

# Designing a Communicational Model between the Competitiveness Types of Small and Medium Industries in Iran

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## ABSTRACT

Competitiveness is a multi-dimensional concept that organizations must inevitably strengthen themselves in all its dimensions to develop competitive power. Competitiveness is effective on the success of an enterprise in a world-wide level. Accordingly, the purpose of this research was to design a communicational model between the competitiveness types of small and medium industries in Iran. Regarding the research purpose, the study is applied, which is conducted based on the descriptive-causal method. The statistical population of this research in identifying factors affecting competitiveness includes all small and medium enterprises in Qazvin province, Iran. In order to design a model for competitiveness, the experts familiar with the issue of competitiveness were used. Accordingly, two questionnaires were used in this research to collect data. This questionnaire is distributed among members of the statistical sample after the determination of validity and reliability. The exploratory factor analysis, the Interpretative-Structural Modeling (ISM), and Structural-Equation (Path) Model (SEM) have been used to analyze the data. The results findings indicated that among the factors influencing competitiveness, the competitiveness factors related to firm management and the competitiveness factors related to suppliers and resources have the most impact on the competitiveness of small and medium firms. The results (findings) also showed that the competitiveness factors related to demand and customers are recognized as an absolutely influential component. The results of the Structural-Equation (Path) Model (SEM) have evaluated the path coefficients significance. According to the research's findings, it can be said that the factors affecting the competitiveness related to firm management and competitive factors related to suppliers and resources should be firstly strengthened in order to make small and medium industries more competitiveness and stimulate resources.

Keywords: Competitiveness, Small and Medium Industries, Interpretative-Structural Modeling (ISM), Structural-Equation (Path) Model (SEM)

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## 1. INTRODUCTION

The competition among economic, production, or commercial rivals in a business environment is one of the

most important criteria for the growth and development of industries. In fact, the appropriate level of competition and competitiveness is considered as a tool for achieving a favorable economic growth and sustainable develop-

ment in a healthy business environment (Ahmedova, 2015; Becut, 2016). In fact, the industry competitiveness is considered as a means of achieving desirable economic growth and sustainable development (Andzelic *et al.*, 2011); therefore, the industrial competitiveness promotes the economy through promoting the global trade and the development of diverse thinking (Hussain *et al.*, 2012). In fact, the competitiveness is the power of economic maneuver in a unit (firm), which is in a competitive market against the competitors and offers goods, services, skills, and ideas to a degree beyond the geographical boundaries under the terms and conditions of its business environment (Gonzalez, 2017; Rensmann, 2017).

Competitiveness is a multi-dimensional concept in which organizations need to strengthen themselves in all its dimensions in order to develop their competitive power (Akimova, 2000). The previous types of research focused on the competitiveness of new products on market responses to product design, and others focused exclusively on markets or competition (Suharyanti and Tontowi, 2015).

Competitiveness affects the success of a business firm at the global level (Ceptureanu, 2015; Ülengin *et al.*, 2014). An enterprise is a competitor from the perspective of its customers when it can provide a value more than its competitors. This value will be measured by offering products with lower prices, but with a similar quality to competitors, or creating a distinction in quality that can justify higher prices (Divandari *et al.*, 2009). However, one of the major problems in the industry in developing countries is the lack of competitiveness. One of the most important reasons for firms' inability in competitiveness is the lack of a clear approach to increase competitiveness. In other words, organizations or even the state specifically do not pursue a steady approach and policy toward the competitive advantage for industries. Therefore, changing the conditions changes the competitiveness increasing methods. On the other hand, because many experts believe that the competitiveness of firms should be increased in order to increase competitive power or competitiveness of a country, therefore, firms have a primary role in raising the competitiveness of industry and the country (Schwab *et al.*, 2007). Competitiveness at the firm level can be defined as the ability of the firm to design, produce, product marketing, and selling them more than competitors. Porter (1998a) states that governments are able to compete if their firms can compete. Porter expresses that these firms compete in the market rather than the government (Porter, 1998a). According to experts at Institute for Management Development (IMD, 2012), national competitiveness is not simply the concept of a simple community of firms, but it is the result of many factors, such as the administration of the economy by the government, social policies, and the mechanism of value creation. Competitiveness is the concept of the country's ability to create value added and increase the wealth of

society by managing assets and creating attractiveness, etc. According to Ma (1999), national competitiveness is the rate of production of goods and services that a country can reach international markets.

