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Organization Agility Model in Marine Transportation Industry in Iran

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Abstract: The main objective of this research is to design and introduce the organizational agility model of marine transportation of Iran in order to heighten the market share and marine transportation industry position of Iran. The basic framework and also the needs and requirements of marine transportation industry business of Iran were designed with the study and use of former agility theories and models. In this context, seventeen structural agility variables were identified and classified as four main components: the agility of human resources agility of technology, agility of organizational factors and finally marine transport chain agility components. Based on this, there are seventeen hypotheses designed for the evaluation test of the studied industry. In this study, questionnaire was used for the needed and requirement data and the statistical population was considered to be the experts and managers of marine transportation industry organizations of Iran. The amount of the sample was estimated based on the ideas of the structural equation analysis scholars for each seventeen test variables which is 255 totally. The factor-confirmatory analysis method was used to test the hypotheses and well-being of model evaluation. The results of the analysis indicate that the seventeen identified variables have a good correlation with the four main factors and eventually with the marine shipping industry agility of Iran. Although, structure agility and strategy were a top priority, other factors are also at a high degree of importance.

Key words: Marine transportation industry's agility, organizational factors agility, human resource agility, transport chain agility, factor-confirmatory analysis

INTRODUCTION

The importance of the marine shipping industry as one of the important economical components and its role in the economic development of countries in particular is no secret. Currently, the share of marine transport industry in the transportation, storage and goods distribution in world trading makes up about 90% of total trade (UNCTAD Report 2013 and 2014). Therefore, the infrastructure of trading and the main element of goods supply chain is marine transportation. Despite the unique geographical location and situation in the important transportation corridor such as North-South and East-West, the statistics and information published by the United Nations Conference on Trade and Development (UNCTAD) show that Iran's shipping industry and its ports that make up the core of the industry has a trivial share of goods and passenger transit in comparison with other countries of the region and the world. One of the main reasons is the lack of coordination in the growth of marine transportation in all dimensions compared with the rapid and increased growth of international trade. In other words, the shipping industry has not been able to keep pace with changes and agile the human resources, organizational factors and transport chains.

To confirm this claim, the World Bank Report in 2014 in relation to Logistic Performance Index of countries (LPI) could be mentioned. According to this ranking, among 155 countries in 2007-2014, Iran has had a record of 78-102-112, respectively. Moreover, in Iran, the time and cost of import and export processes completion is very high compared with other countries, especially the United Arab Emirates (Table 1).

The accuracy in the results as well as reports by UNCTAD and the World Bank approves the inefficiency and lack of effectiveness of processes, logistic operations and marine transport chain and ultimately and lack of agility in marine transport industry. These problems has caused a small share (about half a percent) of international marine transport market and fall behind their opponents by the year 1404 (2013, UNCTAD). Simplifying processes and structures and generally agility and flexibility of organizational factors and human resource in Iran's marine transport industry has become a requirement as concluded above. The objective of this study is to design the agility model of this industry in order to upgrade the its position compared to competitors, increase market share, achieve the 1404 program and ultimately achieve economic theory of resistance in the marine transport sector. Due to the research or design of the agility model

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Table 1: The comparison of export and import among four countries in 2013

Processes	Iran	UAE	South Korea	Singapore (first rank)
Export process levels				
The number of documents for export	7	4	3	4
The time of export document preparation (days)	25	7	7	5
The expense of exporting one container	1470	630	665	456
Import process levels				
The number of documents for import	8	5	3	4
The time of import document preparation (days)	32	7	7	4
The expense of importing one container	2100	590	695	439
Total score of the country among 189 other countries	145	26	8	1

World Bank Doing Business in 2013 report

and suggesting it to the officials, they would be able to promote the position of this industry in the transportation with the design of applicable programs and making their organizations agile and flexible in order to cope with the surrounding conditions and the ability to response quickly to the market requirements which cause the quality promotion, expense decrease and customer satisfaction.

