

Designing a Pattern of industrial brand competitiveness by using ISM modeling

(Case study: National Iranian Petrochemical Company)

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Nowadays, with the expansion of globalization, increasing competition, the entry of various domestic and foreign companies, various products and advances in technology, maintaining customer satisfaction and loyalty has become difficult. One of the hallmarks of successful companies today is their competitiveness. The main purpose of this study is structural-interpretive modeling of industrial brand competitiveness in the petrochemical industry. This research is qualitative-quantitative mixed exploratory research. The statistical population in the qualitative part of the research includes faculty members and experts in the field of industrial management, marketing and industrial brand, professors familiar with the subject of research and managers and deputies with experience in petrochemical companies in the country using 16 snowball sampling method were chosen. In a small part, the statistical community includes personnel (managers, deputies and experts) of the marketing and sales department of petrochemical companies in the country. For sampling, due to the small size of the statistical population and the irreversibility of the questionnaires has been used the whole number and the whole population has been considered as a sample in a small part ($N = 255$). The research tool in the qualitative part of the interview is semi-structured and in the quantitative part the researcher has made a questionnaire. For data analysis in the qualitative part, fuzzy Delphi theme and technique analysis has been used and in the quantitative part, ISM technique has been used for data analysis. In the qualitative part of the research, a total of 14 variables were identified as factors affecting the competitiveness of the industrial brand. These 14 factors are: Technological opportunism, Brand strength, brand differentiation, Commercialization of innovation, Strategic entrepreneurship, Exploratory marketing, Innovative marketing, Brand charm, Strategic knowledge management, customer relation management, Brand management system, Strategic intelligence and strategic pricing

Keywords: Competitiveness, Industrial Brand, ISM Modeling, National Iranian Petrochemical Company

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1. Introduction

Competitiveness is a major topic among policymakers in the age of globalization, and it's seen as a way to accomplish the necessary economic growth and development. (Abbasi et al., 2012). One of the most important issues that has been emphasized in recent years in the management and marketing literature is competitiveness and in this regard, different

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perspectives have been determined on the determinants of competitiveness (Mehri and Khodadad Hosseini, 2005). Without strong brands, Iranian firms and companies will not be able to introduce their products and services and penetrate competitive markets, just as a low-quality product in today's competitive world will not be able to maintain a long-term and stable presence in domestic and international markets. In addition, brands as a counter of products and services provided by a country, the ground for business prosperity, increase capital they provide foreign investment and increase exports (Karimi, 2018). The capacity of firms or nations to produce export revenues is frequently viewed as a crucial measure of their competitiveness and ability to generate wealth and prosperity. (Rahmatabadi and Nayebzadeh, 2020).

Currently, branding has a special place in the world's leading companies, to the extent that in some of these companies, brand management has replaced market development management. This is while the necessity of creating and developing the brand in Iranian economic enterprises has not been considered before and these enterprises do not have any share of 1100 billion dollars' worth of world famous brands (Hosseini, 2016). Meanwhile, the category of branding in the petrochemical industry has different conditions. Given the increasing number of competitors domestically and internationally and offering new products to customers in different ways, having a brand in the petrochemical industry can lead to a competitive advantage. Iran's economy is in a position where, on the one hand, it is under great international pressure to liberalize trade, and on the other hand, considerable expansion of non-oil exports and a rise in its percentage of total exports are required for sustainable development. Petrochemicals and its products can play a key role in the way. Despite the large resources, capacities and talents, it seems that petrochemical companies, through proper support, guidance and management, can achieve an acceptable degree of competitiveness in global markets and the source of significant effects in improving the situation. Become Iran's economy. Undoubtedly, having a brand and branding is very important in this industry. Because in the field of competition, units are successful whose names are known to the consumer and create trust in his mind and heart. Therefore, considering the importance of branding in today's competitive economy, the main purpose of this article is to design an industry brand competitiveness model using ISM modeling to increase competitiveness and stay competitive.

Research purposes

This article is done to achieve the following goals. These goals are derived from the issues of the article and are revealed through its expression in this section. The objectives of this research are as follows:

General purpose:

Designing an Industrial Brand Competitiveness Model by Using ISM Modeling (Case Study: National Iranian Petrochemical Company).

