Study the Relationship Between Ability of Information Technology and Organizational Agility in Educational Testing Organization

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Abstract: Agility is to identify needs, rapid response, flexibility and concerted practices in the organization. In general, information technology is considered as an enabler of agility in the organization. The usual assumption is that investments in information technology make organizations more agile. However, it is not uncommon that the implementation of information technology in the organization, sometimes may prevent and even cause the disruption of organizational agility. The purpose of this study is to examine the relationship between the ability of information technology and organizational agility in educational testing organization in the country. For this purpose, a sample of 156 people from the community were selected through educational testing organization in Tehran and surrounding towns by simple random sampling. To gather the data, Torng Lin questionnaire was used to measure that the impact of technology on organizational agility factors in four of accountability, competence, flexibility and speed. Data analysis using pearson's correlation coefficient indicates a positive correlation between IT capability and agility of the organization in educational testing organization.

Key words: Information technology, organizational agility, educational testing organization, flexibility, data analysis

INTRODUCTION

Change is the most stable characteristic that can be introduced to the business. Nowadays, companies face severe competition by technological changes and changes in customer demand. This condition diminishes the validity of the traditional model. Therefore, the ability to respond quickly and efficiently, time-based competition and the needs of the customer is a definite character of competitiveness. Ability to respond quickly to changing in market is called agility and is survival factor of firms.

On the other hand, although, the concepts related agility were presented at the beginning to product manufacturing findings but due to the increasing importance of the services sector as a source of competitive advantage in the global economy, public sector organizations and service excellence agility is also important. Agile system is a top priority attention to details. Agile organizations require intensive care and high rate of information exchange of key information; thus, agile organizations require ict flexibility to accommodate and integrate information technology with business processes with unstable conditions is essential.

So, one of the enablers of agility is IT to the degree of perfection of information systems is network and employees and process information systems and networks. From the 1980s, the strategic use of information as an important issue in business and information technology as a competitive weapon has been known.

IT capabilities are unique to reduce costs and improve processes. Public sector as one of the most important parts of the civil service for reasons such as the large number of clients and additional requirements to meet their needs and demands and in line with the development of their excellence in terms of speed and quality and above all needs to agility more than private sector.

Theoretical history: At the beginning of the 21st century, organizations have experienced significant changes to their environment. These changes will lead organizations to new challenges, the lack of attention to their survival and increasingly threatening success of the organization. Organizations to respond to the challenges of business have developed a new approach called agility. Research oriented operations management to the concepts of agility, researchers recommended agility paradigm as new way to deal with such situations. Therefore, some efforts have been done to develop tools to measure organizational agility.

Studies have shown that agile organizations achieved increasing the success rate in the implementation of measures of development than their counterparts. Given

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Table 1: Different definitions of agility

Rows	Researchers	Definition of agility
1	Goldman *et al.* (1995)	Agility means of delivering value to customers, ready to change the value of sharing knowledge and human skills and virtual partnerships
2	Christopher (2000)	Such as the ability of an organization's agility to respond quickly to changes in demand, in both volume and diversity is defined
3	Mason-Jones *et al.* (2002)	Use knowledge of the market and the concept of virtual enterprise to proper operation of the lucrative opportunities in a volatile market
4	Van Hoek *et al* (2001)	Agility is responsiveness to customer and market turmoil and the need for particular skills that can be reached using lean thinking
5	Mason and Towill	Agility is the ability to have insight into demand, fast and flexible response and is keeping operations

the current context of the business world is dominated organizations, organizations would do changes in attitudes, knowledge, attitudes and their expected results.

According to Yansity, factors driving change and uncertainty are accelerating technology and innovation (increasing customer expectations, increasing competitiveness in the environment, advances in information technology, globalization, human resource constraints for skilled and loyal and cultural factors social (Jafarnejad and Shahaei, 2008).

Agility of organization: Agility tem in the dictionary means to move fast, agile, active and able to move fast, easy and quick thinking ability and clever. Since, the early 1990s, agility paradigm was provided as a solution for the management of environmental dynamics and a strategy for empowerment in order to maintain a competitive advantage in the turbulent environment (Table 1).

Agility is related the ability of organization to deal with unexpected changes and advantages of the change as an opportunity and also is associated to company's success in business, profit, market share and attract customers. Agility can be defined a unique feature, an approach (software development), a source (such as IT), an organization, a supply chain or even in a business network.