According to Marts, competitiveness is equivalent to the economic power of a unit versus its rivals in a market that easily delivers goods, services, skills, and ideas beyond geographic boundaries. Competitiveness at the firm level can be defined as the ability of the firm to design, produce, product marketing, and selling them more than competitors. One of the characteristics of successful firms is the power of competitiveness, and at the same time, the characteristic of unsuccessful firms is the lack of this power. Therefore, if the roots and factors affecting the competitiveness of the enterprises could be identified and their relationship could be determined, effective strategies could be developed to increase the competitiveness of firms.

A review on presented models in the field of competitiveness shows that lack of sufficient knowledge about factors affecting the competitiveness of small and medium industries in countries of origin has made the proposed models to be inefficient in this regard. Different models have been presented for competitiveness including Studies by Jiang *et al.* (2016), Zhao *et al.* (2015), Yang *et al.* (2015), Ahmedova (2015), Utami and Lantu (2014) and Rostek (2012) in some of which the relationship between one or more limited variables and competitiveness has only been studied or the presented models have been more in qualitative manner and the relationship between variables of competitiveness has not been investigated and tested. Accordingly, given that the discussion of providing competitive models for industrial managers and organizations is very important due to the increasing competitive space and shows the complexity of competitiveness processes. This issue needs more functional models and methods development. Therefore, in this paper, while fully studying the literature, the variables affecting competitiveness on the firm level are firstly identified. In continue, considering the logic of impressibility and competitiveness of the competitive variables, the relationship between the competitiveness variables are firstly determined based on the ISM method, and finally the model will be tested in order to ensure its suitability among small and medium enterprise. Accordingly, due to the high simplicity and capability of this method, on the one hand, and the lack of similar models in the examination and presentation of competitive models, especially for small and medium industries on the other hand, it can be said that the competitiveness modeling by using these methods makes development of an applied model in this field possible.

In other words, recognizing the characteristics of different firms in terms of competitiveness and providing effective models based on the factors affecting competitiveness is an issue that the researcher in this study is seeking to investigate. In this regard, the researcher has tried to

provide an appropriate answer to the main research question in developing a communication model between the competitiveness factors by understanding this issue and considering the importance of competitiveness.

## 2. FACTORS AFFECTING COMPETITIVENESS

According to Miller and Whitney (1999), there is no general and universal approach that has specific and identical components to accurately measure and assess the competitiveness that can be applied to all types of organi-

zations. However, Miller and Whitney (1999) developed a general methodology for developing an organization-level competitiveness measurement tool through conducting interviews with experts within and outside the organization, in five distinct parts and collecting information in order to create the tool from the extracted components. The five distinct parts are 1. Organizational values and targets, 2. The market, 3. Key Concepts, 4. Genesis and Evolution, and 5. Supporting Systems (Miller and Whitney, 1999; Nilsson and Rapp, 2005):

Factors influencing competitiveness enhancement in terms of subject literature are collected from various studies in the form of Table 1.

**Table 1.** Factors influencing competitiveness enhancement

Factor tile	Related research
Quality of access to the required resources and materials	Peteraf (1993), Grant (1991)
Level of access to the required human resources	Peteraf (1993), Grant (1991)
Appropriate strategies for procurement	Sirikrai and Tang (2006)
Number of Suppliers	Porter (1990)
The level of the competitiveness of alternative products	Porter (1990)
The existence (Lack of) alternative products	Porter (1990)
Organizational mission, targets, and perspectives in order to enhance the competitiveness of the business firm (existence of a coherent and strong competitive strategy)	Dyer and Singh (1998), Porter (1990, 1998b), Bruggeman and Van der Stede (1993)
The existence of efficient systems in the firm to hear the voice of the customer	Fagerberg (1995), Merrifield (1989), Andrades and Dimanche (2017)
The cost of making changes	
The amount of capital required for newcomers	Porter (1998a)
Branding and differentiating provided products and services	Porter (1998a), Szerb and Ulbert (2009), Andrades and Dimanche (2017)
The proper use of communication and technology infrastructures in the flexible production of products	Porter (1990)
High demand for products and services provided by the firm	Porter (1990), Wu <i>et al.</i> (2017)
Number of major customers	Porter (1990), Wu <i>et al.</i> (2017)
The amount of government support from the firm and related industries	Porter (1990), Andrades and Dimanche (2017)
Unique product offering	Szerb and Ulbert (2009)
The existence of a culture of creativity and continuous innovation in the organization	Szerb and Ulbert (2009)
Production of products at a low cost	Szerb and Ulbert (2009)
Quick responses to customer demand	Szerb and Ulbert (2009), Andrades and Dimanche (2017)
Proper site locating of the business firm	Rugman and Verbeke (2001), Szerb and Ulbert (2009)
Strong strategic business partners in the market	Szerb and Ulbert (2009)
Bargaining power of buyers	Sirikrai and Tang (2006)
The importance of the firm for suppliers and sellers of raw materials	Sirikrai and Tang (2006)
The power of competition among firms in the industry	Sirikrai and Tang (2006), Andrades and Dimanche (2017)
(Control) of potential competitors (newcomers)	Sirikrai and Tang (2006)
The level of threats associated with successor products	Sirikrai and Tang (2006), Szerb and Ulbert (2009)
Rules and regulations related to the use of human resources	Sirikrai and Tang (2006)

