

Study the Effect of Turbulent Environment on Business Performance From the view of Agile Manufacturing

Case Study: Joreh Flour Company in Esfahan Province

Azadeh Fakhimi

M.S.C., Industrial management, Islamic Azad University, Branch of Najafabad, Iran

Email: azadefakhimi@yahoo.com

Rasul Aghadavood Ph.D.

Assistant professor, Management Department, Islamic Azad University,

Branch of Dehaghan, Iran

Email: rasool_ghadavood@yahoo.com

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Abstract

In today's dynamic world, the process of globalization and the speed of technological advancements made quick change in markets. Agile manufacturing is an important and crucial factor for manufacturing organizations in order to create value and sustainable competitive advantage in today's complicated and changing environment. Along this goal, organizations should focus on quick buoyancy of information in manufacturing, assembly, distribution, offering etc. the quicker this movement, organizations will response to market's need and demand. This research, in terms of its purpose, is an applied and practical one; and in terms of nature and descriptive method is a survey. The statistical population includes 73 of managers (production and sales) and production and sales workforce in Joreh Flour in Isfahan. Since the population is limited no sampling is necessary. Thus, the whole population is studied. The data collection tool is research-made questionnaire the validity of which was obtained using the standpoints of specialists and scholars in management and the reliability was obtained with a Cronbach's alpha coefficient of 98%. The collected data were analyzed using SPSS and AMOS software programs through statistical tests at descriptive (frequency, percentage, accumulated percentage, average and standard deviation) and inferential (t-test, regression modeling, variance analysis, non- parametric Kolmogorov and Smirnov test, and Freedman non-parametric test) levels. According to the results obtained, all hypotheses except seventh, eighth and tenth were supported.

Keywords: Turbulent environment, Agile human resource, Supply chain integration, Concurrent engineering, Agile technology, Knowledge management, Joreh Flour

1. Introduction

Nowadays, companies are challenged through increasingly competitive commercial environments, rapid changes of such environments, and customers whose expectations are increasing. Even the most traditional companies recognize that their processes and procedures need modification, review, and restore for achieving and maintaining competitive results and estimating customers' expectations (Cook, 2010). In order to achieve such requirements and new conditions, it is necessary to focus on the production strategies as a valuable tool for achieving competitive advantage through flexibility, responsibility, and quality. Indeed, current productive companies facing two-way challenges. From one hand, some new productive technologies and philosophies have emerged for obsoleting existing productive technologies and philosophies. On the other hand, current customers have been more proactive and assertive in terms of short-term products demand and new services. This is why that today's productive companies need to act in accordance with surrounding competitive situations. As a result, a new productive philosophy has been developed that is known as agile production. Now, there is an unanswered question which states that is organizational agility an inevitable necessity and activity in global economy? Since beginning of the 1990s, agile production has been introduced as a productive solution for dynamics and environmental variations management (Sherhi et al., 2007). It also is considered as a practical strategy for enabling organizations to maintain their competitive advantage in variable environmental conditions and productive organizations have accepted it. Although interest of achieving agility is an important characteristic of success in the competitive business environment, but it should be noted that agility and its achievement is not a goal. According to Son and Son, agility is not a goal, but it is an inevitable tool for maintaining competitive advantage in the variable conditions. This result in a critical question "is organizational agility an inevitable necessity and activity in global economy in responding variable conditions of products, services, quality, and customer satisfaction?" with respect to the above-mentioned discussions and importance of such an issue, the present study was aimed to investigate the effect of dynamic environment on the performance from agile production perspective in Joreh Flour Company in the city of Isfahan.

2. Literature Review

Dynamicity refers to the degree of market variation and processes of product and technology development (Buganza et al., 2009). Indeed, economic unsustainable conditions, continuous changes of customer needs, and continuous changes of technology are the main effective factors on creating environmental dynamicity. Consumer and technology are the main encouraging factor in this regard. In the every-changing world, customers want new products, innovative products, more access to product and its differentiation, and better quality with low prices. Ecology is another encouraging factor in terms of environmental dynamicity. For example, destructive effects of war result in less consumption in the customers and consumers. Indeed, environmental dynamicity influences rapid changes and unpredictable variations of performance estimation in both internal and external environments (Rob, 2013).

