

Investigating and Explaining the Relationship between Inter-Organizational Factors and Organizational Agility by Using Structural Equation Modeling Method

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Abstract

This study investigates the inter-organizational factors influencing organizational agility. In this study, factors such as organizational agility, information technology, organizational structure and organizational culture are mentioned. The research methodology of data collection is descriptive-survey which is considered as an applied research. Questionnaire (as primary sources) and also books, articles, theses and databases as secondary sources are used to collect the data needed to investigate the research hypotheses. The data collected from the questionnaire is initially entered into SPSS software for descriptive statistics and PLS software is used for inferential statistics and extraction of confirmatory factor analysis model and structural model. The research population is consisted of managers of the development of a Mapna company and due to the limited population the census method is used. This study is done with the expression of the general problem of inter-organizational factors influencing organizational agility. The data analysis results confirm the positive and direct impact of components. Since the t-values obtained for each of these components is a positive value, it could be clearly claimed that the impact of each of these components has a positive impact.

Keywords: agility of organization, information technology, organizational structure and organizational culture.

Introduction

The existing variations in customer demands, market atmosphere and technological innovations

have encountered companies with increased competition. This critical condition led to the revision of business priorities and strategic perspective and also reduction of reliability of available organizational models. In such a competitive market, the need for flexibility and improvement of accountability to customers is essential and considering agility is needed to survive. Thus, companies must achieve a level of agility in organization and internal processes to outpace of competitors in global markets. An agile organization covers a set of internal processes, structures and organizational culture and information technology that are distinct from each other and yet in terms of working have dependencies to each other. The agile organization emphasizes on increasing adaptability and flexibility and is able to react and respond to market changes quickly and effectively. The agile organization is proposed as the paradigm of the twenty first century and is considered as the winning strategy for companies that are looking for a market leader in the national and international level.

Despite the obvious advantages of agility, organizations by operating in complex environments are confronted with the challenge of organizational agility rate measuring, the relationship of agility with inter-organizational factors and the type and extent of this relationship. The organization's agility is also considered as a crucial factor in strategic and international level. Since the agile organizations feel the existing variations in space quickly, comfortably and with high predictability and with appropriate quality and respond them in the same way; the agility of organization is crucial to its survival. However, most researches conducted in relation to agile organizations have ignored the issues relevant to inter- organization factors.

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The purpose of this study is to investigate and explain the relationship of inter- organization factors including organizational culture and structure, information technology and business processes with organization's agility and measurement of these indicators in a large and project-oriented organization of Mapna. Finally, a tool is presented to measure the agility in organization.

Statement of Problem

Today's organizations are confronted to issues such as rapid, immediate and unpredictable changes, special and personal orders of customers and their expectation in receiving perfect quality and high level services and products. Hence, organizations take different forms to survive and maintain their position and should go across the meander way to move from traditional organization towards the top and pioneer organization. One of the organizational mechanisms to save and avoid the retrogression and achieving the peak of success is to create the agility in organization.

The term agility for the first time was used in America in 1991 to describe the required capacity to modern production. Agility means the ability to respond and react quickly and successfully to the environmental changes.

Like producers, other organizations and institutions are forced to follow agility to compete in the twenty-first century, because modern organizations are encountered to the increasing pressure to find new ways of effective competition in the global dynamic market. Agility increases the ability of organization to supply the high quality products and services and consequently becomes an important factor for effectiveness of the organization. Because many organizations approach virtual organizations and virtual teams are motivated to improve organizational agility and be able to compete globally. Many organizations turn to approaches like virtual organization and virtual teams to improve organizational agility and can compete globally. However, sometimes agility may be considered as integration in the processes, members and also features of organization with advanced technologies.

Many factors limit the adaptability of organizations with environmental changes and convert the opportunities provided for organization to threats and make competition difficult and costly. Appropriateness of technical and structural factors of or-

ganizations as well as organizational culture with internal and external variations and developments are the fundamental issues of the organizations. Appropriate reaction and conscious response to the complex developments place organizations under the classification of the social open systems which continuous variation and development is the integral part of their nature. Therefore, organizations as the social open systems should vary and complicate their internal mechanisms and structures according to the principle of affirmative diversity commensurate with the environmental complexity and in continuous interaction with the environment, create changes in their main constituent elements (structure, functions, roles, behaviors, goals and culture) and also in some peripheral elements. So, if these variations and conscious responses to environmental developments to be occurred based on the specific model and pattern, would lead to the establishment and continuity of one or more factors within the organization. (Jafarnezhad & Zarei, 2006)

This question raised here is that how the design and creation of inter-organizational factors such as culture, information technology and structure will lead to the creation of competitive advantage and agility for the set of organization (Bahmani, 2007) What are the dimensions of this agility to determine the overall behavior of the organization? What is the impact of inter-organizational factors architecture on agility of organizations?