**Table 1.** Factors influencing competitiveness enhancement (Continued)

The appropriateness of business-related laws and regulations	Sirikrai and Tang (2006)
Rules and regulations related to investment	Sirikrai and Tang (2006)
Integrated and systematic management	Sirikrai and Tang (2006), Szerb and Ulbert (2009)
Capabilities and abilities of excellent management levels	Sirikrai and Tang (2006), Bruggeman, Van der Stede (1993)
Human assets	Sirikrai and Tang (2006)
Financial assets	Sirikrai and Tang (2006)
Available capacities and abilities of production	Sirikrai and Tang (2006), Szerb and Ulbert (2009)
The rate of access to new technologies	Sirikrai and Tang (2006), Szerb and Ulbert (2009)
Organizational process promotion capabilities	Sirikrai and Tang (2006)
Improving product capabilities	Sirikrai and Tang (2006)
The capabilities of the firm to create and develop new products or develop a previous product	Sirikrai and Tang (2006)
High level of productivity in a firm	Nagy (2016)
The rate of utilization of specialized market analysis tools	Wu <i>et al.</i> (2017)

Source: Collection of various scientific sources by the researcher.

The results of Table 1 show that totally, 41 factors have been identified and extracted as factors affecting the competitiveness through research literature.

### 3. RESEARCH METHOD

The study is an applied study with respect to the purpose and it is a descriptive modeling study in terms of methodology. The statistical population of this research in identifying factors affecting competitiveness includes all small and medium enterprises in Qazvin province. The size of the statistical sample with the critical value of the standard normal variable was calculated according to  $z = 1.96$ ,  $1 - \alpha = 95\%$  confidence interval, and  $95\%$  confidence interval  $\varepsilon = 0.0250$  and the research questionnaire is provided to the managers of these enterprises. In the second part, ten experts who have been familiar with the topics of competitiveness have been used to determine the communication model and leveling the factors influencing competitiveness.

In order to collect the research data, two researcher-made questionnaires were used. The first questionnaire was designed to identify the main components affecting competitiveness, and the second questionnaire was designed to level the effective factors and determine the

communication model in small and medium enterprises. The views of university professors and experts in this field have been used in this study to determine the validity of the questionnaires according to the content validity method. If necessary, corrective suggestions have been made by them.

In order to investigate the reliability of the questionnaire, the competitiveness factors (type I questionnaire) have been calculated based on the reliability test of the construct considering the dimensions of competitiveness and their evaluation indicators. The results of the reliability test are summarized in Table 2.

The results of Table 2 for determining the reliability of each of the effective dimensions on competitiveness show that the Cronbach's alpha coefficient for each of the effective dimensions on the competitiveness is more than 0.7 which indicates the suitable reliability of each dimension and research questionnaire (type I).

The reliability of the paired comparison questionnaire is based on collecting the information required by the ISM method through re-test and using Spearman's correlation coefficient. To assess the reliability of the responses provided by the expert group, the paired comparison questionnaire was distributed among 10 experts in two rounds with 6 days intervals and they were asked to answer the questionnaire questions. Then, the responses

**Table 2.** Results of the reliability of the type I questionnaire

Dimensions	Alpha coefficient
Competitiveness factors of the cost of obtaining superiority in the business environment	910.0
Competitiveness factors associated with suppliers and resources	982.0
Strategic competitiveness factors and strategic prediction	867.0
Competitiveness factors related to firm management	951.0
Competitiveness factors related to demand and customers	984.0

**Table 3.** Spearman correlation test for type II questionnaire

	The cost of obtaining superiority	Suppliers and resources	Strategy and Prediction	Management	Demand and customers
The cost of obtaining superiority		0.883	0.910	0.804	0.787
Suppliers and resources	0.863		0.795	0.731	0.884
Strategy and Prediction	0.811	0.721		0.839	0.713
Management	0.875	0.753	0.713		0.811
Demand and customers	0.868	0.724	0.764	0.750	

were entered into SPSS 23 software in two different rounds (by the same individuals) and the Spearman correlation test was performed. The results are shown in Table 3.

Regarding the calculated correlation coefficients that were more than 0.7, it can be stated that the data collected through the type II questionnaire had a good reliability.