How to manage and motivate manpower is one of the main issues in moving toward organizational agility. There are four main agile human resource policy and strategy including adaptable structure, multi-skilled and flexible manpower, capable and rapid decision making, and continuous learning. Adaptable structure refers to the organizational form and shape. Multi-skilled and flexible manpower is the key factor in designing an agile organization. It should be noted that agile organizations do not depend on the systems seriously. Indeed, they rely on the intelligence, capability, and competency of employees. In addition, capability, participation, loyalty, and empowerment of manpower are the main basis of agile production. Indeed, intelligence, capability, and competency of employees are the main interest in achieving organizational agility. Continuous learning refers to a degree in which organizational members have good preparation and openness to perceive new points and select new functions. Some authors believe that continuous learning is the only competitive advantage resource in long-term (Jaafarnejhad and Shahaei, 2007). Many organizations have attempted to increase, develop, and expand their real knowledge cycle. Knowledge management is a system improves integrative attitude for recognizing, managing, and developing organizational information across the organization. Such a capital includes informational banks, documents, policies, and procedures. The main principles of knowledge management include development, implementation, and maintenance of organizational and technical infrastructures as the main ground of expanding knowledge and selecting especial technologies. All of knowledge management processes can be created in a supply chain with focus on the organizations as in an organization with focus on the employees. In this regard, there are many issues such as knowledge sharing systems, knowledge sharing culture, motivation, and security levels which have their own forms. This subject is the main beginning point of global knowledge management. Indeed, information is the systemized and targeted form of data. It is the main basis of knowledge management. It can play role of coordinating and integrating factor as a motivator in terms of micro and macro policies. It also may play as motivator of other parts of supply chain such as supply, transportation, and facilities (Farsijani et al., 2011).

It is inevitable to do profitable activities and operations in a variable and unpredictable environment for achieving agility. There are many discussions about participation of human-technical systems in terms of agility. Manpower with knowledge and motivation, who attempt to facilitate direction and facilitation, is one of the main parts of agility. A technology, which is used by organization, should support necessary activities and functions of organization so exactly that customers' variable needs can be satisfied continuously. Telecommunication network is one of the main subsystems which are used for agility in the innovative world. Such a network is liaison of employees, departments, organizations, and even machines which support organizational and environmental data exchanges and fundamental business processes (Jaafarnejhad and Shahei, 2007).

So, the following hypotheses can be developed based on the literature review.

1. Turbulent Environment influences Agile Human Resource significantly.
2. Turbulent Environment influences Value Chain significantly.
3. Turbulent Environment influences Concurrent Engineering significantly.
4. Turbulent Environment influences Agile Technologies significantly.

5. Turbulent Environment influences Knowledge Management significantly.
6. Agile Human Resource influences Manufacturing Strength significantly.
7. Value Chain Integration influences Manufacturing Strength significantly.
8. Concurrent Engineering influences Manufacturing Strength significantly.
9. Agile Technologies influences Manufacturing Strength significantly.
10. Knowledge Management influences Manufacturing Strength significantly.
11. Manufacturing Strength Influences Business performance significantly.

3. Conceptual Model of Study

The conceptual model of this study has been presented in figure 1. The research hypotheses have been indicated in the relationships between research variables.