Since, the main objective of this article is to investigate the effect of inter-organizational factors especially the culture and organizational structure on the agility of organization, therefore, the studied variables include culture, information technology and organizational structure which their effect will be examined on organizational agility in this article.

The significance of study

Rapid technological developments, enhancement of risks, globalization and privatization expectations are the environmental characteristics that the current business organizations are facing to them. In order to be successful in this environment, agility creates a competitive advantage that can be maintained with innovation and quality. Agile organization synchronizes the organization's processes and members with advanced technology

and obviates the customer needs based on its high quality products and services and in relatively short time frame. However, this situation occurs when agility to be considered as a systematic organizational value and a competitive strategy for leaders and for this reason, the relationship between organizational agility and inter-organizational factors that the most important of them include organizational structure and culture will be discussed in this article. The subject of agility is a relatively new area which requires to be examined in terms of identifying the inter-organizational factors effects. The importance and necessity of conducting this research refers to the necessity of its subject that the organizations can use it to benefit from the environmental conditions and utilization of variations as the hidden inherent opportunities in the environment and the ability to respond effectively to customer and attracting their satisfaction and ultimately for surviving and progressing with constant and unpredictable changes. Also, organizational agility directly effects the organization's competitive position and reduces organizational costs, so agility is considered crucial for the organization and its results are directly involved in the success of organizations.

The conceptual model of study

One of the best ways to cope with environmental changes refers to guiding organization toward being agile namely an organization that is designed and built in an agile form. The agile organization is a unique organization that can carry out their activities more efficiently. Accordingly,

one way to achieve agility in the organization refers to the proper shaping of inter-organizational factors. An appropriate pattern for the role of organizational variables in facilitating agility of organization can be found through investigating the effect of inter-organizational factors such as organizational structure and culture on the agility of organizations. Hence, the general objective of this study is to investigate and determine the relationship between inter-organizational factors and agility of organizations and also particularly the impact rate of inter-organizational factors on organizational agility is obtained. By revealing the impact of inter-organizational factors on agility rate of organization and its measurements, the Development Company 1 would be able to conduct the relevant practical planning and actions to improve the factors and variables affecting the agility of organization. This study is an applied one because it seeks to identify inter-organizational factors as well as the analysis of organizational culture and structure and their impacts on organizational agility. The Bahman Group Company has codified structure and systematic organizational culture and is exploitable, therefore, in selection of studied location, it is tried to select a company that has validation and a personnel with appropriate education until, in addition to the existence of a common understanding of the agility concepts, they should have the evaluated capabilities in an appropriate extent and the diversity and plurality of the existence of different organizational and working parts to be observed in them.

According to the conducted studies, the research model is as follows:

