

Investigating the Effect of Comparative Pressure and Environmental Changes on the Relationship between Information Technology and Organizational Agility (Case Study: Ilam's Petro Chemistry)

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DOI: 10.6007/IJARBSS/v4-i12/1347 URL: <http://dx.doi.org/10.6007/IJARBSS/v4-i12/1347>

Abstract

The current study is aimed to investigate the effect of comparative pressure and environmental changes on the relationship between information technology and organizational agility. This is a descriptive – measuring study in which structural equations modeling has been used. Populations included 504 employees of petro Chemistry Company of Ilam among whom 119 ones were selected as the sample by use of Cochran's formula. Data was gathered by use of a standard questionnaire. In order to examine the reliability and credibility of the questionnaire, Cronbach's method was used ($\alpha = .91$). Data was analyzed by use of structural equations modeling and Lisrel's software. Results show that there is a meaningful relationship between information technology and organizational agility. Moreover, the variable comparative pressure acts as a mediator.

Keywords: Agile, Organization, Information Technology, Comparative Pressure

1- Introduction

Today, organizations confront with some challenges including instantaneous changes, unpredictable changes, high quality and different customs. The organizations, therefore, are obliged to have different procedures in order to preserve their position. Agility is one of the

modern procedures. The agile organization should be able to seize the opportunities created in a turbulent environment and reach a stable position for its sake. Agility is refers to a kind of ability by which the organization is able to contrast with rapid changes of the market (Ebner, 1990). The word "agile" means rapid and active movement, the ability of moving rapidly and the ability of thinking cleverly (Hornby, 2000). One of the key issues relative to the agility of an organization is the ability of managing human resources in order to support organizational flexibility. It is important the organization to be succeeded without regarding the information related to the human resource. Agile production challenges the manager's comfort because of the product development and accessible information (Crocitto & youssef, 2003). The agile organizations should emphasize on design and development of products by which the customers' requirements are obviated. When traditional procedure fails, it is necessary to design new products rapidly and effectively. In addition, the priority of such systems is the high volume of their informational contexts. Therefore, the agile organizations need advanced and flexible informational system by which the flow of information is guaranteed. Moreover, such organizations should be able to match various conditions by use of reliable standard and protocols proportional to between – organization information. Furthermore, it is necessary the organizations to use modern information technologies in order to form a perfect relation between the employees and integrate the members of the organization, including customers, suppliers and cooperators.

2- Review of literature

2-1- Agility

Jenny et al (2003) believethat the appearance of production systems depends on the variable customers' demands during various periods. In the early 1990, the authors presented a comparative approach for the organizations based on the customer's demands. The authors' study "The strategies of productive organizations in 21th century "is a landmark in the research on "agility" (Nigel& Dave, 1991). The conditions to which the agile production is related include: (a) short – term production, (b) variety of products in comparison to unpredicted demand, (c) an exiguous budget and high profit and (d) completion based on the products' means. Regarding the definitions related to the word "agility", this is to say that an agile organization is one which satisfies the clients by presenting ordered products (Zanjiri Chi &Olfat, 2010). The strategic capabilities of an agile organization include (Sharif & Zhang, 1999):

- Responsibility: the ability of recognizing changes and responding and resisting them reactively.
- Worthiness: Worthiness refers to a set of abilities by which the organization can reach its goals through its productivity and effectiveness.
- Flexibility: the ability of doing works and achieving various goals by the same facilities.
- Speed: The ability of doing works at the shortest possible time.

2-2- Measuring the agility levels

There are many evidences related to the change of abundant production systems and agile production ones. In so doing, various procedures are considered among which the Liverpool's model is of great importance. In reality, the model uses the following procedures for having an agile production system:

- Searching in a commercial environment and determining the environmental confusion criterion
- Recognizing the current agility of the organization and the agility criterion
- Determining the current performance of commercial environment and agility performance
- Determining the tools needed for comparative improvement of the organization and recognizing the best performance relative to agility
- Presenting an agile methodology (Christopher, 2004).