Ideal goals

Helping to increase the level of knowledge and studies related to branding in order to promote the value of assets and increase profitability by relying on the competitiveness of Iran's petrochemical industry

Specific objectives:

Identifying the components of the industrial brand in the Iranian petrochemical industry

Study and survey of the effect of variables affecting the competitiveness of the industrial brand in the Iranian petrochemical industry

Prioritization and categorization of factors affecting brand competitiveness in Iran's petrochemical industry

Presenting a conceptual model of industrial brand competitiveness in Iran's petrochemical industry

Practical purposes:

Assistance to petrochemical industry managers in order to increase competitiveness by explaining the interpretive structural model

Assistance to petrochemical industry managers in order to brand products and facilitate their relationship with the market through branding

Definitions of research terms

Competitiveness: Competitiveness means the ability to force the customer to choose the company's offers against the offers of competitors (Safari, 2011).

Intensity of competition: The strategic management literature shows that managers formulate the strategies of the organization after considering the environmental trends.

Therefore, the key point is: How managers perceive and interpret competitive forces. Market conditions shape the nature and intensity of competition and affect industry dynamics.

Intensity of competition refers to a situation where there is a (high) number of competitors in the market and the lack of growth opportunities is very intense competition (Yoon et al, 2015).

Brand: A name, phrase, design, symbol or any other feature that characterizes a particular service or seller of a product that distinguishes it from other similar products and services (Ghasemi, 2012).

Brand Management System: The brand management system describes how businesses should think about and build their internal brand management in order to make the creation and maintenance of strong brands easier in the long term. The brand management system is a dynamic component that keeps the brand management chain model running. It is neither a brand management process nor a collection of possible linkages between activities connected to the branding process. (Aaker & Joachimsthaler, 2000).

Branding: The degree to which a firm understands the value of its brand as a valuable asset and concentrates its strategy and marketing operations on having strong branding skills is referred to as branding. Urde (1994, 1999) was the first to establish this notion, and it underscores the critical emphasis that senior management must take on branding. In this context, branding refers to a method of thinking and a type of organizational culture that guarantees the brand plays a central part in the company's strategy. (Baumgarth, 2010).

Internal branding: When the construction of powerful brands is reinforced as a basic strategic objective by organizational culture, all members of the organization must work together to accomplish this goal and institutionalize the value of the brand. As a result, businesses must train and educate their whole staff at every level and in every aspect of their jobs so that they are knowledgeable with and supportive of the brand's identity and meaning. And completely comprehend the ramifications (Wu et al., 2017). The purpose of this method, which follows an internal marketing approach, is for workers to build symbolic associations with the brand and therefore become "brand ambassadors," rather than limiting their relationship with the brand to a business transaction for monetization. (Julian Et al., 2018).

2. Research methodology

The present study is a combined qualitative-quantitative research with a structural-interpretive modeling approach. This study is also classified as applied research in terms of its goal. The statistical population in the qualitative segment is made up of specialists. (faculty members and experts in the field of industrial management, marketing and industrial brand, professors familiar with the subject of research and managers and deputies with a history of petrochemical companies). Because specialists in the field of industrial branding are difficult to identify, targeted sample and snowball sampling approaches were utilized. The emphasis is on those who are better knowledgeable about the research issue. In addition to this strategy, interviewees are invited to introduce additional experts in the subject, a technique known as snowball sampling in qualitative research. This approach was used to identify and choose the second sample unit after identifying or selecting the first expert and expert. Other sample units are discovered and selected in the same way. At the beginning, criteria for purposeful selection of experts were considered. Based on these criteria, a list of these experts was prepared to make the necessary arrangements for scheduling and conducting the interview. Expert criteria for entering the interview included the following:

- 1- Managers and deputies of marketing and sales department of Iranian petrochemical companies
- 2- Faculty members who had a long history in teaching related courses such as, industrial marketing, brand, etc.
- 3- Faculty members who have a history of research in the field of industrial brand, variables related to competitiveness, brand and branding, and this field was one of their research interests.