Theoretical foundations and literature review: The word agile in the dictionary means to move fast, adroit and active and agility is to be able to move fast and easy and also being able to think quickly and cleverly (Gunasekaran and Yusuf, 2002). Andrea and Drsc (2012) has defined the word agility into respond and adapt to changes and fluctuations in the market with a fast and steady economic method which means the ability to meet the needs of customers in terms of price, quality and speed of delivery. Most of scholars and researchers have emphasized the variable and unpredictable environment in their definition and the ability of organizations to adapt and keep pace with such environments. Some researchers believe that the conformity to the environment is fulfilled through the design of organic and enabling structures and processes (flexible, low recognition) or generally the agile organizational factors. According to these definitions, the agile strategy could be defined as the survival and development in a competitive environment the essential feature of which is change and uncertainty, and that shows reactions to changing markets based upon customers' will quickly and effectively (Andreeva, 2008). There is no exception in the issue of making ports and transportation industry agile which has a close relationship with international trade and affects any change in the market and international setting. The environment relationship and its impact on organizations and organizational agility can be demonstrated as follows (Fig. 1).

Since, the advent and expanse of agility paradigm, thinkers and leaders of organizations have offered different approaches and model with various dimensions in order to agile their organizations.

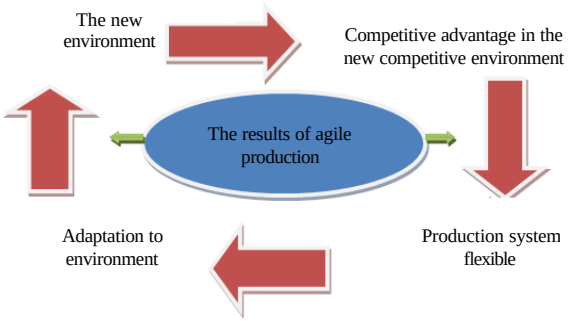

Fig. 1: The relationship between environment and organizational agility

To understand the dimensions, tools and functions of organizational agility, some of the models are mentioned that are the basis for the preparation of the conceptual framework of this study.

Sharifi (1999) Model: In a relatively comprehensive model, the two researchers have divided the agility factors into three categories (Attafar, 2012): agility drivers, agile providers and gility capabilities.

Agility drivers: Figure 2 are the factors that are out of organization's will or organization has little power to control or influence on them. These factors affect the companys business and cause chaos and transformation. In other words, the main factor is the need for agility.

Agility providers: To achieve organizational agility, the system requires providers enabling instruments to achieve it.

Agility capabilities: Agility capabilities are achieved by agility providers. In the opinion of these two researchers, the agility providers are of four types including: organization, technology, human resources and innovation. According to Sharifi (1999), agility will not materialize without proper integration between the four divisions. The researchers have defined four general features for organization agility including: accountability, competence, flexibility and speed.

The effective and agile model of ports: Sue Han Wu Model. In a survey called "the integrated and port-based supply chain" has provided and designed the effective and agile model of ports its which forms the coral point of marine transportation industry. The assumptions and the results of his research is based on the port-based supply chain and in his opinion, the integration of port chain improves the effectiveness and agility of ports and eventually marine transport industry. He has divided the effectiveness and agility of operation or service index of measurement into two parts and also the efficiency of marine and port operations in two parts in the form below (Fig. 3).

The model of agile port models and Beskovnik (2012) multi-dimensional model of transport: Beskovnik and Twrdy justify their marine transport chain model with the argument that the supply chain has a direct impact on the status of marine transport. Shipping lines, terminal operators, shipping agents and forwarders do several operations to meet customer needs and satisfaction. Solid logistics of shipping grounded on agile-secure and flexible marine and port services. For this reason and due to transport market competition and financial crisis, transport logistics is after the management of time, space (storage and transport space) and information between production and consumption centers in order to use the opportunities. With the study of traditional marine transport chain, these researchers have seen that there are seven centers or members in the chain which their number and the necessity of information or service exchange between them has caused lack of agility and inflexibility of services. They have provided a new model of marine transport chain which reduces the number of these centers to four elements and have integrated the process of transport services chain.