2-3- Information technology

Information technology has been currently used in various fields. By interesting computer technology and communication technology from 1980, the experts have created a domain named "communications and information technology". Such technology aims to achieve information using communication tools and techniques (Razavi, 2007). Information technology is specially referred to the performance of information proportional to the electronic tools and all management aspects (Ghorbani, 2004). Information technology means to gather, organize and publish information by use of computer and telecommunication tools (Darabi et al, 2007). Information technology is not only referred to the ability of data processing by use of computer , but also to the human and management skills in putting such data into operation. Information technology is referred to the process of production, transfer and protection of information by use of technology. In such process, technology prepares the needed field for exchanging information among persons, groups and organization (Kamari, 2012). Information technology supports the organizational agility through services such as internet, intranet and electronic commerce. There are four main advantages for information technology: (1) increase of the ability of making decision, (2) decrease of expenses (3) decrease of needed time and (4) increase of quality (Fathian&Sheikh, 2005). Information technology affects on the achievement of strategic objectives related to the agility of organizations. It prepares the information needed for recognition of unpredictable changes in organization, improves the organizations' efficiency in order to changer commercial procedures, improves the organization's decision making and increases the quality of products (Sharifi & Zhang, 1999) In order to evaluate the organizations' information technology, 2 main sub structures should be described as the following (Ali Ahmadi, 2004).

- Information system has influence on the organization operations, managerial decision makings and recognition of comparative strategies.
- Computer – based information systems have changed during the current time and such changes have influenced on the managers of information systems (khosro moradi, 2003).
- Information technology includes various fields: electronic commerce, communication management and electronic education (Fathian& Sheikh, 2005).

3- Background

Sharifi& Zhang (1999) presented the meaning – based model of agility which included three main parts:

- **Part one** includes agility stimulants by which the organization is forced to seek a new position for continuing its trade and reaching comparative advantage. Such stimulants cause the organization to review and rebuild its strategy.
- **Part two** is related to the agility capabilities including feedback to environmental change, propriety, flexibility and speed.
- **Part three** is related to the policies of agility including approaches, performances, structures, technology and innovation.

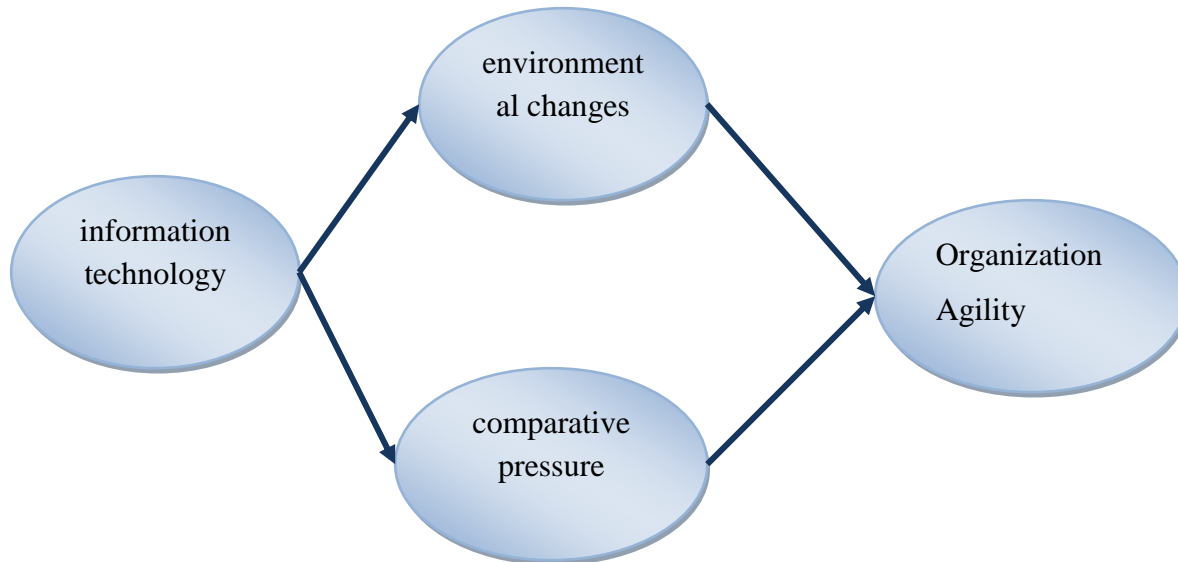
Yusuf et al (1999) presented a 33 – factor set for agility. They divided the factors into four groups: basic priorities of management, false agency, rebuilding capability and knowledge – based organization. In reality, such factors determine the total behavior of the organization.