## 4. FINDINGS

### 4.1 Exploratory Factor Analysis

Considering that the purpose of this research is to design a communicational model between the factors affecting competitiveness for the competitive species of small and medium industries, therefore, factor analysis has been used to achieve the main dimensions of competitiveness in the dynamics of the studied society. Table 4 shows the results of the adequacy of data are shown for determining the competitiveness dimensions.

Table 4 shows the value of the KMO index, the Bartlett test statistic, the degree of freedom, and the level of significance. Since the KMO index is calculated as much as 0.877 (greater than 0.5), the sample number is sufficient for factor analysis. Also, the level of significance

level (sig) of the Bartlett test is less than 5%, which shows that factor analysis is appropriate for identifying the structure of the factor model and the hypothesis of the recognition of the correlation matrix is rejected. Table 5 shows the confirmed components and the total explained variance.

Table 5 shows that totally five factors from all the questions of research's questionnaire have been extracted and these five factors explain 70.928 percent of variance of factors affecting the competitiveness in population under study. These five factors have been named as the cost of obtaining superiority, suppliers and resources, strategy and prediction, management, demand and customers.

### 4.2 Leveling the Factors Affecting Competitiveness and Formulating the Communication Model

Given the small number of dimensions and the lack of transparency in order to identify the causal relationships, the researcher distributed the paired comparison matrices to 14 members of the research, including the experts in the field of competitiveness and asked them to determine the type of relationship between the decision matrix ordered pairs based on the structural-interpretive approach. Therefore, Table 6 summarized the frequency

**Table 4.** The results of KMO and Bartlett tests to determine the dimensions of competitiveness

	Index KMO	0.877
Bartlett test	Chi-square value	44066.547
	Degree of freedom	820
	Significance level (sig)	0.000

**Table 5.** The number of verified components of the total variance

	Initial Specific Values			Specific values of verified factors without rotation			Specific values of extracted factors by rotation		
	Total	Percentage of variance	Cumulative percent	Total	Percentage of variance	Cumulative percent	Total	Percentage of variance	Cumulative percent
1	8.651	21.100	21.100	8.651	21.100	21.100	8.113	19.787	19.787
2	7.247	17.675	38.775	7.247	17.675	38.775	5.742	14.005	33.792
3	5.750	14.025	52.800	5.750	14.025	52.800	5.515	13.452	47.243
4	5.535	13.500	66.300	5.535	13.500	66.300	4.856	11.844	59.087
5	3.801	9.271	75.571	3.801	9.271	75.571	4.855	11.841	70.928

of responses provided by 14 experts for each of the internal relationships (regular pairs) of the research variables according to the process of collecting and summarizing the data related to the impact and effectiveness of the components based on the structural-interpretive approach.

For example, the number 3 in line of cost of obtaining superiority and column of suppliers and resources shows that three experts have believed that the cost of obtaining superiority can be considered as factor affecting the suppliers and resources. In continue, according to the ISM method, obtaining a majority vote of experts indicates the existence of a relationship and non-obtaining a majority, equal to the absence of a relationship between

each regular pair. The number of majority votes is also obtained by using equation (1) as follows:

$$\frac{n}{2} + 1 = \frac{14}{2} + 1 = 8$$

Thus, in Table 6, the entries with more than 8 votes have connections (1), and the entries with less than 8 votes indicate the lack of relationship (0) between regular pairs. With this argument, the initial access matrix ( $D_{ij}$ ) is constructed in the form of Table 7.

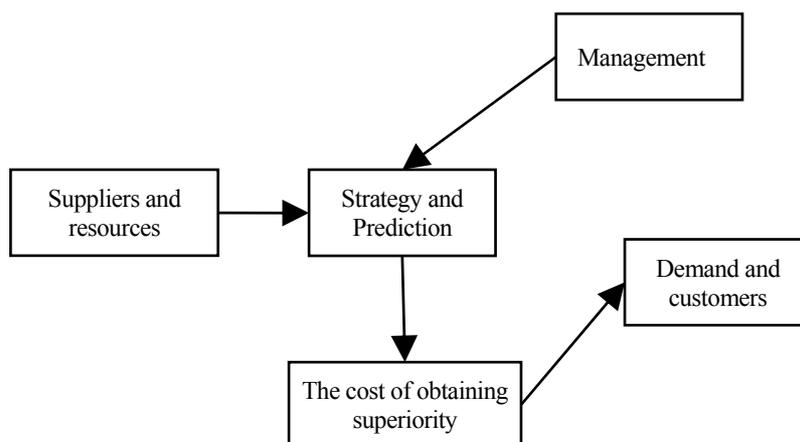
Also, the initial diagram of the relations between the research components can be formulated based on the initial access matrix in the form of Figure 1.