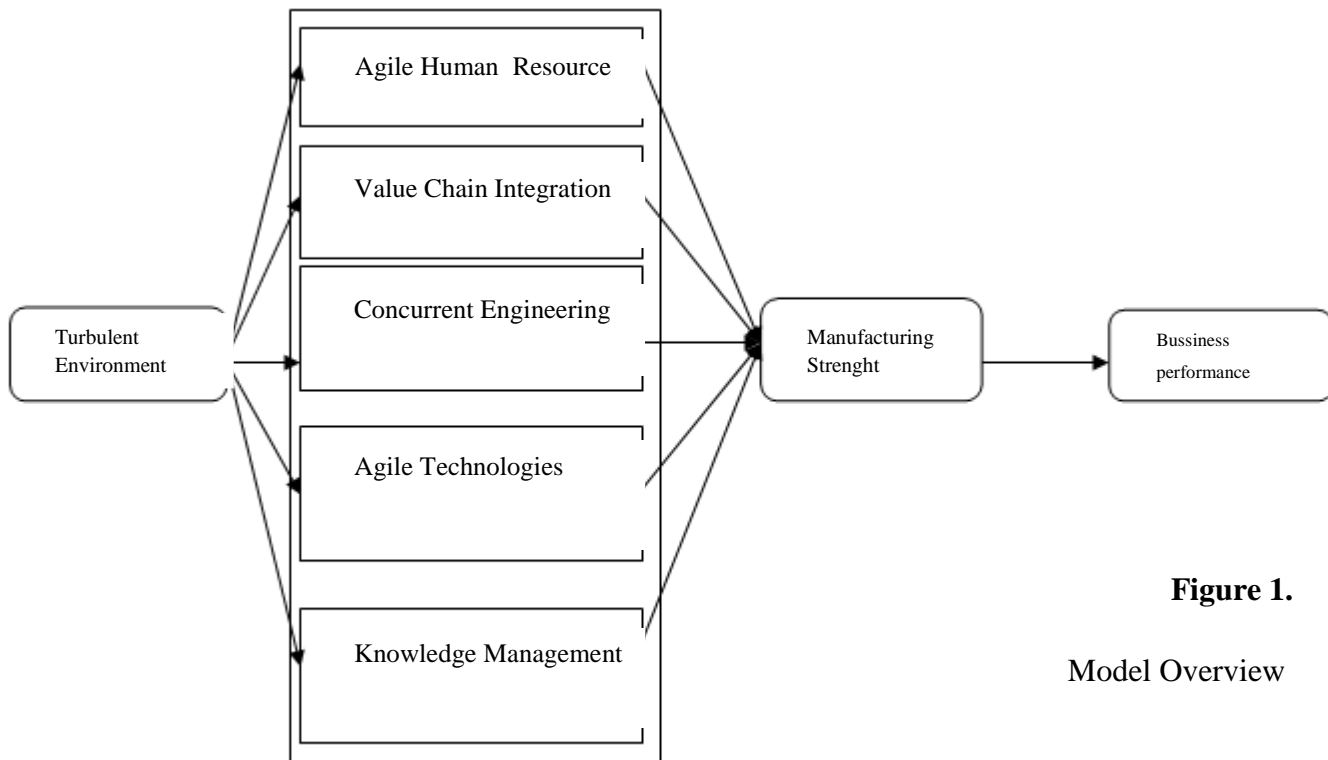


Figure 1.

Model Overview

4. Research methodology

4.1 Research method

This study is a descriptive research from purpose view. The reason is that the authors only describe the existing conditions (Hafeznia, 2008). This study is also a practical research. The practical study is used for finding solution for research questions. Also this study is a correlation

research. The correlation studies are determined to examine the relationship between research variables. Also the purpose of such studies is to evaluate the correlation between variables that have relationship with another variable (Khaki, 2010). There are several types of descriptive studies that the survey has been used in this study. Indeed, the surveys are determined to predict and analyze the relationship between variables. In summary, it can be said that this study is a survey-correlation research. Also it should be remembered that this study has a case study approach.

4.2 Statistical Population and Sample

The statistical population of this study includes production and sales managers and production and sales workforce in Joreh Flour in Isfahan. This population consists of 73 members. This is why that census method has been used rather than sampling.

4.3 Data-collection Method

The authors use questionnaire for collecting the data in field study and also review method in the library studies. In order to examine and confirm validity of the questionnaire, face validity has been used. Also Cronbachs' Alpha coefficient has been employed for examining and confirming reliability of the questionnaire. The questionnaire has been developed based on Likert five-point scale.