Rajab Zadeh & Shahabi (2005) presented a model for evaluating agility of government organizations with respect to information technology. Based on the model, there are seven aspects for agility including leadership and management, organizational change, cultural values, performance management, safe guarding changes, information technology and clients' services. Each aspect makes clear the importance of agility in organizations.

By presenting some questionnaires to the managers of small companies and gathering needed data, Fathian& Sheikh (2005) investigated the influence of information technology on agility of the companies with the help of nine fold elements. Finally, They divided the companies into three groups: agile group, semi agile group and no agile group. They concluded that the companies' agility is affected by information technology.

Rahmani (2010) investigated the relationship between acceptance of information technology and organizational agility from the view point of supervisors. Results showed that organizational agility is affected by acceptance of information technology. Moreover, such influence is increased by the managers' tendency to use technology.

Research meaning – based model



Research hypotheses

H1: environmental changes are meaningfully affected by information technology.

H2: Comparative pressure is meaningfully affected by information technology.

H3: Organizational agility is meaningfully affected by environmental changes.

H4: Organizational agility is meaningfully affected by comparative pressure.

H5: The variable environmental changes acts as a mediator in the relationship between information technology and organizational agility.

H6: The variable comparative pressure acts as a mediator in the relationship between information technology and organizational agility.

4 – Methodology

Since the study is aimed to determine the relationship between the variables information technology, environmental changes, comparative pressure and organizational agility, this is to say that it is an application – descriptive study based on the structural equations modeling. There are many approaches for investigating the relationship between the above mentioned variables. One of these approaches is "structural equations modeling". The variable information technology ($\alpha = 93/9$), comparative pressure ($\alpha = 82/5$) and organizational agility ($\alpha = 90/3$). Data was gathered by use of a questionnaire included 9 questions for the variable information technology, 4 questions for the variable comparative pressure and 5 questions for the variable organizational agility. Using gathered data, the reliability of the questions was determined and then the confidence coefficient was determined and then the confidence coefficient was estimated by use of Cronbach 's α . Results show that the questionnaire is reliable.

- **Population and sample**

Populations include 504 employees of Ilam 's petro chemistry company who were randomly selected because of the clarity of sampling frame and behavioral variables.

About 119 ones were selected as the sample:

$$n = \frac{NZ_{\alpha/2}^2 \sigma^2}{\varepsilon^2 (N - 1) + Z_{\alpha/2}^2 \sigma^2}$$

$$n = \frac{504 \times 1.96^2 \times 0.23}{0.075^2 (504 - 1) + 1.96^2 \times 0.23} \approx 119$$

Research variables condition

Table 1: statistical universe average ($H_0: \mu = 3$)

Variable	Average	SD	P – value	Min	Max	Variable condition
Information technology						Suitable
Environmental changes						Suitable
Comparative pressure						Suitable
Organizational agility						Suitable

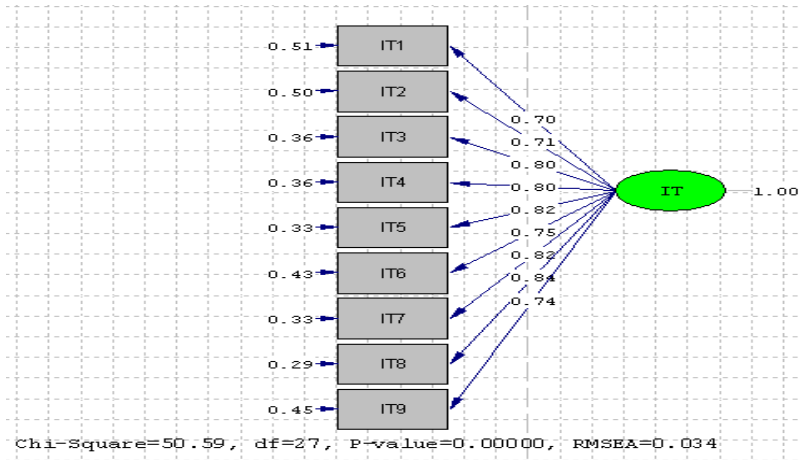
Research variables measuring models

Before testing research hypothesis, it is necessary to examine dependent and independent variables by use of confirmatory factor analysis model. This model is one of the old statistical models used for investigating the relationship between hidden factors and unhidden questions variables.