**Table 6.** The frequency of responses provided by experts for internal relationships between regular pairs of the research variables

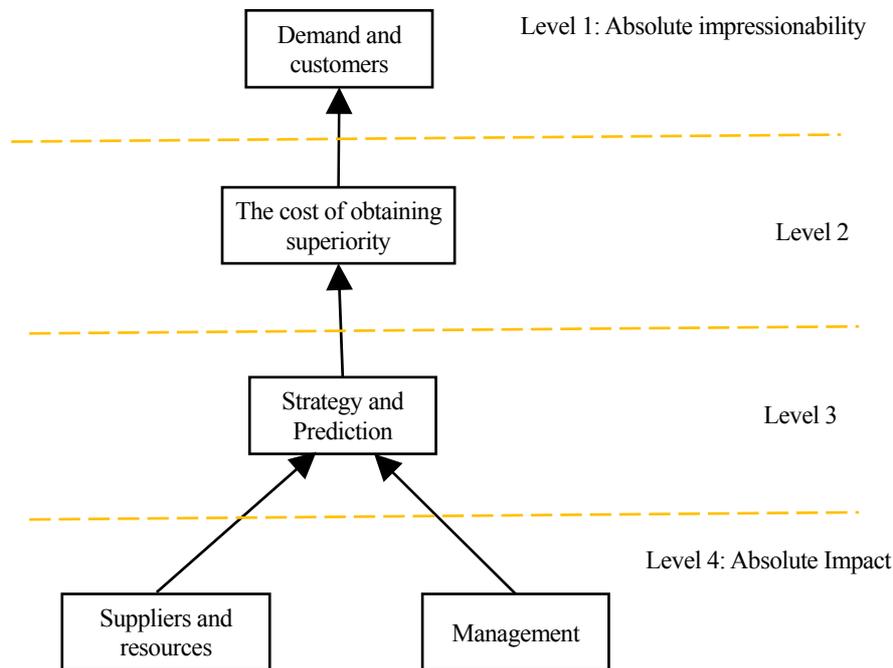
Total	The cost of obtaining superiority	Suppliers and resources	Strategy and Prediction	Management	Demand and customers
The cost of obtaining superiority	0	3	3	2	11
Suppliers and resources	2	0	11	3	4
Strategy and Prediction	11	2	0	2	7
Management	3	7	12	0	3
Demand and customers	3	4	2	2	0

**Table 7.** The access matrix of regular pairs

Total	The cost of obtaining superiority	Suppliers and resources	Strategy and Prediction	Management	Demand and customers
The cost of obtaining superiority	0	0	0	0	1
Suppliers and resources	0	0	1	0	0
Strategy and Prediction	1	0	0	0	0
Management	0	0	1	0	0
Demand and customers	0	0	0	0	0



**Figure 1.** The causal relationship model (conceptual model of the research).



**Figure 2.** The final model of the relationship between the components of competitiveness.

For example, Figure 1 shows that according to results of the initial acquisition matrix (Table 7), suppliers and resources can influence strategy and prediction and the strategy and prediction can influence cost of obtaining superiority.

Following the technique steps, the final achievement matrix ( $T_{ij}$ ), which contains direct and indirect relationships between the components, is calculated. In the next step, the leveling is done according to the structural-interpretative method. In Figure 2, the final pattern of the leveling of relationships between the competitiveness components is based on the ISM technique output.

The results of Figure 2 show that the competitiveness factors associated with firm management and the competitiveness factors related to suppliers and sources (Level 4) have the most impact on the competitiveness of small and medium enterprises. After these two components, the factors including strategic competitiveness and prediction (Level 3) and the cost of obtaining superiority in the business environment (Level 2) are placed as the next. Finally, the most influential component of competitiveness was the competitiveness factors associated with demand and customers (Level 1), which were recognized as an absolute influential component.

#### 4.3 Testing the Relationship Model between the Factors Affecting Competitiveness

Following the implementation of the ISM method, according to the paper's model, the data related to key dimensions affecting competitiveness for 196 recog-

nized industrial firm were prepared and imported into Smart PLS software. After implementing the conceptual model of the research and obtaining outputs, composite reliability, reliance on reliability, the convergent validity, and discriminated validity are investigated usually to evaluate reflection measurement models in equation (path)-structural models with partial least squares approach. Table 8 shows the external loads of factors related to each structure.