The statistical population of this research in the quantitative part includes the personnel (managers, deputies and experts) of the marketing and sales department of the country's petrochemical companies, whose number is 320 according to the statistics published by these companies. The sampling method in the qualitative part of the research is snowball sampling. In the qualitative stage, the number of samples is determined by the theoretical saturation level. To put it another way, the researcher has extended the interviews to the point where additional interviews have yielded no new data and no new knowledge about defining the features of the industrial brand and building its model has been gained. Therefore, if more interviews do not lead to more data and the previous data is repeated, the researcher will stop the interviews. In the quantitative part of the research, according to the population size ($N = 320$), 175 people were selected to select the sample size using Morgan table. Sampling

method in the quantitative part of the research is stratified sampling. In the qualitative stage, after in-depth review of the theoretical literature of the research, protocols and interview questions were designed to collect information. Therefore, the method of data collection in the qualitative stage of this research is interview. The data collection tool in the quantitative phase is library studies and questionnaires. Through library studies, secondary data are obtained, which are reviewed by the researcher before starting the research. The sources of this data are: Data in past documents, official and unofficial statistics, books, English and Persian articles, dissertations and websites. To evaluate the validity in the qualitative part has been used triangulation or three-way analysis of data sources and peer review. To evaluate the reliability in the qualitative part has been used the definition of terms and external and internal status. Content validity has been used to check the validity in the quantitative part and Cronbach's alpha coefficient has been used to check the reliability in the quantitative part. All coefficients have been higher than 0.70 and it is a sign of confirmation of the reliability of the quantitative part tool.

Interpretive Structural Modeling

Interpretive Structural Modeling (ISM) is a technique for creating a pattern of complicated and numerous interactions among variables in a phenomena. This approach is based on an interpretative paradigm and is a type of structural analysis. This technique is appropriate for management and social science research because it identifies links between the underlying factors of a multidimensional and complicated event. An interpretative structural model (ISM) is a method of examining the impact of each variable on other variables; it is a complete technique to evaluating communication that is used to construct the model framework that allows the study to achieve its overall goals.

Determination of the variables

Interpretive structural modeling begins with a list of variables that are relevant to the problem or subject (Kanan and Noor Haq, 2007). These variables are obtained from the study of the subject literature, interviews with experts or through a questionnaire (Tizro, 2010).

Obtaining a structural self-interaction matrix

This matrix contains the dimensions of the variables mentioned in the first row and column of each variable, correspondingly. Symbols are then used to identify the two-by-two relationships between the variables (Tizro 2010). The structural self-interaction matrix is created based on a group of experts' debates and opinions (Jetish Takar et al., 2007). It has been advised that professionals employ different management strategies, such as brainstorming and nominal grouping techniques, to discover the kind of links (Singh et al., 2003). The following symbols can be used to figure out what kind of relationship you're in:

In the construction of a structural self-interaction matrix, conceptual linkages are important. (Jetish Takar et al., 2007)

concept of symbol	symbol
i leads to j. (Row leading to column)	V
J leads to i. (Column leads to row)	A

There is a two-way relationship i and j	X
There is no valid relationship.	O

Obtain the achievement matrix

By converting the SSIM matrix relationship symbols to the numbers zero and one, the matrix can be accessed. These rules have been stated (Jetish Takar et al., 2007).

How to turn conceptual relations into numbers (Jetish Takar et al., 2007).

Conceptual symbol	J to i	i to j
V	0	1
A	1	0
X	1	1
O	0	0

Obtaining the achievement matrix

The condition of cohabitation between components should also be taken into account at this point; if I leads to j and j leads to k, then I must lead to k. (Jetish Takar et al., 2007). Huang and colleagues Used mathematical criteria to ensure consistency, resulting in a power ($K + 1$) accomplishment matrix. The matrix empowerment operation must, of course, follow the Boolean rule. (Huang et al., 2005).

Determining the level of variables and forming a conical matrix

The accomplishment set and set of requirements for each variable are defined to determine the degree and priority of variables. Each variable's access set contains the variables that can be accessed via it, whereas the prerequisite set contains the variables that may be accessed through it. The subscriptions of the access set and the requirements of all factors are then calculated, and if the access set equals the subscription set of that factor, the access set is called high level. Other levels can be obtained by separating the previous levels from the matrix and repeating the procedure. The receiving matrix is ordered in order of levels after re-determining the levels, and the resultant matrix is called a conical matrix. (Jetish Takar et al., 2007).