A) Dependent variable measurement

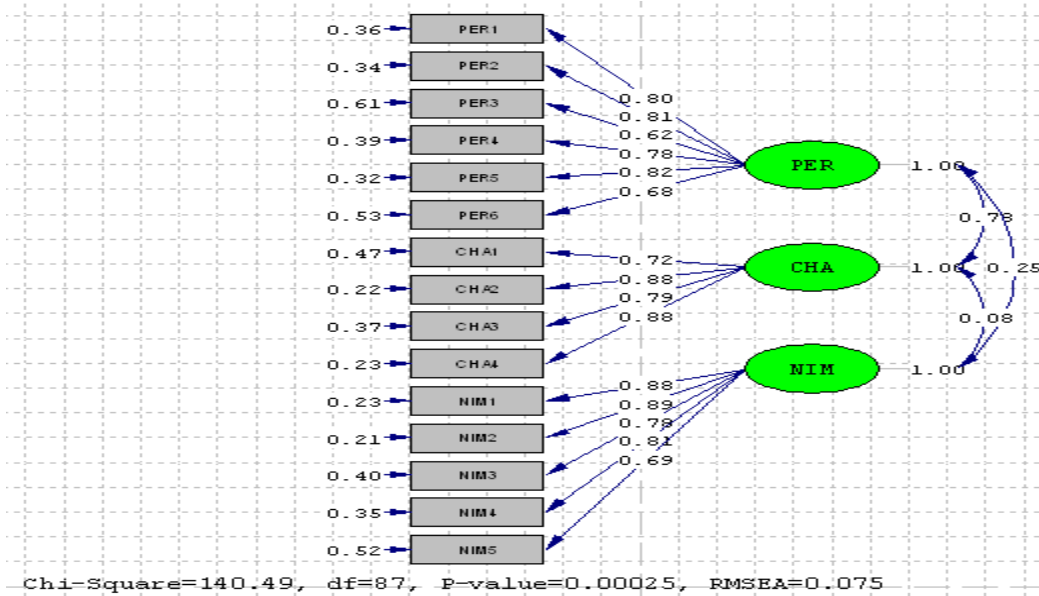
Results of confirmatory factor analysis related to the variable information technology showed that the model is suitable and all parameters are meaningful.

Figure 1: Standard estimation model



B) Independent variables measurement

Figure 2: Standard estimation model



Results showed that the model is suitable and all parameters are meaningful. The criterion related to eh measurement model are shown in the figure above. As seen, the model is suitable and there is a positive and meaningful relationship between the dependent variables.