In assessing the reliability of the reagent, it should be noted that the external loads on the structure should be greater, indicating that the corresponding reagents have a large subscriptions, which are obtained by the structure. Also, the rule for examining external loads indicates that the values should be at least 0.4 and the best value is considered to be greater than 0.708. According to the factor load indicators in Table 8, most of the obtained factor loads are more than 0.708, which indicates an excellent factor load in the reliability of the reagents. The lowest factor load belongs to the BM\_6 reagent as much as 0.639, which is considered to be appropriate due to being more than 0.4. In other words, the results of Table 8 show that each construct has appropriately convergent reagents.

In the study of equation (path)-structural models for enterprises, the indicators including convergent validity, composite reliability, and compatibility reliability have been investigated for the model components. In Table 9, the values of these indicators are given for the main structures.

**Table 8.** The external loads of factors related to each structure

	Suppliers and resources	Suppliers and resources	Strategy and prediction	Management	The cost of obtaining superiority
BM_1				0.921	
BM_2				0.965	
BM_3				0.954	
BM_4				0.822	
BM_5				0.766	
BM_6				0.639	
CC_1					0.914
CC_2					0.899
CC_3					0.903
CC_4					0.872
CC_5					0.744
CC_6					0.762
DC_1		0.986			
DC_2		0.978			
DC_3		0.973			
DC_4		0.951			
SP_1			0.958		
SP_2			0.950		
SP_3			0.926		
SP_4			0.952		
SP_5			0.881		
SR_1	0.970				
SR_2	0.946				
SR_3	0.937				
SR_4	0.947				
SR_5	0.924				
SR_6	0.918				

**Table 9.** Validity and reliability indicators of the structure

	Compatibility	Reliability	Composite reliability	The average variance explained (AVE)
Suppliers and resources		0.974	0.979	0.884
Demand and customers		0.981	0.986	0.945
Strategy and Prediction		0.963	0.971	0.872
Management		0.921	0.940	0.727
The cost of obtaining superiority		0.923	0.940	0.726

Convergent validity is the measure in which a measurement is positively correlated with the alternate measurements of the same structure. Convergent validity measurement is usually based on the average of the variance extracted (AVE). The minimum average variance extracted as much as 0.5 indicates sufficient convergent validity. This means that a latent variable can averagely explain more than half the distribution of its reagents.

The Cronbach's Alpha is the traditional criterion for

controlling the reliability. If the Cronbach's Alpha of a block was larger than 0.7, the block is single-dimensional and the measurement model is confirmed. According to the results reported in Table 9, it is observed that the Cronbach's alpha values for all measured structures are greater than 0.7. Therefore, the one-dimensionality of all structures for the first cluster is confirmed based on Cronbach's alpha. However, in many studies, an alpha greater than 0.6 is also acceptable, nevertheless, another criterion entitles the com-

posite reliability is also applied to make sure that all structures are single-dimensional. Based on the results of Table 9 related to this index, it is seen that the composite reliability values for all measured models are greater than 0.7. Therefore, the one-dimensionality of all measured models is reconfirmed based on the composite reliability. Finally, the estimated coefficients for the structural-equation (path) model described in the first cluster can be summarized in the form of Figure 3.

After ensuring the appropriateness of the validity and reliability estimations, the structural part should be evaluated and the data should be extracted. Findings of the coefficient of determination and its significance test are presented in Table 10.

The basic criterion for evaluating the endogenous la-

tent variables is the coefficient of determination. The values of the coefficient of determination as much as 0.67, 0.33, and 0.19 in the PLS path models are significant, moderate, and weak, respectively. Based on the results of Table 10, the values of the coefficient of determination for the latent variables are somehow weak.

In the following, the path coefficients of the model are investigated. Each path coefficient in the structural model can be considered as a standardized beta coefficient in regressions of the ordinary least squares. The path coefficients in the model have been calculated for the structural part of the research regarding the direct and indirect effects as shown in Table 11. According to the results obtained in the above table, the direct and indirect effects of each of the components on the other can be determined.

