.

3. RESEARCH Hypothesis

The Main Hypothesis

Use of information technology has caused significant changes in the dimensions of organizational structure in 'Refah Bank'.

Sub-Hypotheses

- a. Use of information technology has caused significant changes on the dimension of organizational structure complexity in 'Refah Bank'.
- b. Use of information technology is caused significant changes on dimension of organizational structure formalization in 'Refah Bank'.
- c. Use of information technology is caused significant changes on dimension of organizational structure centralization in 'Refah Bank'.

4. RESEARCH METHOD

To obtain an optimum result, field and library study are used in data collecting. The Questionnaire of organizational structure is based on the standard questionnaire of organizational structure by 'Robbins', which is also used by 'Alimardani' et.al, in 1388, entitled "survey of the relationship between organizational structure and organizational entrepreneurship". Statistical society of the present study is 224 managers, including departments' authorities, experts and department directors, deputies as well as officials of bank branch offices in 'Guilan' province. That sample size

in this study is based on the Morgan table includes 136 testees since 5 percent 143 subjects didn't hand out their questionnaires.

In this study reliability coefficient of total questionnaire is obtained, indicating 85%. Since the questionnaire comprises three sections for each of the dimensions of organizational structure, Cronbach's alpha coefficient was calculated for each one separately. Cronbach's alpha reliabilities for 'complexity', 'formalization' and 'centralization' are 78%, 74%, and 73% respectively. And considering the total (>70%) Cronbach's alpha coefficient indicates high reliability of the questionnaire content, which facilitated further analysis used by t-test.

5. DATA ANALYSIS

First sub-hypothesis:

Use of information technology has caused significant changes in the dimensions of organizational structure Complexity in 'Refah' Bank.

Table 1. The mean of effects of Information Technology on the organizational structure complexity

	Mean	Standard deviation	Standard error
Effects of Information Technology on the organizational structure complexity	18.64	3.39	0.29

According to Table 1, the mean of Effects of Information Technology on The organizational structure Complexity of the bank is 18.64.

Constant value t or supposed mean is calculated as 21.¹

Constant value = 21

According to the Table 2, t is calculated as -3.22 with Degrees of freedom df= 139, which is larger than t table or critical (2/58); So the difference between the two the means is significant statistically. Since the obtained mean is larger than the assumed mean, it can be claimed that the effect of IT is effective on the decrease of the organizational

Table 2. T-test for the effect of IT on the organizational structure complexity

	t	df	sig	Mean difference	the mean range with a 95 percent confidence	BIAS second approach
					Low limit	High limit
Effects of Information Technology on the organizational structure complexity	-3.22	139	0.028	-2.36	-0.07	-3.20

1. 1- t valu = 3K = 3*7=21, The median of Likert spectrum

structure complexity.

Second sub-hypothesis:

Use of information technology has caused significant changes on the dimensions of organizational structure Formalization in 'Refah' Bank.

Table 3. The mean of effects of Information Technology on the organizational structure formalization

	Mean	Standard deviation	Standard error
Effects of Information Technology on the organizational structure formalization	22.97	3.21	0.27

Table 4. T-test for the effect of IT on the organizational structure formalization

	t	df	sig	Mean difference	the mean range with a 95 percent confidence	
					Low limit	High limit
Effects of Information Technology on the organizational structure formalization	7.97	139	0.000	1.97	1.44	2.51

According to the Table 3, the mean of 'Effects of Information Technology on The organizational structure Formalization of the bank' is 22.97.

Constant value t or supposed mean is calculated as 21.²

Constant value = 21

According to the Table 4, the calculated t is 7.97 with Degrees of freedom df= 139, which is larger than t table or critical (2/58); So the difference between the two means is significant statistically. Since the obtained mean is larger than the assumed mean, it can be claimed that the effect of IT is statistically meaningful on decrease of the organizational structure Formalization.

Third sub-hypothesis:

3- Use of information technology has caused significant changes on the dimension of organizational structure Cen-

tralization in 'Refah' Bank.

According to the table 7, the obtained mean of 'Effects of Information Technology on The organizational structure Centralization of the bank' is 28.35.