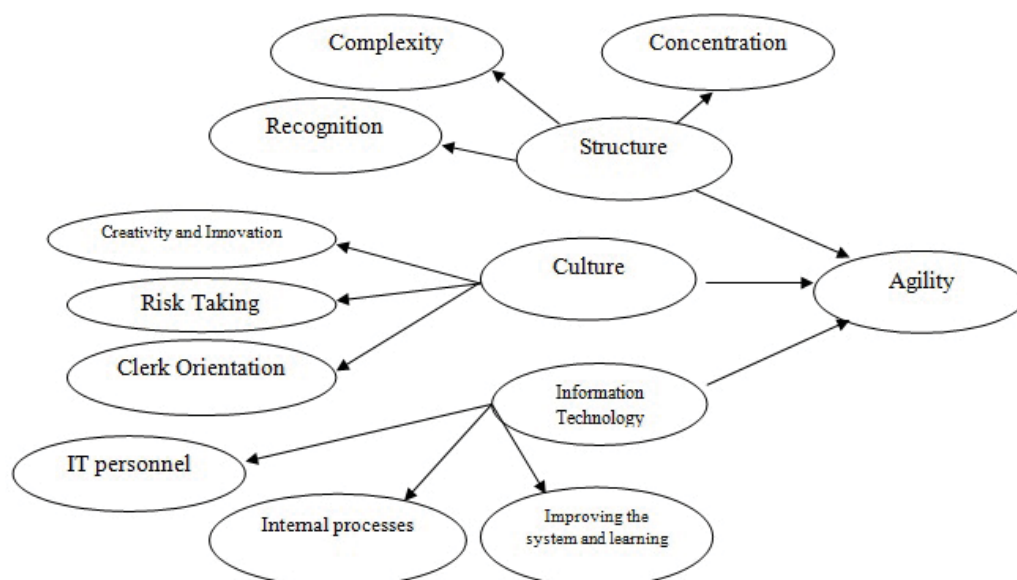


Figure 1. The conceptual model of research

Research hypotheses

1. The organizational culture has a significant impact on organizational agility.
2. The organizational structure has a significant impact on organizational agility.
3. The information Technology has a significant impact on organizational agility.

Methodology

The researcher collected data from population (Statistical Sample) with appropriate tools and by analyzing, processing and converting them to data tries to test the hypotheses. The variety of tools is needed to collect data. The type of tools depends on the various factors including the nature and method of study (Khaki, 2009, p.239)

In this study, two data collection methods are used including the Survey method, in which a questionnaire is used as a data collection tool in survey method, an library method, which is used as a data collection tool in this method.

The statistical population and sampling methods

When the population was defined, the sample that adequately represents the populations' features were extracted. In fact, the scientific method of sampling refers to the selection of a sample from complete list of sampling units which is called the sampling frame (Iran Nejad Parizi, 2007).

Sample : Sample of finite population is an investigation that encompasses all population units. In many cases, the implementation of sample is possible in a finite population. In this study, the sample were the senior managers of Bahman group that are accessible. The number of population is 120 people.

The research measurement tool

Hypotheses are proposed as the possible conscious thoughts, guesses, solutions and responses about the research problem. Researchers should collect the required data from the statistical population (sample) by using of tools and test the research hypotheses by analyzing, processing and converting them to information.

The secondary sources including books, magazines, articles, and digital and physical resources are used to collect the research literature that by using them the appropriate information is obtained about research subject and literature and also tak-

ing notes tool is used as the library data collection methods.

The questionnaire tool is used as the survey data collection method to collect the statistical data. The Likert scale is used in the questionnaire, noting that the respondents are asked to express their response or evaluation towards an idea, behavior, belief, etc., based on the objective or subjective criteria in the response range between agreement and disagreement.

Data analysis tools and methods

The research hypotheses are tested by analyzing and processing data which is collected through suitable tools. The data collection needs different tools. In this way, the research nature and method determine the type of tool (Khaki, 2010). Factor Analysis is used to discover the infrastructural variables of a phenomenon or to summarize a set of data. The correlation matrix between variables is the primary data for factor analysis. Factor analysis does not have the predetermined dependent variables. The use of factor analysis can be divided into two general categories: exploratory and confirmatory objectives. If there is not any guess about the structure of relations between items, the exploratory factor analysis is used, but if the items have been identified based on the dimensions, the confirmatory factor analysis should be used.

In exploratory factor analysis, the researcher seeks to study the experimental data in order to explore and identify indicators and also the relationships between them. There is no certain model here. In other words, in the exploratory analysis, in addition to having the proposed or exploratory value, we can make structure, model or hypothesis. The exploratory analysis is used when the researcher has insufficient pre-experimental evidence to form hypothesis about the number of infrastructural factors of data and in fact, to be interested in discovering data to determine the number or nature of the factors that justify the variance between variables. Therefore, the exploratory analysis is considered as a method to compile and produce a theory, not a method to test the theory. Also, in this study the exploratory factor analysis is used to examine the relationship between indicators. In this study, two data collection methods are used. The structural equation modeling method is used to analyze the data and test the research hypotheses. The structural equation modeling is a multivariate and powerful technique of multivariate regression fam-

ily and more precisely, a general linear model which allows researchers to test a set of regression equations simultaneously. Structural equation modeling is a comprehensive statistical approach to test hypotheses about the relationships between observed and latent variables which is called as the structural analysis of covariance and causal modeling, however, the dominant term of structural equation modeling or in short is "SEM". Through this approach, the acceptability of theoretical models can be tested in the specific population by using the correlation, non-pilot and pilot data. The descriptive and inferential statistics will be used in this research. The parametric and nonparametric statistical method is used to analyze the data. The data is described by frequency distribution table and multivariate regression method is used to prepare variables to utilize the structural equation method (SEM) and finally, the research hypotheses are examined by PLS Software and T-values test.