In fact, the ability to be agile means rapid change in the business, beyond the normal level of flexibility. Other definitions of agility are presented in Table 1. Organizations should control their condition always after observing first change because in the absence of a change in circumstances, the competitors were aware of the situation and try to remove them from the scene of their competition.

Since, agility is a concept and philosophy is not limited to a specific part of the organization to achieve agility but also the entire organization components must be agile. Organizations should design principles used by managers and staff, tools, equipment and organizational culture and organizational structure to make them

agile. Agile organization established to respond to environmental changes and meet the changing requirements of customers.

Basically to do a set of capabilities and skills is needed. The most important factor of driving agility is change. Even if the change is not a new issue, changes occur today faster than ever before. The turmoil and uncertainty in the business environment, the Organizations has become one of the main causes of failure. The number, types and characteristics or change cannot be easily changed because they are unlimited.

Different institutions with different characteristics experience different changes that provide a unique to themselves but basically agile organizations go beyond compliance with changes in thinking and willing to take advantage of potential opportunities in a turbulent environment and gain a strong position for innovations and their own merits. This causes the position unavailable of agile organizations to competitors. Moreover, agile organization focused on design or develops products that enable them to respond to customers' needs.

Information technology: Information technology is tools and methods used in different ways to collect, store, retrieve, process, analyze and distribute data. IT ability is defined as an ability of a company to acquire, deploy, combine and reconfigure IT resources in order to support and strengthen the business strategy and business processes.

In fact, capability is very important for IT organizations to understand the business value and maintain competitive advantage. Although, current researches show the link between the organization's extensive ability and competitive advantages in organizations information technology (Bhatt and Grover, 2005). But still there is limited understanding of IT ability and how it relates to organizational agility in the current business environment (Kohli and Grover, 2008).

- First hypothesis: there is positive correlation between capability of information technology and organizational agility

Table 2: Influential studies about multiple factors in achieving agility in IT deployment

Factors	Resources
Knowledge and keep pace with technological innovations, looking for new ways to improve the effectiveness of the use of information technology, organizational atmosphere encourages experimentation of new information technologies	Weill *et al.* (2002)
Clear insight into the role of IT invalue creation for th ebusiness; integration of strategic planning and IT planning, understanding the value of investment in information technology and commitment to investment, planning and development of a flexible and effectiv eprogramin placefor IT	Mata *et al.* (1995) and Jharkharia and Shankarit (2004)
Architecture and product data management (databases, availability ofdata, sharingdata), communications services network (LAN, reliability, quality of communication, availability), application service	Jharkharia and Shankarit (2004)
Desire, lack of strength and commitment of senior managers	Jharkharia and Shankarit (2004)
Understanding needs of our customers and strive to meet them	Vijayasarathy and Turk (2012)
Doactivities as a virtual organization, high automation and flexible equipment with the use of technology	Ching-Torng and Hero Ch. Po-Young Ch.

Agility and IT: Over nearly two decades, after the introduction of agility topic in 1991 in Yakoka Institute at Lehigh University, in the west, many study were presented and different models have been proposed. After peter drucker that for the first time introduced the agile institute to the business world, many experts such as Goldman *et al.* (1995) and Sharifi and Zhang (1999), etc. explained and outlines the dimensions and agility in level of organizations.

Although, basis ofagility component returns to Goldman and his colleagues but mentioned other names helped to the development and growth of this concept and in terms of environmental conditions and organizational situations added components and axles to its original dimensions. Previous studies generally argue that agility can provide "data pathways" to match the flow of information in the organizations and creation of digital options; it is able to make decisions quickly, enhancing communication and rapid response to the situation to change it (Lucas Jr. and Olson, 1994).

Accordance with these researches, information technology and information collect, process, store, analyze and disseminate information to pay for a particular purpose. IT function distinguishes concept of others agile manufacturing-production philosophy. In agile organizations, information systems should be viewed as enablers of agility (Overby *et al.* 2006).

Because of relationship between the constant aspects of IT and the consequences of it the researchers noted that IT can sometimes be an obstacle to achieving agility in the organization (Lucas Jr. and Olson, 1994; Overby *et al.*, 2006; Weill *et al.*, 2002).