Constant value t or supposed mean is calculated as 30.³

Constant value =30

According to the table 8, the calculated t is -6.04 with Degrees of freedom df= 139, which is larger than t table or critical (2/58), indicating the difference between the two the mean is significant statistically. Since the obtained mean is larger than the assumed mean, it can be claimed that the effect of IT on decrease of the organizational structure Centralization is statistically meaningful.

Based on the obtained results drawn from the testing sub-hypothesis, the results of the main hypothesis are presented as follows:

The main hypothesis:

Use of information technology has caused significant changes in the dimensions of organizational structure in 'Refah' Bank.

Table 5. The mean of effects of Information Technology on the organizational structure centralization

	Mean	Standard deviation	Standard error
Effects of Information Technology on the organizational structure centralization	28.35	6.55	0.56

Table 6. T-test for the effect of IT on the organizational structure centralization

	t	df	sig	Mean difference	the mean range with a 95 percent confidence	
					Low limit	High limit
Effects of Information Technology on The organizational structure centralization	7.97	139	0.000	1.97	1.44	2.51

2. 1- t valu = 3K = 3*7=21, The median of Likert spectrum

3. 1- t valu = 3K = 3*10=30, The median of Likert spectrum

Table 7. The mean of effects of Information Technology on the organizational structure dimension

	Mean	Standard deviation	Standard error
Effects of Information Technology on the organizational structure dimension	69.57	10.91	0.93

According to the Table 7, the obtained mean of ‘effect of information technology on organizational dimensions of the bank’ is 69.57.

Constant value t or supposed mean is calculated as 72.⁴

Constant value = 72

The obtained results show application of information technology has caused significant changes in every measured indicator; it also fostered changes in the dimensions of organizational structure, including complexity, formalization and centralization. Besides, ‘IT’ application has enhanced the coherence and integration among individuals and different units in bank by doing organizational tasks, leading to achieving organizational goal. To sum up, the research findings confirms the findings of ‘Mohammadi Talehvaran’. The research also shows the effect of applying the information technology on reducing the dimensions of the organizational structure. Accordingly, it supports the role of high management on feasibility of having more effective IT to boost productivity in organization. The investigation also implies appropriate change in leadership style in orga-

Table 8. T-test for the effect of IT on the organizational structure dimension

	t	df	sig	Mean difference	the mean range with a 95 percent confidence	
					BIAS second approach	BIAS second approach
					Low limit	High limit
Effects of Information Technology on The organizational structure centralization	7.97	139	0.000	1.97	1.44	2.51

According to the Table 8, the calculated t is 3.88 with degrees of freedom df= 139, indicating the difference between the two means is significant statistically. Since the obtained mean is larger than assumed mean, it can be claimed that the effect of IT on the decrease of organizational dimensions is statistically meaningful.

6. CONCLUSION

The purpose of this study is to examine the relationship between information technology and organizational structure tracking down the studies of John Woodward, Charles Peru and other theorists of the contingency approach. It is also concluded the ‘Information Technology’ such as other technology is effective on organizational various factors, including the organizational structure. Therefore, organizational structures will undergo changes consistent with it. To detect the effects of information technology application on organizational structure in ‘Refah’ bank Robbins questionnaire ,consisting of twenty-four indicators with seven indicators indicating ‘complexity dimension of the organizational structure’, seven indicators indicating ‘Formalization dimension’ as well as ten indicators indicating ‘Centralization dimension’ is administered. The effects of ‘IT’ on organizational structure are measured by using the survey of managers and experts in Guilan ‘Refah’ Bank.

nizations compatible with the advent of new technology of information to guarantee a successful implementation and integration.

7. SUGGESTIONS

Information Technology like other technologies, pertaining to organizational structure is effective on various factors in an organization. Since ‘IT’ undergoes changes, the ensuing organizational structures should be modified to adapt to such change appropriately. It necessitates accurate training of middle managers accordingly. In this respect, Delegation of Authority to middle managers accompanies with less challenges. It is recommended that the organizations and management focus on their individual performance dealing with information along meticulous attention on the technical capabilities of information systems. Consequently, impeccable understanding of the information needs of managers and users during the analysis and design of systems is of great importance. Determining the information characteristics to crystallize different levels of organization needs and to hold training courses of proper ‘IT’ usage for company managers and employees information necessary is considerably important.

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4. 1- t valu = 3K = 3*24=72, The median of Likert spectrum

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