

The study of the role of information technology in organizational transformation of Guilan general office of education

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Abstract: It has been tried to study results of information technology in human resources and organizational transformation in general department of education in this research. The research method has been analytic-descriptive and gathering required data has been in the library and field method and by having interview with experts and filling out the questionnaires. In the researcher-made questionnaire, 45 items are designed to be related to effective dimensions of information technology and validity of questionnaire items were proved by some professors and its reliability was determined to be 86% by using Cronbach alpha test. Statistic population of this research has been all employees in general department of education in Guilan and subordinate departments (regions and districts) with size of 1625 subjects. Sample size has been calculated to be 313 subjects by using random multistage cluster sampling and Krejcie-Morgan Table. Research hypotheses were evaluated by using SPSS software and t-tests and Friedman Kalmogorov-smiranov test. Results of this research show that variables of information technology including human, mechanisms, tools and structure all have influence in organizational transformation and its dimensions (structure, culture, technology and change in providing services) and generally there is a significant relationship between information technology and organizational transformation. But, amount effectiveness of variables of information technology in organizational transformation is not equal in general department of education in Guilan.

Key words: Information technology; Organizational transformation; Education

1. Introduction

Since transformation in education is basis of big transformations in the society and for this transformation inevitably we need information to process it as good and better as possible. So, using information technology and communication in department of education the transformation can be considered as the most important ring of national development chain. On the other hand, benefitting information technology in learning process should transform the basis and structure of learning as a medium and this will be possible by direct communication of teachers and employees and others' role changes and creating structural and cultural transformation in employees' occupational and educational content. Because of extensive use of information systems by organizations, information technology has been one of change and transformation dimensions in organizations (Akhavan, 1385).

Considerable growth of new information and communication technology in past decades has brought department of education in most of countries into a new phase of growth and development. Traditional managers used to obtain information directly by physical presence in environment of the organization and analyze the

methods by <<trial and error>>. Their information network was limited to a few honest people in sensitive points and sometimes managers' faced error at the time of entering into these information networks. Old mechanisms of management information cannot be used for current complex condition and in confronting complex problems we cannot rely on limited thought or reports or what employees say. Managing affairs in an effective and efficient way requires processing a huge portion of different information which grows in a very fast rate and makes its analyses very difficult. Having a systematic point of view, because of potential comprehensiveness, is focused into unity and coordination of current information in an organization and the best case of systematic point of view toward organizations leads into establishment of systems of management information.

Comprehensive competitions that exist in area of operation management need management methods to be transformed like other factors to guarantee existence of the organization. Parallel to it, beside management, systems of management information will be affected by transformation and dynamicity. In this case, systems of information help management by creating transformation in organization to gain precise information as soon as possible and gain the maximum effectiveness and efficiency by having efficient use of it.

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2. Research hypotheses

2.1. Main hypothesis

Information technology leads into organizational transformation in general department of education in Guilan province.

2.2. Secondary hypotheses

1-human beings (human resources, concepts and thought, innovation) are effective in organizational transformation in general department of education in Guilan province as a part of dimensions of information technology.

2-mechanisms (rules, regulations and methods, mechanisms of improvement and growth, valuation and financial mechanisms) are effective in organizational transformation in general department of education in Guilan province as a part of dimensions of information technology.

3-tools (software, hardware, network and communication) are effective in organizational transformation in general department of education in Guilan province as a part of dimensions of information technology.

4-structure (organizational, related cross-organizational, global) is effective in organizational transformation in general department of education in Guilan province as a part of dimensions of information technology.

3. Research method

This research is a kind of applied research and the research method is descriptive with correlation and data gathering method is survey and the reason for using survey method is because of using questionnaire and interview for gathering data and generalizing the results to statistic population. Statistic population is general department of education in Guilan province and related regions that is 34 offices with 1625 subjects including men and female that among them, 9 offices with 749 subjects have been selected by the method of random multistage cluster sampling. First, Guilan province was divided into five regions of west, east, and north, south and central. Then among those five regions, three regions of central, western and eastern were selected randomly. Three offices, totally nine offices, and 313 subjects among 1625 subjects were selected among employees (managers, vice chancellor, managers of staff affairs and employees in technology centers who are settled in information technology centers were included) to answer the questions in the questionnaire (Table 1). It is worth noting that Morgan is used for estimating sample size in this research since variance of the population in not specified, so, total population are estimated to be 313 subjects. 313 questionnaires were distributed among employees in general department of education in Guilan province and its regions and 305 questionnaires were filled out and were returned.