About role of information technology in organizations agility, many researches have been conducted that include:

- Allen: existence information systems to achieve optimum agility

- Lucas: information technology has considerable impact on organizational agility by accelerating theprocessing of information and rapid response to changing conditions
- Zaheer and Zaheer (1997): the use of information networks leads to knowledge and respond quickly to the changing market
- Weill *et al.* (2002): IT infrastructure will lead to strategic agility
- Overby: IT is caused to agility by the expansion and enrichment of knowledge
- Fink and Neumann (2007): technical and behavioral competencies of information technology lead to strategic agility
- Zhang: information systems is one of providers the agility
- Tallon (2008): technical capabilities of information technology and information technology skills are effective managers' agility
- Lu and Ramamurthy (2011): information technology is one of the enablers of operational agility

In Table 2 can see influential studies about multiple factors in achieving agility in IT deployment:

- Second hypothesis: ability of information technology to enhance the IT systems and these are effective on organizational agility jointly

MATERIALS AND METHODS

This study seeks to identify the impact of information technology on organizational agility, so this is applied study. The method of collecting data in this study is a combination library-based methods (study of literature and history and familiarity with the experience and understanding of knowledge management and organizational agility inside and outside of Iran), field research (interviews with experts and consultants, expert guided half in order to understand the industry and

Table 3: Demographics of research

Variables	Number	Percent
Gender		
Men	113	59.0
Women	76	40.0
Age		
20-29	22	11.0
30-39	101	53.0
40-49	59	31.1
50<x	7	3.0
Education		
Associate degree and lower	11	5.0
BA	81	42.0
MA	66	34.0
PhD	32	16.0
Educational field		
Engineering	70	70.0
Basic science	24	12.0
Human science	92	48.0
Work experience		
X<10	58	30.0
10-20	90	47.0
20-30	36	18.0

Table 4: Average and std. deviation (inter-organizational systems)

Organzations	Average	Std. deviation
Internet	4.260	0.947
Automation	4.125	0.975
Organizational website	4.102	0.983
Server	3.960	1.010
Internet	3.810	1.210
Related software	3.454	1.151
Extranet	3.174	1.320

Table 5: Pearson correlation test research hypotheses (correlation)

Hypothesis	IT	Agility
IT		
Pearson correlation	1	0.582**
Sig. (2-tailed)		0.000
N	189	189
Agility		
Pearson correlation	0.582**	1
Sig. (2-tailed)	0.000	
N	189	189

**Correlation is significant at the 0.01 level (2-tailed)

recognition of the effect of dimensions and measures to improve knowledge management and organizational) and survey (data collection from research sample).

Before the final assurance to tools and their application in the main stage of data collection it is necessary that through scientific research to obtain the relative confidence necessary to allow the use of the tool. Therefore, to ensure that the appropriate measures have been developed can be used two measures of reliability and validity. Validity and reliability of measurement instruments from two different perspectives studied in this research is discussed. Generally from the experts is used about the test questions (the validity of the content). On the other hand, the Cronbach's alpha was used to assess reliability.

Cronbach's alpha is achieved 0.95%. Total sample size, according to Morgan table includes 185 individuals

who were selected by simple random sampling. In the present study, Torng Model Lin *et al.* (2006a, b) have been used. In this model, the impact of technology on organizational agility factors in four indices of speed (6 questions), competence (7 questions) and flexibility (9 items) are examined. Introductory part of questionnaire (page 1) included questions about demographic variables of participants in research.

In part 1, questions are asked about the use of IT in the organization. Section 3-5 containing 29 closed questions that examine the impact of information technology on organizational agility. In Table 3, the results of the demographics of the participants in research is given.

In Part 1, questions were asked about the use of IT in organizations in Table 4 summarizes the information obtained, are presented. The following information is based on the extent to which people in the organization have been ranked.

As you can see from Table 4, the highest use with an average of 4.26 is by the internet and lowest usage is extranet (inter-organizational systems).

- First question: is capability of information technology positively correlated with organizational agility?

To test the main hypothesis of the study, must first examine whether the relationship between IT and organizational agility exists or not. For this purpose, correlation analysis should be used. Normality results of IT and agility (higher than 0.05 in case "KS" for structures agility = 0.709 and for IT = 0.978) assuming normal distribution of observations is approved (in the attached table have been distributed). As a result, the Pearson correlation test was used to show the correlation (0.569) at the significant level of 0.01 (Table 5 and Appendix 1).