Drawing the chart

First, we arrange the criteria by level, then by priority, from top to bottom. The structural model is constructed by nodes and lines using the matrix derived from the incoming matrix sorted by surfaces. An arrow from i to j indicates if there is a relationship between i and j. (Jetish Takar et al., 2007).

MICMAC analysis

The goal of this study is to discover and assess the factors' effect and dependency. According to the power of direction and reliance, the variables are categorized into four groups in this study: 1- Autonomous variables: those with little or no leadership and a lot of reliance. These variables have little or no contact with the system and are relatively disconnected to it. 2- Dependent variables: variables with a low conductivity but a high degree of dependence. 3- Communication variables: those with a high conductivity and a high degree of dependability. These variables are unstable because any change in them might have an impact on the system, and system feedback can eventually lead these variables to change again. 4- Self-contained changes: those with strong leadership but little reliance. (Ravi et al. 2005).

Research Findings

In the qualitative part of the research, semi-structured interviews have been used to extract the factors affecting the competitiveness of the industrial brand in the petrochemical industry. In these interviews, in addition to university professors and managers with a background in Ilam Petrochemical Company, doctoral students familiar with the subject of the researcher were also present. The final results obtained from the analysis of the interviews are reported in Table 1.

Step 1: Identify the variables related to the problem

In the qualitative part of the research, 14 factors were finally identified as variables affecting the competitiveness of the industrial brand in the petrochemical industry, which is shown in the table.

Factors Affecting on Industrial Brand Competitiveness in Petrochemical Industries (Source: Researcher Findings)

	Extracted variables
Industrial brand competitiveness in petrochemical industries	Brand differentiation Exploratory marketing customer relation management Commercialization of innovation Brand management system Innovative marketing Strategic entrepreneurship Strategic pricing Technological opportunism Strategic knowledge management Inclusive quality

	Brand strength
	Strategic intelligence
	Brand attractiveness

Step 2: Formation of structural self-interaction matrix

In the structural self-interaction matrix, dimensions and indicators are compared utilizing four phases of conceptual relations.

Self-interactive matrix of factors affecting on industrial brand competitiveness (Source: Researcher Findings)

Factors	۱۴	۱۳	۱۲	۱۱	۱۰	۹	۸	۷	۶	۵	۴	۳	۲	۱
1. Brand differentiation	A	X	O	O	O	O	O	V	V	X	O	V	V	-
2. Exploratory marketing	A	A	O	A	A	V	O	O	X	A	A	A	-	
3. Customer relationship management	A	A	O	A	A	O	V	A	V	A	O	-		
4. Commercialization of innovation	A	A	O	A	A	V	V	A	O	A	-			
5. Brand management system	A	X	A	A	V	O	V	V	V	-				
6. Innovative marketing	A	A	A	A	A	V	V	A	-					
7. Strategic entrepreneurship	A	A	A	A	A	V	V	-						
8. Strategic pricing	A	A	O	A	A	X	-							
9. Technological opportunism	A	O	O	A	O	-								
10-Strategic knowledge management	A	A	A	A	-									
11-Inclusive quality	V	V	V	-										
12. Brand strength	O	O	-											
13. Strategic intelligence	X	-												
14. Brand attractiveness	-													

Step 3 and 4: Creating the initial and final access matrix

In order to achieve the initial availability matrix, the symbols mentioned in Table 2 must be converted to zero and one symbols. The final access matrix is created by inserting the transferability in the variables after obtaining the first access matrix. In this way can be done the next step of implementing the ISM methodology. The results of using multiple

relationships between variables are shown in Table 3, and the influence of each variable and the degree of dependence of each variable are also shown.