5. Reliability and validity of Questionnaire

5.1 Validity of the Questionnaire

Validity refers to this fact that the measurement instrument can measure the main variable and characteristic (Khaki, 2008). Assuring trust of the questionnaire is a technical thing, but validity is more than a technique (Homan, 1994). There are three types of validity including face, content, and construct validity. Face validity is a primary measure and is less important than content validity. On the other hand, it should be remembered that validity refers to the degree in which the instrument can measure a concept precisely (Khaki, 2008). In face validity, the researcher seeks to examine that whether instrument measures the main concept of research or not. This is why that face validity has been employed in this study and then the authors seek to ensure that whether the questionnaire is developed based on the literature review.

5.2 Reliability of the Questionnaire

Reliability of a questionnaire refers to its trust, predictability, and precise. The authors of this study used internal consistency for measuring reliability of data. Cronbachs' Alpha Coefficient is the most important measure of internal consistency that refers to the degree in which the questions of the questionnaire measure the variable or characteristic (Zohori, 2008). It should be noted that Cronbachs' Alpha Coefficient cannot show the errors that are created through external factors such as difference in the test positions and differences in the respondents' responses during time and only examines the internal measures. This coefficient has been

calculated through SPSS. This coefficient has been calculated based on 30 primary responses. This coefficient was 0.98 for 30 questionnaires and was 0.90 for 70 questionnaires.

Table 1:pre test Cronbach's Alpha

Cronbach's Alpha	N of Items
.98	44

Because the minimum acceptable level of reliability is 0.70, it can be said that the questionnaire of this study has desirable reliability. Also this coefficient was calculated individually for each of research variables. These findings have been indicated in table 2.

Table 2: scale, frequency of the questions, Cronbachs' Alpha coefficient, and resources of the questions

Variables	Scale type	Number of questions	Cronbachs' Alpha coefficient	Resources
Turbulent Environment	Likert five-point	5	0.85	[McCann J et al., 2011]
Agile Human Resource	Likert five-point	6	0.84	[Yauch, 2012]
Value Chain Integration	Likert five-point	5	0.81	[Ifandoudas&Chapman, 2011]
Concurrent Engineering	Likert five-point	5	0.86	[Ifandoudas&Chapman, 2011]
Agile Technologies	Likert five-point	5	0.91	[Ifandoudas&Chapman, 2011]
Knowledge Management	Likert five-point	5	0.90	[Ifandoudas&Chapman, 2011]
Manufacturing Strenght	Likert five-point	5	0.86	[Yauch, 2012]
Bussiness performance	Likert five-point	8	0.89	[Ifandoudas&Chapman, 2011]

6. Data Analysis

In order to analyze the research data, disruptive and inferential statistical have been used. In order to examine the demographic characteristics of the respondents, five questions have been used. The results of the descriptive test indicated that 86% of the respondents were male and 14% of them were female. These results indicated that most of the respondents were male in

Isfahan joreh flour company. Also the results of this section revealed that about 50% of the respondents had less than 40 years old. Also the results revealed that 47% of the respondents had M.Sc.. 36% of them had job experience Less than 5 years. These results have been indicated in table 3.

Table 3: the respondents' demographic characteristics

percent	Distribution	Variables	percent	Distribution	Variables
52.9	Less than M.Sc.	Educational levels	85.7	Male	Sex
47.1	M.Sc.		14.3	Female	
0	M.A.				
35.7	Less than 5 years	Job experiences	38.6	Less than 30 years	Age
24.3	6-10 years		38.6	30-39 years	
22.9	11-15 years		15.7	40-49 years	
12.9	16-20 years		7.1	More than 50 years	
4.3	More than 20 years				

Also inferential statistics have been used for testing the research hypotheses. In order to this, confirmatory factor analysis, path analysis, and structural equation modeling have been used. For this purpose, the SPSS and Amos have been used.