- Second question: capability of information technology enhances the organizations IT systems that the two jointly have a greater positive impact on organizational agility

To investigate the impact of information technology on agility, regression test was used that can see in the following (Table 6). According to data gathered diagonal axis in the chart Q-Q, assuming normal distribution of residuals was confirmed.

A graph of residuals versus predicted values, constant variance for all values of the independent variables showed no uniform trend of increase or decrease and distribution points around the horizontal axis

Table 6: Resultstest of "Durbin-Watson" (correlation)

Model	B	Std. error	β	t-velues	Sig.
Constant value	0.885	0.317		2.789	0.006
Speed	0.141	0.093	0.133	1.517	0.031
Competence	-0.065	0.132	-0.054	-0.489	0.025
Responsiveness	0.487	0.112	0.432	4.342	0.000
Flexibility	0.200	0.097	0.167	2.057	0.041

Dependent variable: IT

Table 7: Result the regression model, using analysis of variance

Standard error	Square of modified correlation coefficient	Square of correlation coefficient	Correlation coefficient
0.633	0.353	0.367	0.606

assumed to be proportional and there is no concern about the instability of the variance in the dependent variable. With the independence of all observations was performed using "Durbin-Watson" on the residuals.

Given the proximity of the test of "Durbin-Watson" to number 2 (1.824), assuming no correlation between successive data for the model is already established.

Variable such as speed, competence, responsiveness and flexibility were entered to the regression model as the agility components. t-statistics of predictions are significant with respect to regarding the beta, responsiveness variables is a better predictor. In general, the responsiveness variable explains 0.432% of the variance agility. Adjusted R^2 of these three variables are 0.367.

This coefficient shows that >43% changing using IT in agility of is caused by changes in "responsiveness" and >67% of agility changing is result of the other three variables. After responsiveness index, flexibility is second indicator in which agility is increased using IT. The overall fit of the regression model, using analysis of variance was performed to test the validity of the model and the low level of significance (0.000) showed a good fit to the model (Table 7).

RESULTS AND DISCUSSION

In this study, the relationship between the use of information technology and organizational agility Educational testing organization is evaluated. For this purpose, 4 agility indices such as "speed (6 questions), competence (7 questions) and flexibility (9 items)" and the application of information technology in the form (7) were examined. To answer the first question of the study, pearson correlation test was used and the results show positive correlation (0.582) between these two variables.

Then, regression model was used to answer the second question. Data from this study shows that the use of information technology was effective on responsiveness, flexibility, speed and finally competence. The most important component of information technology plays an important role in the organization agility was

employee access to the Internet as well as logging and reporting systems that process more convenient for employees and managers. Therefore suggested to organizations use decision support systems.

The results obtained in this study (Huanga *et al.*, 2012) have also been approved. The findings correspond to the results of many other studies so that the indicators in this study were confirmed in previous studies, including Akbulut (2002) IT capabilities to organizations government have been identified.

CONCLUSION

Given the importance of the use of information technology in organizational agility it is suggested that a comparative advantage in adopting new technology and capabilities than previous technologies or similar and should be considered as superior to previous technologies or similar will have to introduce it is to the organization.

RECOMMENDATIONS

Also recommended, secure and reliable technologies to ensure the sharing and exchange of information carefully considered. By strengthening the organizational environment and culture that encourages change and be receptive to new technologies with the support of senior management can be an effective step in facilitating the acceptance of new technologies. Also, attention to building up mutual trust within and outside the organization to enhance cooperation and coordination between different departments will have an important role in the adoption of innovation.

Since, amount of agility in all the following criteria related to two measures of responsiveness and flexibility at high speed and eligibility criteria were moderate, therefore is obvious that the focus should be more on improving standards of speed and competence criteria of competence and flexibility to be considered.

APPENDIX

One-sample Kolmogorov-Smirnov test

Parameters	IT	Chaboki
N	91	91
Normal parameters[a]		
Mean	3.8507	3.9451
Std. deviation	0.78909	0.57217
Most extreme differences		
Absolute	0.103	0.074
Positive	0.073	0.033
Negative	-0.103	-0.074
Kolmogorov-Smirnov Z	0.978	0.709
Asymp. Sig. (2-tailed)	0.295	0.696

[a]Test distribution is normal

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