In addition to the above mentioned research models, other models of organizational agility is provided by researchers such as Alexopoulou, Fathian, Farzaneh, Asari, Gun, Prenald and Gunasekaran, Gong Bing Bi Zhoa and Cai. In each of these studies and models one or more aspects of organizational agility is emphasized. For example Beskovnik and Twrdy emphasize: on port and agile transit operations model, research site zenith researchorg.ir: on the new role of ports in the global supply chain agility, Farzane etc: on organizational

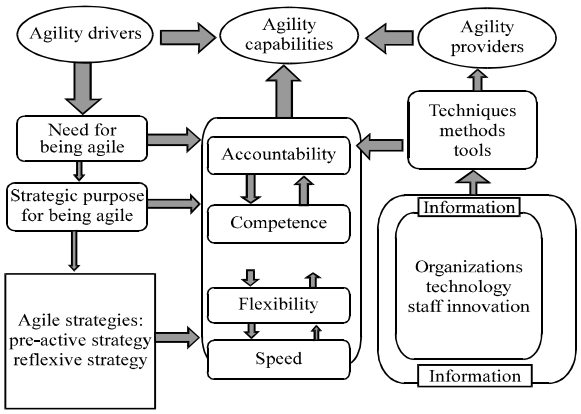

Fig. 2: Conceptual model of organizational agility Sharifi (1999)

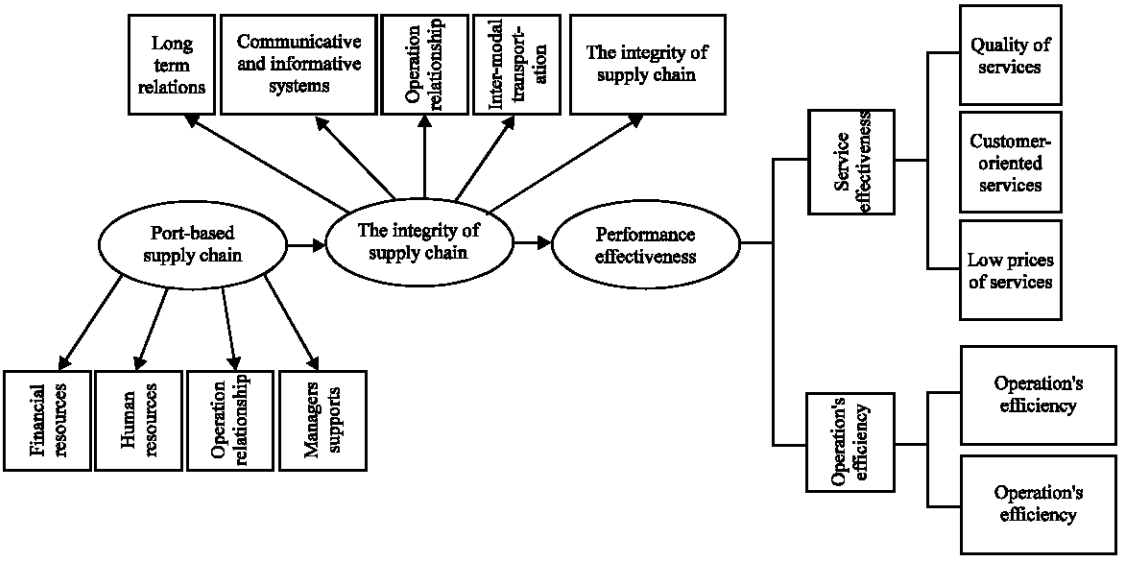

Fig. 3: Sue Han Woo Model of efficiency and agility of ports (modified by the investigator)

aspects, Darwishi and Jafarnejad: on agile supply chain, Khosravi in 2012: on Human resource agility, Mohammadi and Amiri in 2012, Asari in 2014 and Gong in 2012: on the role of human resources in organization agility, Prenalal in 2012: on the power of information technology on organizational agility and ultimately Meziani in 2009: on the agility of business processes for organizational agility. In this study, components and dimensions of organizational agility is presented using the following models, requirements and indicators by which the studied industry and ports are assessed, ranked and identified in the form of the following assumptions and primary conceptual framework in Table 2.