Descriptive Statistics

Table 1. Frequency distribution of gender, education and working experience variable

		Frequency	Percentage
Gender	Female	15	13
	Male	105	87
Age	<30	18	15
	40-31	45	37
	50-41	31	26
	More than 50 years	26	22
Education	BA	87	72
	MA	27	23
	PhD	6	5
Work experience	<5	12	9.8
	10-5	47	39.2
	15-11	28	23.5
	>15	33	27.5

Structural model (path analysis model)

Figure 2 shows the research model in the state of significance coefficients (t-value). In fact, this model tests all measurement equations (factor loadings) and structural equation by using the t-statistic. According to this model, the path coefficient and factor loadings are meaningful at the 95% significance level, if the t-statistic value to be out of

-1.96 to +1.96 ranges. The t-values calculated for factor loadings of each indicator with its latent construct or variable is over 1.96. Therefore, the alignment of questionnaire's questions to measure concepts can be showed valid at this stage. Actually, the results of above table show that whatever researcher intends to measure by questionnaire's questions is achieved by this tool. Therefore, the relationships between constructs or latent variables are attributable. The fit indices should be studied to show that these obtained values to what extent are consistent with the existing facts in the model.

Table 2. Results of hypothesis testing

Result	P	T-statistics	Path coefficient (β)	Research hypotheses
+	<0.05	4.234	0.299	Organizational culture → organizational agility
+	<0.05	3.533	0.237	Organizational structure → organizational agility
+	<0.05	2.538	0.164	Information technology → organizational agility

The results of hypothesis testing

Hypothesis 1: The organizational culture has a significant impact on organizational agility.

H0: The organizational culture has no significant impact on organizational agility.

H1: The organizational culture has a significant impact on organizational agility.

According to the Table 2, the effect of organizational culture on organizational agility has path coefficient of 0.299 with t-value of 4.234. The t-value for this parameter (according to the five percent error rule in the area of null hypothesis rejecting for the values out of -1.96 to +1.96 ranges for each parameter model) is calculated greater than 1.96. Therefore, it can be stated that the hypothesis is confirmed with 95% reliability. In other words, organizational culture has statistically significant effect on organizational

agility and due to the positive path coefficient it can be said that the relationship between these two variables is positive and significant. Thus, in 95% reliability level, it can be expected that the enhancement

of organizational culture will lead to the increase of organizational agility in the positive direction and any weaknesses in the organizational culture will follow the organizational agility reduction.