Path analysis

Figure 3: Standard estimation model

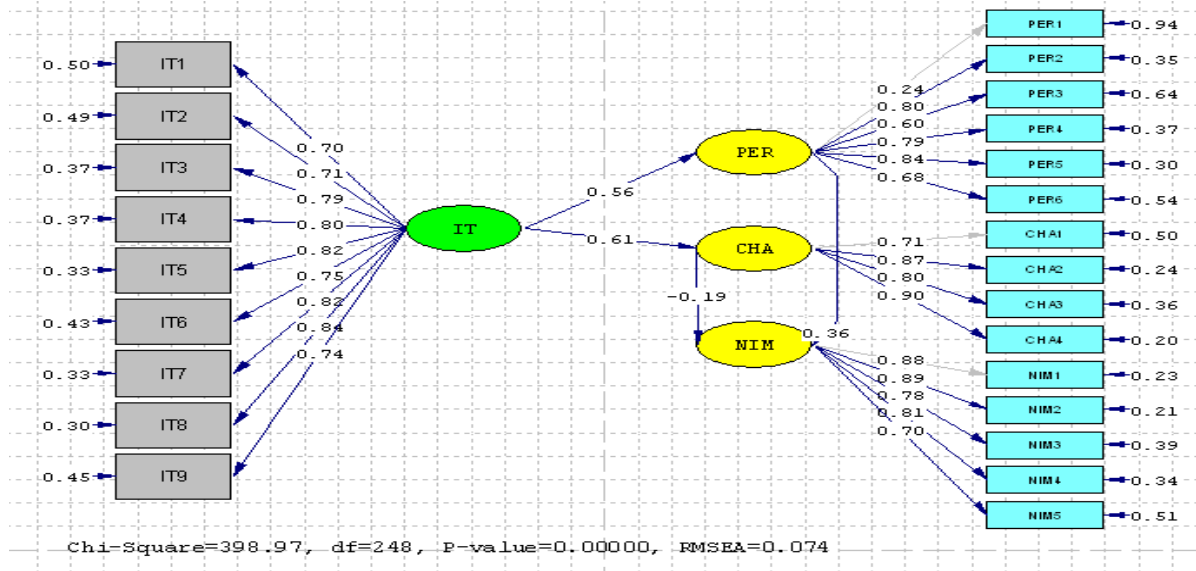
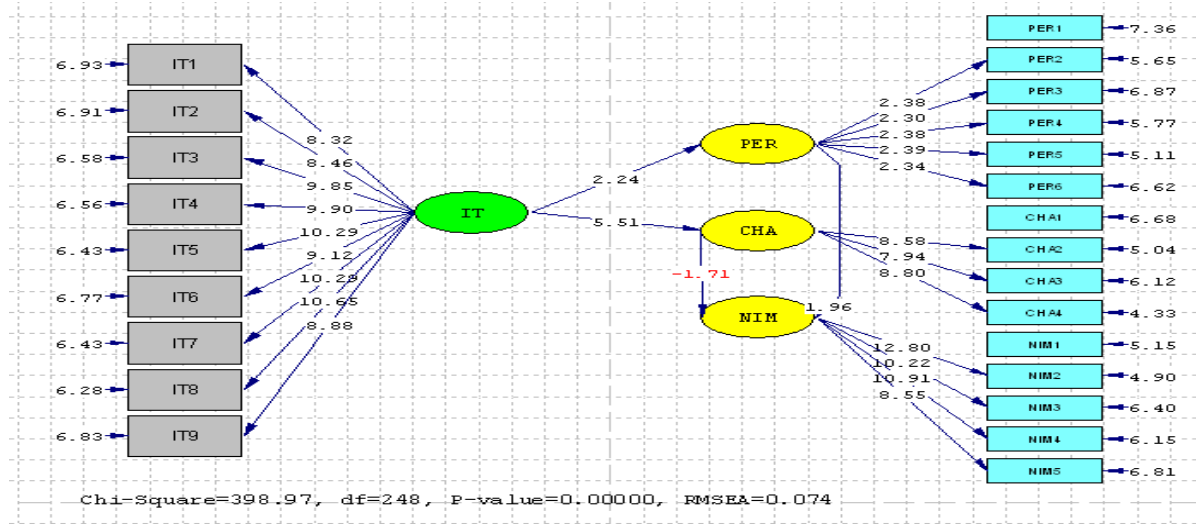


Figure 4: Meaningful values model



Hypothesis test

As mentioned before, the model is suitable from suitability perspective. Moreover, results showed that the variable information technology has positive and direct influence on comparative pressures (hypothesis 2). Furthermore, organizational agility is affected by comparative pressures (hypothesis 4). The variable comparative pressure is regarded as a mediator and hypothesis 6 is accepted. Due to the results, it became clear that the variable information technology has an indirect and positive influence (/201) on organizational agility. Results showed that the variable information technology has positive and direct influence on environmental changes (/61), but there is no meaningful relationship between environmental agility and organizational agility. Therefore, hypothesis 4 is not accepted.

5- Conclusion

During the current era, information technology has been considered as the main industrial revolution by which new capacities are created in the field of human knowledge. Today, all organizations aim to use information technology system. Information technology affects on the main criteria of the organizations. Organizational agility is usually affected by information technology. Agility refers to a set of abilities and capabilities which affect on the organizational development. This study aims to investigate the relationship between information technology performance and organizational agility. Results show that environmental stimulants have no influence on agility of organizations and agility is mainly affected by intra organizational factors. On the other hand, comparative advantage helps the organizations to control the market. Information technology prepares comparative advantage by helping organization to fulfill strategic objectives and increase productivity. As mentioned before, various aspects of information technology affect directly on comparative pressures and organizational agility. Ashlee argues that agility affects on the distribution of measurement and integration of resources and facilities. Information technology helps the groups to be in communication with each other, makes sub structural transfers possible and simplifies computer modeling. All factors create organizational agility and comparative advantage. Results show that the comparative pressures affect directly on the organizational agility.

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