Table 4: the goodness of fit indexes for structural equation modeling

main model	index	kind of fit index
31	NPAR	
5	DF	
0.332	P (More than 0.05)	
5.740	CMIN (Chi Square)	unconditional
0.895	AGFI (More than 0.9)	
0.980	GFI (More than 0.9)	
0.993	(More than 0.9)TLI	Comparative
0.991	(More than 0.9) NFI	
0.999	CFI (More than 0.9)	
0.177	PNFI (More than 0.5)	Thrifty
0.178	PCFI(More than 0.05)	
0.046	RMSEA (Less	

	than 0.08)	
1.148	CMIN/DF (Less than 5)	

7. Structural Model

It is necessary to attend the relationship between talent variables in the structural models. In such models, the existing relationship between talent variables that are derived based on the theory can be explained through collected data from sample members. In the structural equation models, the hypotheses can be tested through path analysis. The RMSEA is less than 0.08 that is acceptable. Therefore, it can be said that the predicted parameters are reliable in the model and so the hypotheses test can be done. In order to use Amos, it should be remembered that γ refers to the effects of external variables on the internal variables and β refers to the effects of internal variables on each other. In order to examine the significance of β and γ , it is necessary to examine the t-value of every path

Figure 2: The effects of internal and external variables

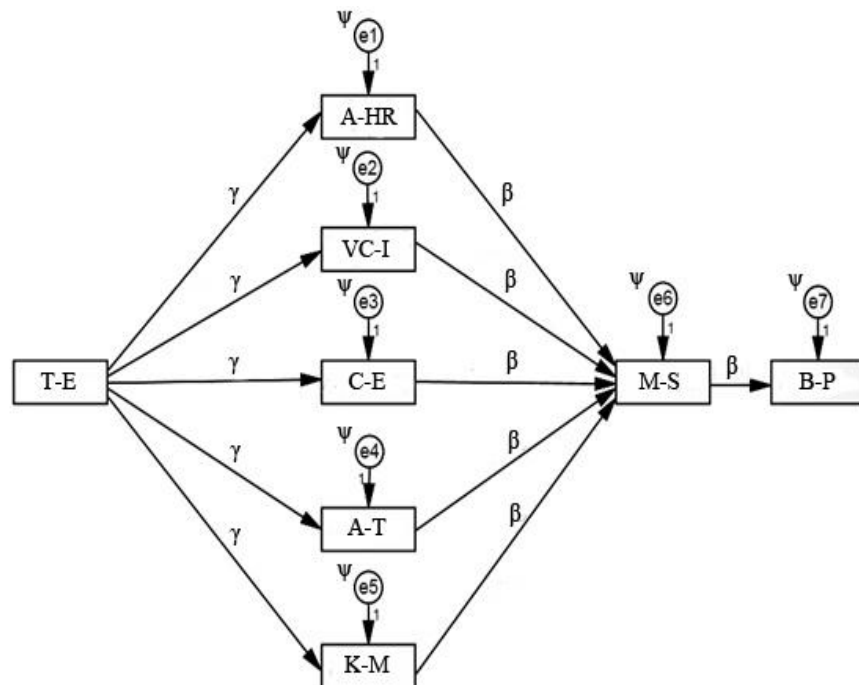
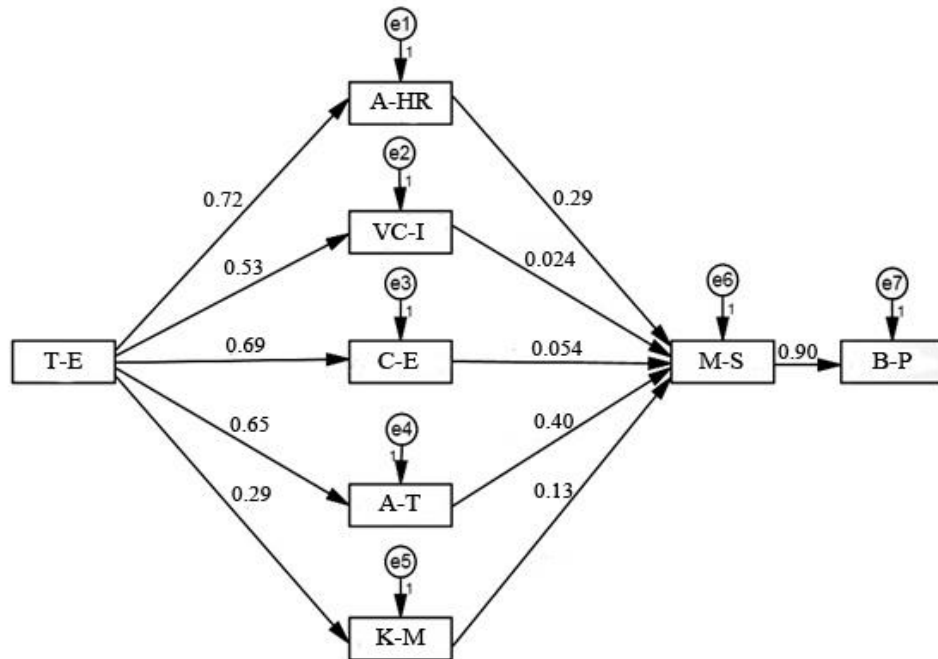