The main questions:

- What is the model of organizational agility of Iran's marine transportation industry
- How much is the impact of independent variables on the dependent variables in Iran's marine transport industry organizational agility model

Hypotheses of research

Human resource agility components:

- Training and providing of staff has effect on the organizational agility of marine transportation industry
- Knowledge-based human resource development has impact on the organizational agility of marine transportation industry
- Global management (managers) development has impact on the organizational agility of marine transportation industry
- Development of human resources skilled with IT has impact on the organizational agility of marine transportation industry

Table 2: Shaping the conceptual framework of the research

Criterion	Agility index	Source (the designer or the writer)
The agility of	Educating and providing the staff	Sharifi (1999), Yusef, etc., human resource Ganaskaran and Yusef, Ganaskaran and human Dabi, resource Dehmorde *et al.* (2010), Sharp, etc., Zeiaee , etc., Olfat and Mahmoud (2009), Jafarnejad and Shahaie (2008)
	Development of knowledge-based human resource	Yusef, Ganaskaran and Yusef (2002), Dehmorde *et al.* (2010), Sharp (1999), Zeiaee *et al.* (2012)
	The development of global management	Ganaskaran and Yusef (2002), Ganaskaran and Yusef (2002),
	The growth of number of staff with IT skill	Ganaskaran and Dabi, Sharp, Nancy *et al.* (2008), Olfat and Muhamoud (2009)
The agility of technology	Developed system and web	Sharifi (1999), Yusef, Ganaskaran and Yusef, Lean, etc., Sue Han, Woo model (2010), Ganaskaran and Dabi, Tulieusien and Mankute (2013), Sharp etc., Zeiaee etc., Nancy *et al.* (2008), Momeni etc., Olfat and Mahmoud (2009), Yusef and Kerosito
	Developed porting and disembarking equipment	Marine transport industry
	Developed maintenance system	Marine transport industry
The agility of organizational factors	Organizational structure agility	Sharifi (1999), Yusef etc., Sue Han Woo Model, Tulieusien and Mankute, Dehmorde etc.,
	Supportive and operational processes agility	Lean, Beskovnik (2012), Azar *et al.* (2011), Mthupha (2012), Jafarnejad and Shahaie (2008)
	Organizational strategy agility	Sharifi (1999), Ganaskaran and Yusef, Dehmorde, etc., Momeni, etc., Ebayer and Sharifi, Olfat and Mahmoud (2009), Jafarnejad and Shahaie (2008), Marine transport industry
	Relationship with the customer	Yusef, etc., Lean, etc., Sue Han Woo model, Ganaskaran and Dabi, Marine transport industry
	Solid services	Marine transport industry
	The improvement of marine and port safety services	Marine transport industry
The agility of supply chain	Using door-to-door transportation	Sue Han Woo Model, Supply chain Model, Marine transport industry
	The management of marine transport chain relationship (ship, port, goods' owners)	Lean, etc., Sue Han Woo Model, Beskovnik etc., Supply chain Model, Ganaskaran, Hunglay and Chang, Marine transport industry
	Logistics agility	Sue Han Woo model, Beskovnik, etc., Supply chain model, Marine transport industry
	The tendency to third generation ports	Beskovnik etc., Marine transport industry

The use of advanced technology components:

- Development of integrated information network system has impact on the organizational agility of marine transportation industry
- Utilizing advanced porting and disembarking equipments has impact on the organizational agility of marine transportation industry
- Utilizing preventive maintenance system has impact on the organizational agility of marine transportation industry

Organizational agility factors components:

- The organizational structure agility has impact on the organizational agility of marine transportation industry
- Supportive and operational processes agility has impact on the organizational agility of marine transportation industry
- Organizational strategies agility has impact on the organizational agility of marine transportation industry
- Customer relationship management has impact on the organizational agility of marine transportation industry
- The solidness of services has impact on the organizational agility of marine transportation industry
- Improvement of the level of safety and ports has impact on the organizational agility of marine transportation industry

Marine transport chain agility:

- Utilizing door-to-door transport system has impact on the organizational agility of marine transportation industry
- The management of marine transport chain (ship-port-goods owners) has impact on the organizational agility of marine transportation industry
- Logistics Agility has impact on the organizational agility of marine transportation industry
- The tendency to the third generation ports has impact on the organizational agility of marine transportation industry