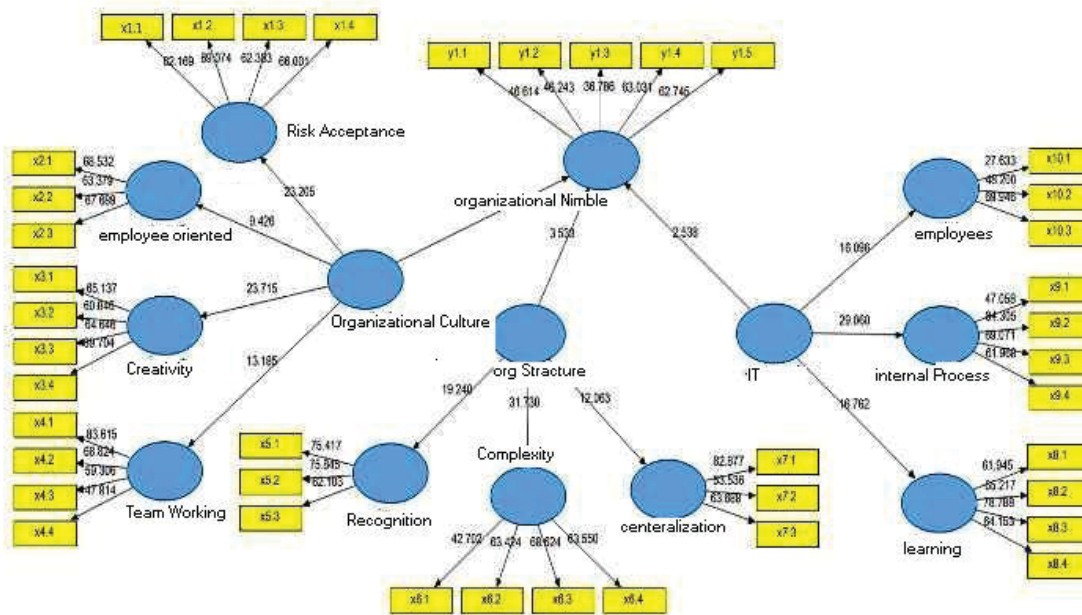


Figure 2. The main research model in the significant state (t-value)

Hypothesis 2: The organizational structure has a significant impact on organizational agility.

H0: The organizational structure has no significant impact on organizational agility.

H1: The organizational structure has a significant impact on organizational agility.

By looking at the table 2, the impact of organizational culture on organizational agility has the path coefficient of 0.237 with t-value of 3.533. The t-value for this parameter (based on the five percent error rule in the area of null hypothesis rejecting for the values out of -1.96 to +1.96 ranges for each parameter model) is calculated greater than 1.96. Therefore, it can be said that this hypothesis is accepted with 95% reliability. In other words, organizational structure has statistically significant effect on organizational agility and according to the positive path coefficient it can be stated that the relationship between these two variables is positive and meaningful. Therefore, at 95% reliability level, it can be expected that the organizational structure increasing will lead to the enhancement of organizational agility in the positive direction and any weaknesses in the organizational structure will follow the reduction of organizational agility.

Hypothesis 3: The information technology has a significant impact on organizational agility.

H0: The information technology has no significant impact on organizational agility.

H1: The information technology has a significant impact on organizational agility.

Based on the table 2, the impact of information technology on organizational agility has the path coefficient of 0.164 which has the t-value of 2.538. The t-value for this parameter (based on the five percent error rule in the area of null hypothesis rejecting for the values out of -1.96 to +1.96 ranges for each parameter model) is calculated greater than 1.96. Therefore, it can be concluded that this hypothesis is verified with 95% reliability. In other words, the information technology has statistically meaningful effect on organizational agility and due to the positive path coefficient it can be stated that the relationship between these two variables is positive and meaningful. Therefore, in 95% reliability level it can be expected that any weaknesses in the information technology will follow the organizational agility reduction and the information technology increasing will lead to the organizational agility enhancement in the positive direction.

Recommendations arising from the results of research hypotheses

The study tried to investigate the impact of inter-organizational factors on organizational agility in the Mapna Company based on the defined conceptual model. The research results show that all the mentioned factors including information technology, organizational structure and culture has a significant impact in creating an agile organization. As a result, company managers of Bahmani group should provide a condition to establish an agile organization by creating a favorable atmosphere in the area of three expressed variables.

- The results of the first hypothesis approve the positive impact of organizational culture on organizational agility. According to this hypothesis, the creation of suitable culture is essential for agility of organization. In this regard, managers should try to give opportunity to individuals in order to propose new suggestions.

- Appreciating of the innovative individuals and managers

- Enhancing the employees' morale and confidence

- Encouraging employees to work in hard situations.

- Encouraging employees to try new ways.

- Allowing employees to speak about the issues related to their work.

- Giving opportunity to each employee to improve the quality of their work.

- Participating employees with authorities in performing their work.

- Creating effort spirit among employees.

- Authorities pay more attention to the results of collaborative work.

- Performing tasks in the group and team form to be possible.

The second hypothesis testing results confirm the impact of organizational structure on organizational agility. This hypothesis indicates that the structure of organization has a crucial role in creating agility.

The team, partnership and organic structures have more ability to create agility. Therefore, it should:

- Supervisors and middle managers to a large extent make decision regardless of the rules, written procedures and policies.

- In the collection of data for decision making, senior management has had less direct role and to a

large extent, the delegation of authority to be allocated to lower level employees.

Suggestions for further research

Conducting this study in other companies, it is recommended to conduct this study in other statistical population.

- Investigating the effects of other inter-organizational variables on agility.

- It is recommended to conduct this study in various time periods.

- Conducting this study with regard to external stimuli variables and empowerment of agility

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