Figure 3: The model of study (path analysis model)



The coefficient of path can be examined through P-value. Therefore, it can be said that all of the research hypotheses except seventh, eighth and tenth were confirmed. The results of examining direct and indirect effects of independent variables on dependent variable have been indicated in table 6.

Table 5: The results of hypothesis test

	Secondary hypotheses	Standard coefficient	Standard error	Critical ratio	p-value	Result
T-E→M-CH	H1	0.718	0.071	8.568	***	Is confirmed
T-E→VC-I	H2	0.534	0.085	5.249	***	Is confirmed
T-E→C-E	H3	0.690	0.078	7.912	***	Is confirmed
T-E→A-T	H4	0.652	0.097	7.145	***	Is confirmed
T-E→K-M	H5	0.289	0.113	4.492	***	Is confirmed

M-CH→M-S	H6	0.292	0.139	2.556	***	Is confirmed
VC-I→M-S	H7	0.024	0.114	0.261	0.794	Unconfirmed
C-E→M-S	H8	0.054	0.124	0.504	0.615	Unconfirmed
A-T→M-S	H9	0.402	0.120	3.282	***	Is confirmed
K-M→M-S	H10	0.134	0.114	1.245	0.213	Unconfirmed
M-S→B-P	H11	0.902	0.095	9.186	***	Is confirmed
*** P is less than 0.001						

Table 6: total, direct, and indirect effects

Dependent variable	Independent Variable	Direct effect	Indirect effect	Total effect
Turbulent Environment	Agile Human Resource	0.72	–	0.72
	Value Chain Integration	0.53	–	0.53
	Concurrent Engineering	0.69	–	0.69
	Agile Technologies	0.65	–	0.65
	Knowledge Management	0.29	–	0.29
Agile Human Resource	Manufacturing Strenght	0.29	–	0.29
Value Chain Integration	Manufacturing Strenght	0.024	–	0.024
Concurrent Engineering	Manufacturing Strenght	0.054	–	0.054
Agile Technologies	Manufacturing Strenght	0.40	–	0.40
Knowledge Management	Manufacturing Strenght	0.13	–	0.13
Manufacturing Strenght	Bussiness performance	0.90	–	0.90

8. Discussion and Conclusion

The results of this study revealed that dynamic environment influences agile manpower significantly (γ : 0.72). With respect to the organizations' coordination with rapid changes in the global areas, agile production, as an integrative mechanism, helps organizations in improving their performance. The results structural equation model revealed that dynamic environment influences supply chain integration significantly (γ : 0.53). These findings are supported by Negay et al. (2008). Also dynamic environment influences simultaneous engineering (γ : 0.65). These findings are supported by Ayfandodas et al. (2011). They found that dynamic environment reinforce development of technical capabilities in terms of flexibility. In the present study, agile production with high level capabilities (such internal capabilities, soft and hard technologies, human resource, and information) satisfy variable market needs (speed, customer flexibility, competitors, suppliers, and responding). The results of this study revealed that agile human resource and agile technology influence production ability significantly. This finding implies that organizational managers can influence production through considering development and implementation of such factors. The results showed that production ability influences commercial performance significantly (γ : 0.90). In addition, other factors such as youngness of respondents lead to more creativity in the teams. On the other hand, lower levels of respondents' education lead that less productivity of teams.