Table1: Calculation of sample size proportion in selected offices

Selected three regions	Name of selected offices	Number of employees	Sample size
Western	Astara	42	18
	Talesh	67	28
	Rezvanshahr	44	18
Central	General office	321	134
	Region2	95	39
	Khomam	33	14
Eastern	Astaneh Ashrafieh	38	16
	Roudsar	38	16
	Lahidjan	71	30
total	9	749	313

4. Information technology

According to definition of teacher training university dated to 5/17/1383 information technology in consisted of four basic elements of human, mechanism, tools and structure. In such a way that in this technology, information flow by the value continuum that is made of connection of these elements and its ultimate purpose is development of the organization:

- Human: human resources, concepts and thoughts, innovation
- Mechanisms: rules, regulation and methods, improvement and growth mechanisms, financial and valuation mechanisms

- Tools: software, hardware, network and communication
- Structure: organizational, related cross-organizational, global (Khosrovani Shariati, 1388). Information technology is a compound of computer software, hardware, telecommunication, internet and other communicative technologies (Markard et al., 2006).

5. Process of organizational transformation

<<organizational transformation is a planned effort all over the organization that is managed by excellent management of the organization and increases efficiency and health of the organization via transformation of planed changes in process of

the organization by using behavioral science>> (Alvani, 1392).

Perhaps the model given from MIT90 (research program of management in 90 decade college of university management MIT) be able to be proposed as a model in the method of organization interaction and IT. Above mentioned model have some powers with organizational components that interact with each other, stimulus and changes in external environment of the organization. These powers are:

1. Technology: technology is a tool in order to facilitate business process, and in Scott Morton's opinion, decrease effects of time and distance, increase connection and relations, better organizational memory and better forming of rules of the organizations.
2. People and roles: is related to people inside of organizations and related responsibilities.
3. Structure: style and method of organizing the responsibilities, authorities and relations to perform organizational responsibilities.
4. Management processes: distribution of power and control in organization.
5. Strategy: general styles and methods for business in order to pursue organizational objectives.

According to this model component of <<management processes>> is an important connection between two components of strategy and IT and if the organization has no specified and appropriate, it will not be able to make strategies and technology parallel to each other.

Richard L. Daft also summarizes the issue of organizational change into four categories:

-change in department including: change in structure, objectives, organization desires, reward systems, information and accounting systems.

-change in people involved in the organization: change in peoples' points of view, skills, experience and behavior.

-change in technology, this kind of change is done in related to process of organizational production than includes: knowledge, awareness and skill that shows amount of organizational competency. Purpose of creating such change is increasing efficiency and amount of production.

-change in goods and services that is related to providing new productions, change in method of production or creating new production line.

So, in management of education also management processes are designed in such a way that the relation between them should have a suitable position and this relation should be in correct direction and on the other hand the role of education in using management processes that needs suitable cultural infrastructures, is very important. In the current world, information technology has made efficiency of the information possible. Using information technology creates extended transformation in official affairs and industry information systems, in such a way that possibility of electronic transformation of data, documents and different correspondence can be possible via computer and telecommunication lines on the other

hand it facilitates official process and increases efficiency of human force and management. One of main results of information technology, as it was said, is decentralization and at the same time centralization.

6. Research variables

Independent variable: in this research, independent variable is: information technology that provides the managers with required information and reports for decision making after collecting and processing.

Dependent variable: in this research organizational transformation (in general department of education in province of Guilan and related regions) that is evaluated with dimensions of organizational structure and culture and also technology, goods and service, is dependent variable.

Esmaeel Delpasand (1380) in his thesis by the title of: <<studying performance of computer systems in general registry office in province of Fars in efficiency point of view>> answered below questions:

-has application of computer been effective in increasing accuracy of organizational activities?

-has application of computer been effective in increasing speed of activities?