MATERIALS AND METHODS

The methodology of the research is investigational development due to the nature and objectives of the research and that this research will lead to the design of a model for Iran's marine transport industry. It also has applicable aspect. In this study, a questionnaire was used to collect needed data for the wellbeing test on the value of the marine transport industry agility. There are seventeen main questions in this questionnaire that measure the influence of each parameter (dimension) on the organizational agility results and ultimately investigate the studied industry agility. Factors of organizational agility in the questionnaire are:

- Customer satisfaction
- The decrease of marine service tarrif
- The reduction of post service tariff
- The reduction of ship's wait time
- The quality of services
- The flexibility
- Simplifying and effectiveness of services
- The realization of economic theory of resistance in the marine transport sector

In order to check the validity of the questionnaire, content and construct validity was used. Content validity of the questionnaire was studied and approved by the use of university critics and experts' ideas and construct validity by the use of confirmatory factor analysis by LISERL Statistical software. Cronbach alpha ratio was used for the final assessment of the questionnaire. The results of research showed that Cornbach alpha ratio is >0.88 for each agility dimension which is studied for the internal consistency of each factor of the questionnaire. So, the internal equality of the dimension is high.

The statistical population and sampling method: The statistical population of this research is the experts and managers of marine transport industry (ports organizations companies) and the relevant and situated shipping lines in the ports of the country. Stratified random sampling was used due to the establishment of ports in seven states and that the structure of the statistical population is classified clearly. The sample = 255 which is based on the ideas of structural equation modeling scientists and 15 members elected for each variable. The testers have answered to 299 questionnaires.

Data analysis assumptions test method: Confirmatory factor analysis was the method of this study. Weighted Least Squares Method is used since the seventeen variables do not have the normal distribution. Using this method, we do not need the assumption of normality of the data and variables. It is necessary to be noted that several studies have been conducted in this relation which confirm the non-normality of data (Azar *et al*.,

2011). To check the suitability of the model parameters, Bentley Bonnet index, Normed Fit Index (NFI), Tucker Lewis index, Non-Normed Fit Index (NNFI), Root Mean Square Error of Approximation index (RMSEA), GFI (Goodness of Fit Index) and AGFI (Adjusted Goodness of Fit Index) indices and Incremental Fit Index (IFI) were used to test the hypotheses and propriety of models. LISREL 8.51 Version Software is used for data analysis.

RESULTS AND DISCUSSION

Table 3 shows Iran's marine transport industry propriety agility model index which is analyzed by the confirmatory factor analysis. The results of confirmatory factor analysis indicated the appropriateness of the model in the studied population. However, most of the testers have given high marks to the statements (items) which make the data non-normal.

Due to the CFI and TLI indexes in Table 3, the results indicate the suitability of transportation industry agility model, since the two indices are >0.9. Moreover, the RMSEA index derived from Root Mean Square Error Approximation (WLS) indicates that the model has a good propriety in the population since, it is <05.0. Therefore, the propriety of the research model is supported; the less RMSEA, the more efficiency. The χ^2/df is another index which is used for the measurement of propriety wellbeing of the model. The amount of χ^2/df is 1.26 which is <2 so, it is a suitable value. The low rate of this index indicates a slight difference between the primary conceptual framework of the research and the observed data. In addition, the results in Table 4 indicate the appropriateness of confirmatory factor index in other indicators, including: NFI, NNFI, GFI, AGFI and IFI. In general, it can be claimed based on WLS that the shipping industry agility is confirmed in the statistical population.

Hypotheses test and coefficient interpretations: The t >1.96 in the error level of 5% and t >2.58 in the error level of 1% are significant.

Table 4 shows the load factor of each of the dimensions on the corresponding factor. What can be deduced from the information in this table is that all t>2.58 which mean zero loading factors are rejected in 1% level of error. So, we recognize that all aspects of Iran's marine transportation industry agility are effective in its measurement and assessment. Therefore, all the seventeen hypotheses are confirmed in 1% error level. The highest coefficient of determination is for the agility of the organizational structure (R = 0.96) and the lowest determination coefficient is related to the promotion of marine and port safety (R^2 = 0.81).