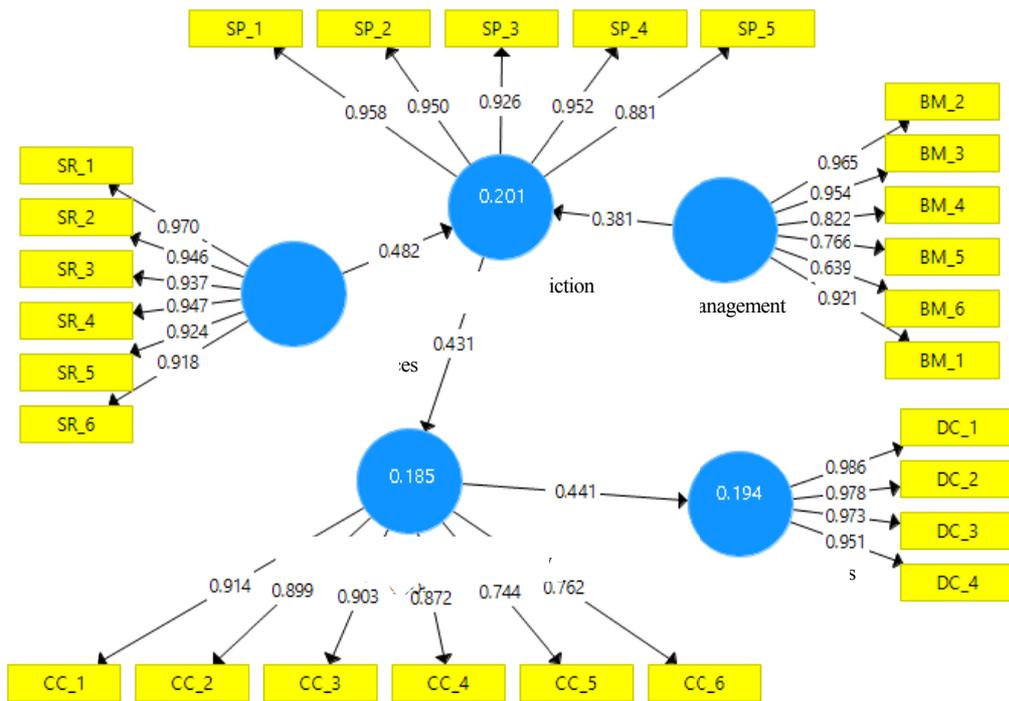


Figure 3. Estimation coefficients of the structural-equation (path) model for the first cluster.

Table 10. Coefficients of determination and their significance test

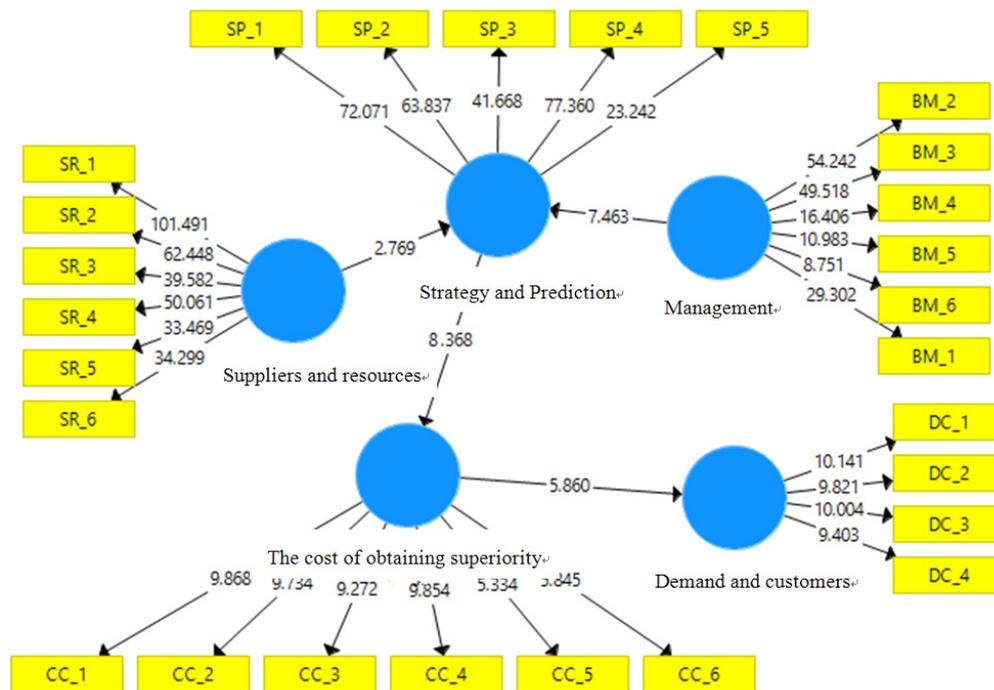
	R Square	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Demand and customers	0.194	0.070	2.769	0.009
Strategy and Prediction	0.201	0.065	3.902	0.000
The cost of obtaining superiority	0.185	0.053	3.463	0.001

Table 11. The total effects of latent variables (direct and indirect) in the estimated structural model

Variables	Suppliers and resources	Demand and customers	Strategy and prediction	Management	The cost of obtaining superiority
Suppliers and resources		0.092	0.482		0.208
Demand and customers			0.190		0.431
Strategy and Prediction				0.381	0.164
The cost of obtaining superiority					0.441