In both questions statistic population showed significance level of 95% in efficiency of computers in increasing accuracy and speed of activities.

Parvaneh Meraati (1383) conducted a research and studied effect of information technology and current systems in culture of human force, education, efficiency, satisfaction and job security in organization of management and planning in province of Tehran. She showed that suitable culture in establishment of current information technology systems has led into increase in employees' accuracy and since employees didn't have required training in application of systems, paid no attention into human force in organization and finally it can be said that information technology has had positive influence in human force in organization and its transformation.

Mahnaz Mousavi (1387) in her thesis named "the study of information technology effect on the organizational structure of Iran oil products refinement and distribution" Mahnaz Mousavi(1387) concluded that information technology cause organizational levels reduction , complication decrease , formality decrease and concentration which alternate organizational structure and her hypotheses have been confirmed by 99% confidentiality.

In a paper labeled the role of organization staff in the acceptance of information technology systems, Hengameh Zolqadri (1390) writes: during last two decades, there have been many studies about effective factors on resistance and confirmation of information systems and technology and various theories and models have been proposed and developed by researchers over time. The significant point is that in all of these models, a new system is

implemented by organization. Thus the issue of resistance and acceptance by staff is proposed. In other words, in this position, some kind of a passive task is considered for employees. While in some cases, these are people who are interested in using modern technology and system and encourage organizations to use technology. Active role of staff in persuading organizations to use technology is one of the most important cases in the field of technology acceptance. Using technology acceptance model and people reflect on facing new technology in resistance and technology acceptance model have been studied.

Aliakbar Farhangi; Abbas Abbaspour; Reza Abachian Qasemi (1392), in an article named the study of new communicational and informational technologies effect on organizational structure and the performance of service – survey firms around consulting surveyor engineers aiming to study existing and desired state of new technologies, the organizational structure and performance of consulting engineers firms made a research in the form of descriptive – analytic among 252 managers and experts of consulting surveyor engineers firms in Tehran and by cluster sampling. Obtained results includes: a) current and desired state of ICT, organizational performance and structure of consulting engineers firms is in an acceptable level, b) there is a significant difference among current and desired state of ICT, structure and organizational performance of consulting engineers firms.

In their article named "the study of relationship between information technology and organizational structure in ministry of youth and sport of Islamic republic of Iran", Ali Mehrabi Koushki and Majid Jalali Farahani (1392), resulted that there is a significant relationship between information technology and organizational structure in youth and sport ministry ($P = 0/001$). Also the relation between information technology and organizational structure dimensions were studied and obtained result suggested that there is a significant relationship between information technology and organizational structure in youth and sport ministry.

In a research named "the study and design of automation system levels" in California argues that recently, designing automation system in order to optimizing jobs and various official levels in saving costs, human forces and time increases. Automation facilitates performing service issues and enhances efficiency. Designing automation system is made according to the organization behavior and performance and various structural processes of system are done (Chai, 2004).

Jeen et al. (2008) claim that information technology capability help directly to improve organizational processes such as adaptation, investigation in changes, absorbing capacity and monitoring; these cases in turn improve the results of strategic and operational performance of an organization and leads to evolution in a system.

Bezweek and Igbo (2010) found that IT has a significant effect on communications, organizational structures, management and organizational

efficiency and causes some changes in the organizational authority ratio and it is possible to effect on concentrate or decentralization of decision making systems and organizational control. These technologies cause benefitting from staff capacity in the operational level in order to do an extended domain of activities. The result of these effects is a change in controlling traditional activities and reducing the need to a head and supervisor, and also computer networks make it possible to communicate with other organization members rapidly and share their opinions and thus exchange their information without considering their physical position. Therefore, a head will be able to have knowledge about more people activities in his sub groups without any need to direct report.

Bloom et al. (2010) studied the effects of IT on organizational structure and suggested that these technologies have different effects on the each level of organization. Better accessing to information cause directing decisions towards lower levels of an organization and thus leads to decentralization and hierarchy decrease.

Assessing the role of computer use in performance improvement of a Malawian firm staff and experts, Baninajarian et al. (2011) found that these firm experts could introduce better performance inside an organization using communicational technology in their relations and employing communicational technology could improve their relation establishment inside and outside of organization.