Figure 1 shows the standardized loading factors of Iran's marine transport organizational agility model. Loading factors >0.6 are considered as high loading factors or have severe impact on the model. Also, if the load factor is <0.3, it is considered as a weak load factor. In other words, variables with loading factors <0.3 should be excluded from the model. Due to the fact that all the loading factors of dimensions in this agility model are >0.9 and each one has a high loading factor, so they have a severe impact on the factor structure agility of Iran's marine transportation industry (Table 1).

Table 3: Results of Iran's marine transport industry properiety agility model index

Properiety index	χ^2	Degree of freedom (df)	χ^2/df	RMSEA	CFI[21]	TLI = NNFI	NFI	GFI	IFI	AGFI
Assessment index	-	≤0	≥2.00	≥0.050	≤0.09	≤0.09	≤0.09	≤0.09	≤0.09	≤0.09
Results	0.08142	113	1.26	0.034	1	1	0.99	0.99	1.00	0.99

Table 4: Non-standardized coefficients of the model

Factors	Iran's marine transportation agility dimensions	Load factor	Error	t-values	R^2
The agility of human resource	Educating and providing the staff	0.95	0.013	71.16	0.910
	Development of knowledge-based human resource	0.97	0.011	87.25	0.940
	The development of global management	0.97	0.011	84.77	0.940
	The growth of number of staff with IT skill	0.97	0.012	79.50	0.940
The agility of technology	Developed system and web	0.96	0.013	79.02	0.920
	Developed porting and disembarking equipment	0.98	0.011	92.77	0.095
	Developed maintenance system	0.96	0.014	68.05	0.930
The agility of organizational factors	Organizational structure agility	0.98	0.009	108.25	0.960
	Supportive and operational processes agility	0.97	0.012	80.21	0.930
	Organizational strategy agility	0.97	0.011	85.09	0.940
	The improvement of marine and port safety services	0.90	0.022	40.58	0.810
	Relationship with the customer	0.96	0.014	70.94	0.920
	Solid services	0.95	0.014	65.85	0.910
The agility of marine transport industry (supply chain)	The traditional ports' tendency to third generation ports	0.97	0.013	76.62	0.930
	Using door-to-door transportation	0.95	0.016	60.11	0.900
	The management of marine transport chain relationship (ship, port, goods' owners…)	0.96	0.013	70.22	0.920
	Logistics agility	0.97	0.012	79.42	0.940

The t values >1.96 in the error level of 5% and t-values >2.58 in the error level of 1% are significant

Table 5: The matrix of correlations between components and agility overall score (229 = N)

Components	Human resource	Technology agility	Organizational factors	Supply chain
Overall score	0.947	0.931	0.966	0.945
Supply chain	0.864	0.831	0.880	-
Organizational factors	0.872	0.872	-	-
Technology agility	0.873	-	-	-

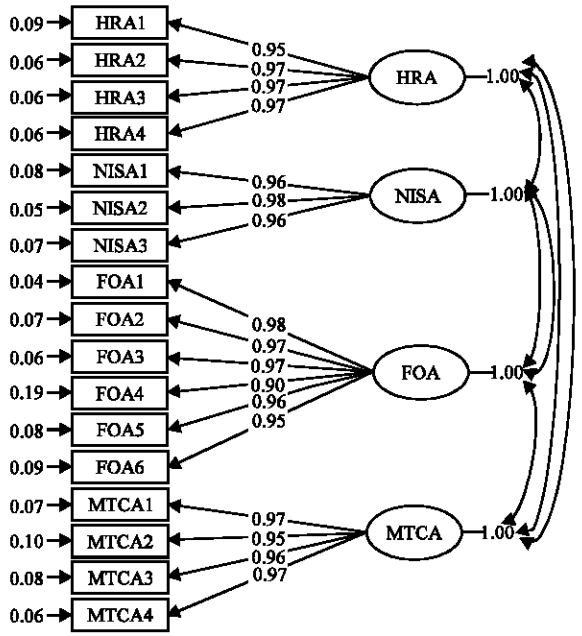

Fig. 4: Factor analysis graph Iran's marine transport industry organizational agility model

Figure 4 factor analysis graph Iran's marine transport industry organizational agility model. Table 5 has presented the correlation between the components of organizational agility. The correlation between all the factors is positive and is significant in 1 percentage error level. The correlation of all components with the overall agility scale is positive and is significant in 1% error level. Therefore, components and dimensions of organizational agility measure their agility and performance.