**Table 12.** The significance test results of the path coefficients in relation to direct and indirect effects

Path	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Suppliers and Resources → Demand and Customers	0.092	0.303	0.304	0.367
Suppliers and Resources → Strategy and Prediction	0.482	0.174	2.769	0.006
Suppliers and Resources → The cost of obtaining superiority	0.208	0.211	0.985	0.182
Strategy and Prediction → Demand and Customers	0.190	0.143	1.329	0.064
Strategy and Prediction → The cost of obtaining superiority	0.431	0.052	8.368	0.000
Management → Demand and Customers	0.073	0.239	0.305	0.361
Management → Strategy and Prediction	0.381	0.050	7.443	0.000
Management → The cost of obtaining superiority	0.164	0.082	1.988	0.044
The cost of obtaining superiority → Demand and Customers	0.441	0.076	5.86	0.006



**Figure 4.** The t-values for the estimated coefficients of the structural-equation (path) model.

The BT procedure must be implemented in PLS in order to make a significance assessment of direct and indirect effects and finally, the total effects and the t value should be obtained for each of the coefficients to assess the significance. In the following, the results of the t-test are shown in Table 12 and Figure 4 to assess the significance of path coefficients (direct and indirect effects).

The results of Table 12 and Figure 4 shows that computed t value in competitiveness model is more than 1.96 for all direct effects which represents the difference of the coefficients with zero. But indirect effects have not been in most cases significant. For example, the direct effect of suppliers and resources on strategy and forecast has a coefficient of 0.482 with a t value of 2.76, while the indirect effect of suppliers and sources on demand and

customers with a coefficient of 0.92/0 and the value of 30.41 t has not been significant.

## 5. CONCLUSION

One of the major problems of the industry in developing countries is the lack of competitiveness. In addition, one of the most important causes of firms' inability in these countries is the lack of a clear approach to increase competitiveness. In other words, organizations or even the government specifically does not pursue a steady approach and policy toward the competitive advantage for industries. Therefore, changing the conditions changes the way of increasing competitiveness. On the other hand, in

the opinion of many experts, the competitiveness of firms should be increased in order to increase competitive power or competitiveness of a country; therefore, firms have a primary role in raising the competitiveness of industries and the country. According to the results of the various analytical approaches used to provide a response and designing a communicational model among the factors affecting the competitiveness of small and medium industries using ISM, the research model has five main dimensions: "Competitiveness factors related to suppliers and resources," "Strategic competitiveness and strategic prediction factors," "Competitiveness factors related to firm management," "Competitiveness factors of the cost of obtaining superiority in the business environment," and "Competitiveness factors related to demand and customers" have been identified. Considering the findings of interpretive structural modeling, four main relationships between the factors are definitively identified among the identified relationships. The mentioned relationships are:

- The Effects of "Competitiveness factors related to firm management" on "Strategic competitiveness and strategic prediction factors"
- The Effects of "Competitiveness factors related to suppliers and resources" on "Strategic competitiveness and strategic prediction factors"
- The Effects of "Strategic competitiveness and strategic prediction factors" on "Competitiveness factors of the cost of obtaining superiority in the business environment"
- The Effects of "Competitiveness factors of the cost of obtaining superiority in the business environment" on "Competitiveness factors related to demand and customers"

The research results in this section show that first, the effective factors affecting the competitiveness of firm management and the factors of competitiveness with suppliers and resources should be strengthened to have more competitiveness in the small and medium industries and stimulate demand to enhance strategic competitiveness and strategic prediction at the firm level. This factor affects the competitiveness factors of the cost of obtaining superiority in the business environment, which ultimately can stimulate demand and customers. Considering the above findings, it can be said that the causal relations confirm some of the main hypotheses, findings, and research results such as Miller and Whitney (1999), Porter (1990), Szerb and Ulbert (2009) and Sirqari and Tang (2006).

On the other hand, given the causal relationship between the competitiveness variables and the causal model test, the competitiveness model presented in this research can make various industry managers easily identify their competitiveness priorities. The model presented in this research for small and medium enterprises can guide

managers in proper programming to enhance competitiveness compared to the previous models for testing the final model among small and medium enterprises and determining the main effective variables. Previous models, such as the Utami and Lantos (2014) and Rostock (2012) studies, have somehow tried to explain some of the competitiveness in the small and medium industries that the model presented in this paper has been somehow a complement to the previous work in terms of the comprehensive examination of various variables affecting competitiveness and the presentation of a conceptual model and testing the model for competitiveness.

Therefore, managers are suggested to develop goals, perspectives and organizational missions in order to improve the competitiveness of the business firm and review at various stages in order to increase competitiveness. It is also proposed to increase the quality and level of access to required resources and raw materials. Paying attention to the efficient supply chain can be beneficial in this regard.

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