7. Reliability and validity of research questionnaire

In order to have perfect reliability of researcher-made questionnaire, guidance and ideas of management professors and also the study of theoretical principles and performed researches in literature review and Cronbach alpha coefficient in SPSS was used for studying validity which this method is used for calculating internal consistency of measurement mechanism such as questionnaires or tests which measure various features. According to Table 3 in this research, it is observed that reliability coefficient is an acceptable mechanism in this research.

8. Analysis method

Collected data by questionnaire, are derived, classified and categorized in detailed and after codifying and entering data to the computer is processed by SPSS. For studying the hypotheses according to the level of variables measurement, t and Kolmogorov – Smirnov tests were used. The obtained data have been analyzed by questionnaire using two descriptive and interpretive methods.

Table 3: The results of IT role questionnaire in organizational evolution

Factor	Material number	Reliability coefficient (cronbach alpha)
Human being	5	0.75
Mechanism	18	0.89
Mechanisms	15	0.90
Structure	7	0.83
Total	45	0.86

Since in this research the variables are spatial types and considering normal distribution of population, t parametric test was used. It should be said that t parametric test is used for testing the hypothesis around the mean of a population. In most researches which are done with Likert scale, this test is used in order to assess research hypotheses and specialized questions analysis. Also in order to calculate necessary mean for comparing with hypothetical mean, there was a need to understand the normality of scores distribution which was a necessary condition for calculating the measure of t mean using non-parametric Kolmogorov-Smirnov test. Also, Freedman test was used for assessing the prevalence of the effect of each independent variable aspects on dependent variable.

9. Research findings

9.1. Descriptive findings of data

Table 4: Sample group distribution of research based on gender

Gender	frequency	percent
Female	61	20
Male	244	80
Total	30	100

As you see in the above Table, 20% of sample group is female and 80% is male.

Table 5: Sample group distribution based on education level

Education level	frequency	percent
Diploma	5	1.6
A.A	23	7.5
B.A	207	67.9
M.A and higher	70	23
Total	30	100

As you see in the above Table, the maximum sample size (67.9%) has B.A degree.

Table 8: Descriptive coefficients of applying IT on organizational transformation

Variable	mean	standard deviation	standard error
Organizational change	182.11	18.45	1.06

In the above Table, the mean of main hypothesis has been calculated in which T test with a hypothetical number or mean was used in order to

Table 6: Sample group distribution based on background

Background	frequency	percent
Less than 5 years	15	4.9
5-10 years	52	17
11-15	11.8	36
More than 15	66.2	202
Total	100	75

As you see in the above Table, the largest size of sample (66.2%) has a background more than 15 years.

9.2. Other results

Table 7: The results of Kolmogorov- Smirnov test on normality test of variables

Variable	Z	sig
Human dimension	1.18	0.09
Mechanism dimension	0.87	0.13
Mechanism dimension	0.59	0.21
Structure dimension	0.58	0.22
Organizational transformation	0.540	0.24

Kolmogorov – Smirnov test was used In order to assess normal distribution of data . Table 7 suggests that according to obtained level (P 0.05) , normal distribution of data is confirmed and using parametric tests is possible .

9.3. Statistical analysis of research main hypothesis

H0: applying information technology results in an organizational transformation in general department of education in Guilan province

H1: applying information technology doesn't result in organizational transformation in department of education in Guilan province.

assess its effect .constant value or hypothetical mean is 135 which has been obtained by multiplying question numbers (45) in answer range mean (3).

Table 9: The results of t-test hypothetical mean for main hypothesis of research

Variable	t	freedom degree level	significance
Organizational change	44.6	304	0.01

T-test results with hypothetical number or mean have been introduced in the above Table. The observed number of t is significant statistically for assessing the effect of information technology on organizational change in the level of $t = 44.60$ ($P < 0.01$); thus the difference between two obtained means and hypothetical mean is significant statistically and since obtained mean (182.11) is more than cut point (135), so it can be concluded that H_0 is accepted .

H_0 : as a component of information technology aspects, human being (human resources, thoughts and concepts, innovation) is effective in organizational change of general department of education in Guilan province.