CONCLUSION

As it was mentioned in the main parts of the study, for the design of Iran's shipping industry organizational agility model seventeen organizational agility dimensions were recognized by the use of previous organizational agility models as well as the analyses of marine industry structure and ultimately the basic conceptual framework of the research was identified and presented. Confirmatory factor analysis was used to test the model hypotheses and the wellbeing of model's propriety. First order confirmatory factor analysis showed that the survey's questionnaire is completely appropriate and precisely define the variables. The second order factor analysis examined the relationship between the dimensions and components of the marine transport industry organizational agility model which also confirmed the models propriety. This means that these seventeen introduced elements or dimensions for the organizational agility industry showed a good correlation with the components and the main variable. So, these seventeen dimensions were introduced as the variables of marine industry organizational agility.

Comparing the results, the conclusion is that all the four elements and seventeen dimensions have paramount importance in the shipping industry's agility. But, among these factors, organizational structure agility and advanced loading and unloading equipment are first and Development of knowledge-based human resources, development of global management, processes agility and organizational strategies agility are the second. Although, the rest of dimensions are on the third place, their importance is not less than first or second dimensions. According to the literature review of the research, it could be stated that all the dimensions of research model are reaffirmed which are argued by the scientists of organizational agility formerly.

RECOMMENDATIONS

The operators of the industry should consider the following complaints in order to exit of this situation: to study the environment requirements, development activities and investment in ports, especially the region ports and design the development and investment strategy and organizational agility of all organizations of marine transport industry (the port society) comprehensively.

According to the results, the lack of agility and low rank of industry and logistics are mostly caused by the lack of providing and flexible organizational structure and also the lack of organizational strategies and marketing suitable to the setting conditions and transportation market. The organic, process-based and customer-oriented organizational design can improve the rank of ports and industry.

If long processes, high costs and long time, lack of attention to customers' demands, lack of integrated marine transportation management systems and integrated and simultaneous ship, port and owners management (and

other organizations) are paid attention to, can improve marine transport industry position and increase Iran's marine transportation market share of the transport market.

Governmental attitudes on the ports and customs of marine transportation industry have devested the possibility of creating mobility, dynamism and agility of the industry. We can get rid of the inefficient way with the liberation and restructuring of the organization business engineering.

REFERENCES

Andrea, L.A. and Drsc, 2012. The study of Agility in production systems and agility metrics, model for Automotive suppliers (prof.ing) Milan Hovac.

Andreeva, N., 2008. Lean prodaction and agilie manufacturing new systems of doing business in the 21st century.

Attafar, A., 2012. Study of Required organization Base for implementation of agility strategy in organization. Case study: Industrial Entekhab Group. The ph.D University of Isfahan.

Azar, A., A. Tizro *et al*., 2011. A model of supply chain agility. Case: Steel Company, Tehran University Industrial Management, No. 7.

Beskovnik, B., 2012. Agile port and intermodle transport operations model to secure lean supply chains concept. Promet-traffic and Transportation, 23: 105-112.

Gunasekaran, A. and Y.Y. Yusuf, 2002. Agile manufacturing: A taxonomy of strategic and Technological, article from an internet database. Intl. J. Product. Res., 40 (6).

Jafarnejad, A. and B. Shahaie, 2008. Evaluation and improving organizational agility. Business Rev., 9 (1).

Mthupha, B., 2012. A framework for the development and measurement of agile enterprise Architc ture, article from an internet database.

Nancy, A., *et al*., 2008. A Holistic Approach for enterprise agility. University of Athens, Greece.

Olfat, L. and Z.S. Mahmoud, 2009. A model for organizational agility in the electronics industry in Iran. J. Manage. Sci., Iran, 13: 74-47.

Sharifi, Z.Z., 1999. A methodology for achieving agility in manufacturing organizations article from an internet database.