9. Limitations of Study and Future Studies Suggestions

Eachs study has several limitations that some of them exist in beginning of study. Also every comprehensive study has several limitations and difficulties that these prevent from generalizing its results to other cases. Recognizing these limitations paves the grounds for interpreting its results and promoting quality level of the future studies. There are several limitations in this study that some of these have been presented in the following sections, the difficulties that the managers facing in communicating managers, managers' sensitivity toward questionnaire, and inappropriate organizational culture are the main limitations of this study. Undoubtedly, the main limitation of every study is that the authors cannot generalize the results of the study to other cases. Such a limitation exists in this study and the authors cannot generalize its results and findings to other cases. Also this study has been done in an especial area of Iran in the city of Isfahan and thereby its results cannot be generalized to other cities of Iran. Another limitation of this study is that there are other factors that influence business performance beside the factors that have been considered in this study. Therefore, it is suggested that the future authors identify and examine these factors. Also this study has been done from agile manufacturing perspective, it is suggested that the future authors use other perspectives. If the future authors can examine different dimensions of business performance individually, its results will be attractive.

References

- Buganza, T., Dell’Era, C. and Verganti, R. (2009), “Exploring the relationships between product development and environmental turbulence: the case of mobile TLC services”, *The Journal of Product Innovation Management*, Vol. 26 No. 3, pp. 308-21.
- Cooke, J. L., 2010. *Agile Principles Unleashed: Proven Approaches for Achieving Real Productivity in Any Organisation*. Ely, U.K.: IT Governance Pub
- Farsijani, H., Feizi, K., and Shafiei, M., (2011), *The impact of competitive forces on the application of knowledge to improve supply chain performance*, Daftare Pajoheshhaye farhango Publications, Tehran, 3th edition.
- Hafeznia, M., (2008), *an introduction to research methodology in human sciences*, SAMT publications, Tehran, 14th edition.
- Homan, H., A., (1994), *inferential statistics in behavioral researches*, Parsa publications, 4th edition.
- Ifandoudas, P., and Chapman, R., 2011. A practical approach to achieving Agility-a theory of constraints perspective. *Production Planning and Control*, 20 (8), pp. 691 – 702.
- Jackson, M., Johansson, C. (2003). An agility analysis from a production system perspective, *Integrated Manufacturing systems*, Vol. 14, No. 6: 482-488.
- Jafar Nejad, A., Shahaei, B., (2007), *Organizational agility and agile manufacturing*, Tolide Danesh Publications, Tehran, 1th edition.
- Khaki, Gh. R., (2010), *research methodology in management*, Baztab publications, Tehran, 5th edition.
- Khaki, Gh. R., (2003), *research methodology with approach on essaying thesis*, Baztab publications, Tehran, second edition.
- Ngai, E. W. T., Cheng, T. C. E. and Ho, S. S. M. (2004), “Critical Success Factors of Web-based Supply Chain Management System Using Exploratory Factor Analysis”, *Production, Planning & Control*, Vol. 5, No. 6, pp. 622-630.
- Rob A. 2013. What is meant by market turbulence and why does it happen, and examples of supply chains, that exhibit this phenomenon. Available from: <http://www.robabdul.com/What-is-meant-by-market-turbulence.asp> [Accessed 5 May 2013].
- Sherehiy, B., Karwowski, W., Layer, J. K. (2007). A review of enterprise agility: Concepts, frameworks, and attribute", *International Journal of Industrial Ergonomics*, 37: 445-460.
- Zohori, Gh., (2008), *the application of social sciences research methodology in management*, Amir Publications, Tehran, 1th edition.