H_1 : as a component of IT dimensions, human being (human resources, concepts and thoughts, innovation) is not effective in organizational transformation in general department of education in Guilan province .

9.4. Statistical analysis of sub-hypothesis 1

Table 10: Descriptive coefficients of man effect (human resources, concepts and thoughts, innovation) as a component of information technology dimensions in organizational change

Variable	mean	standard deviation	standard error
Human resource dimension	21.82	2.34	0.13

In the above Table, in order to assess the effect of sub- hypothesis 1, t-test has been used with a hypothetical mean. Constant value or hypothetical

mean is 15 which have been obtained by multiplying question numbers (5) into answer range (3).

Table 11: The results of t-test with hypothetical mean for sub- hypothesis 1

Variable	t	freedom degree	significance level
Human resource aspect	50.89	304	0.01

T-test results with a hypothetical number or mean have been introduced in the above Table. the observed t value is significant ($P < 0.01$) as a component of information technology in the organizational change ($t = 50.89$) in order to assess the human being effect (human resource, concepts and thought, innovation); thus the difference between two obtained means and hypothetical mean is significant and since the obtained mean is more than cut point or average, so it can be concluded that H_0 is accepted.

H_0 : as a component of information technology aspects, mechanism (principles, disciplines and methods, improvement and growth mechanisms, evaluating and financial mechanisms) is effective in the organization change in administration of education in Guilan province.

H_1 : as a component of information technology dimensions , mechanism (principles , disciplines and methods , improvement and development mechanisms , evaluating and financial ,mechanisms) is not effective in the organizational change in general department of education in Guilan province .

9.5. Statistical analysis of secondary hypothesis 2

Table 12: Descriptive coefficients of mechanism effect (principles, disciplines and methods, improvement and development mechanisms, evaluating and financial mechanism) as a component of information technology in the organizational transformation

Variable	mean	standard deviation	standard error
Mechanism dimension	72.72	8.26	0.47

In the above Table, the mean of sub- hypothesis 1 was introduced which for assessing its effect, t-test with hypothetical number or mean was used. Constant value or hypothetical mean is 54 which has

been obtained by multiplying question numbers (18) into answer range mean (3).

Table 14: T-test results with hypothetical mean for secondary hypothesis 2

Variable	t	freedom degree	significance level
Mechanism	39.59	304	0.01

T-test results and hypothetical number or mean have been introduced in the above Table. the observed t value is significant statistically ($P < 0.01$) , as component of information technology dimensions in the organizational change ($t = 39.59$)

for assessing the effect of mechanism (principles , disciplines , improvement and development mechanisms , evaluating and financial mechanisms) ; thus the difference between two obtained means and hypothetical mean is significant statistically and

since the obtained mean is more than cut point or average , so it can be concluded that H0 is accepted .

9.6. Statistical analysis of sub- hypothesis 3

H0: as a component of information technology, mechanisms (software, hardware, network and communications) are effective in the organizational

change in general department of education in Guilan province.

H1: as a component of information technology in the organizational change, mechanisms (software, hardware, network and communications) are not effective in general department of education in Guilan province.

Table 14: Descriptive coefficients of mechanisms effect (software, hardware, network and communications) as a component of information technology dimensions in the organizational transformation

Variable	mean	standard deviation	standard error
Mechanism dimension	57.69	6.95	0.40

In the above Table, the mean of sub- hypothesis 3 has been introduced that for assessing its effect, t- test with a hypothetical mean or number has been used. Constant value or hypothetical mean is 45

which have been obtained by multiplying question numbers (15) to answer range mean (3).

Table 15: T-test results with hypothetical mean for sub- hypothesis 3

Variable	t	freedom degree	significance level
Mechanisms	31.89	304	0.01

The result of t-test with hypothetical number or mean has been introduced in the above Table. The observed t value for assessing the effect of mechanisms (software, hardware, network and communication) as a component of information technology dimensions in the organizational effect (t=31.89) is significant statistically (P 0.01) ; thus the difference between two obtained means and hypothetical mean is significant statistically and since obtained mean is more than cut point or mean so it can be concluded that H0 is accepted.

H0: As a component of information technology dimensions, structure (organizational, respected infra organizational, universal) is effective in the organizational change of general department of education in Guilan province.

H1: as a component of information technology dimensions, structure (organizational, related infra organizational, universal) is not effective in the organizational change of general department of education in Guilan province.

9.7. Statistical analysis of sub-hypothesis 4

Table 16: Descriptive coefficients of structure effect (organizational, related infra organizational, universal) as a component of information technology dimensions in the organizational change

Variable	mean	standard deviation	standard error
Structure dimension	29.88	3.25	0.19

In the above Table, the mean of sub-hypothesis 4 has been introduced that for its effect assessment, t- test with hypothetical mean or number has been used. Constant value or hypothetical mean is 21

which has been obtained by multiplying question number (7) to answer range mean (3).

Table 17: T-test results with hypothetical mean for sub-hypothesis 4

Variable	t	freedom degree	significance level
structure	47.69	304	0.01

The results of t-test with hypothetical mean or number has been introduced in the above Table. the observed t value is significant statistically (P 0.01) for assessing the effect of structure (organizational, related infra organization, universal) as a component of information technology dimensions in the organizational transformation (t=47.69); thus the difference between two obtained means and hypothetical mean is significant statistically and since the obtained mean is more than cut point or average so it can be concluded that H0 is accepted.

1. the result of testing sub-hypothesis 1: it can be concluded that the hypothesis of " as a component of information technology dimensions, human being (human resources, concepts and thoughts, innovation) is effective in the organizational transformation of general department of Guilan province", thus it corresponds to the research of Hengameh Zolqadri labeled " the role of organization staff in accepting new information technology systems".

2. the result of testing sub-hypothesis 2 : it can be concluded that the hypothesis of " as a component of information technology dimensions , mechanism (

10. Discussion and conclusion

principles, disciplines and methods, improvement and development mechanism, evaluating and financial mechanisms) is effective in the organizational transformation of general department in Guilan province", corresponds to the research of Parvaneh Mer'ati labeled "the study of information technology effect and existing systems in human force culture, instruction, efficiency, career satisfaction of human force in management and planning organization of Tehran province".

3. the results of testing sub-hypothesis 3: it can be concluded that the hypothesis "as a component of information technology dimensions, mechanisms (software, hardware, network and communications) are effective in organizational transformation of general department in Guilan province", thus it corresponds to the research of Esmail Delpasand labeled "the study of computer system function in general department of registration of Fars province according to efficiency".

4. the result of testing sub-hypothesis 4: it can be concluded that the hypothesis "as a component of information technology dimensions, structure (organizational, related infra organizational, universal) is effective in the organizational transformation of general department of education in Guilan province, thus it corresponds to the research conducted by Bezweek and Igbo, "high effect of information technology on communications, organizational structures, management and organizational efficiency", to the research conducted by Bloom et al. "the effects of information technology on the structure and organizational levels", and also to the research conducted by Baninajarian et al. the assessment of the role of applying email in improvement of staff performance of Malawian firm.

Since, there is no evidence for rejecting quadratic hypotheses with defined human indices, mechanism, mechanisms and structure, it can be concluded that there is a significant relationship between information technology and organizational transformation of general department in Guilan province.

11. Suggestions and recommendations

Suggestions based on research about development of information technology in office complexes

1. Conceptual principles of information technology in it are the most comprehensive form should be instructed to staff in governmental offices and in a frame based on organizational culture development.

2. Regarding general policies of government in the field of providing electronic government and strategic prospect of education ministry, information technology and official automation have been studied and for an extended research in this field, instead of amateur researches, specialized research team having vast research facilities and experienced university professors with pioneer firm's contribution in official section should be used.

3. In the organizational transformation of every organ particularly education, empowering IT section is so significant.

4. There is a favorable attitude toward information technology among education directors and staff field. Generally, directors know this system to have positive effects in organization function but it is necessary to give more information about the kind of the effect of this system on the organizational functions set by effective instruction.

5. It is suggested to assess the relationship among each of IT dimensions individually and the organizational transformation in education.

6. It is suggested to study the relationship between IT and the organizational transformation in similar organs.

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