Accessibility matrix (Source: Researcher Findings)

Factors	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Influence power
1. Brand differentiation	1 *	1	0	0	1 *	1 *	1 *	1	1	1	1 *	1	1	1	12
2. Exploratory marketing	0	0	0	0	0	1	1 *	0	1	0	0	0	1	0	4
3. Customer relationship management	0	0	0	0	0	1 *	1	0	1	0	0	1	1	0	5
4. Commercialization of innovation	0	0	0	0	0	1	1	0	1 *	0	1	0	1	0	5
5. Brand management system	1 *	1	0	0	1	1 *	1	1	1	1	1	1	1	1	12
6. Innovative marketing	0	0	0	0	0	1	1	0	1	0	0	0	1	0	4
7. Strategic entrepreneurship	0	0	0	0	0	1	1	1	1	0	1	1	1 *	0	7
8. Strategic pricing	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
9. Technological opportunism	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
10-Strategic knowledge management	0	0	0	0	1	1 *	1	1	1	0	1	1	1	0	8
11-Inclusive quality	1	1	1	1	1	1	1	1	1	1	1	1	1	0	13
12. Brand strength	0	1 *	1	0	1	1	1 *	1	1	1	1	1 *	1 *	1 *	12
13. Strategic intelligence	1	1	0	0	1	1 *	1	1	1	1	1	1	1	1	12
14. Brand attractiveness	1	1	0	0	1	1	1	1	1	1	1	1	1	1	12

power of dependence	5	6	2	1	7	14	14	8	12	6	9	9	12	5	
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Step 5: Determining the level of variables

The final obtained matrix is categorized into distinct levels in this stage. Three sets of output, input, and common were created for each of them to establish the level of variables (factors) in the final model. The components of the system from which the component originates make up a variable's output set. The matching line must be verified to ascertain the output set of each component. The directional lines that emerge from this row are indicated by the number 1s in this row. The input set of a variable is made up of the components of the system that the variable goes to, and the appropriate column must be examined to find the input set of each component. The directional lines that enter that component are indicated by the 1s in this column. The subscription of these sets is established for each of the variables once the input and output sets have been specified. A common set for each variable is thus obtained. To determine the rank of factors, those factors whose output is equal to their subscription set are placed at level one.

Final accessibility matrix (corresponding to level 1) (Source: Researcher findings)

Factors	Inputs	Outputs	Common	Level
1. Brand differentiation	1-5-12-13-14	1-2-3-4-5-6-7-8-9-10-13-14	1-5-13-14	
2. Exploratory marketing	1-2-3-4-5-6-7-10-11-12-13-14	2-6-8-9	2-6	
3. Customer relationship management	1-3-5-7-10-11-12-13-14	2-3-6-8-9-	3	
4. Commercialization of innovation	1-4-5-7-10-11-12-13-14	2-4-6-8-9-	4	
5. Brand management system	1-5-11-12-13-14	1-2-3-4-5-6-7-8-9-10-13-14	1-5-13-14	
6. Innovative marketing	1-2-3-4-5-6-7-10-11-12-13-14	2-6-8-9	2-6	
7. Strategic entrepreneurship	1-5-7-10-11-12-13-14	2-3-4-6-7-8-9	7	
8. Strategic pricing	1-2-3-4-5-6-7-8-9-10-11-12-13-14	8-9	8-9	First

9. Technological opportunism	1-2-3-4-5-6-7-8-9-10-11-12-13-14	8-9	8-9	First
10-Strategic knowledge management	1-5-10-11-12-13-14	2-3-4-6-7-8-9-10	10	
11-Inclusive quality	11	2-3-4-5-6-7-8-9-10-11-12-13-14	11	
12. Brand strength	11-12	1-2-3-4-5-6-7-8-9-10-12-13	12	
13. Strategic intelligence	1-5-11-12-13-14	1-2-3-4-5-6-7-8-9-10-13-14	1-5-13-14	
14. Brand attractiveness	1-5-11-13-14	1-2-3-4-5-6-7-8-9-10-13-14	1-5-13-14	

After setting the technological opportunism and strategic pricing variables as level 1 to determine the other levels, the table is re-leveled by eliminating the technological opportunism and strategic pricing criteria, the results of which are shown in the table.

Final accessibility matrix (related to level 2) (Source: Researcher findings)

Factors	Inputs	Outputs	Common	Level
1. Brand differentiation	1-5-12-13-14	1-2-3-4-5-6-10-13-14	1-5-13-14	
2. Exploratory marketing	1-2-3-4-5-6-7-10-11-12-13-14	2-6-	2-6	Second
3. Customer relationship management	1-3-5-7-10-11-12-13-14	2-3-6	3	
4. Commercialization of innovation	1-4-5-7-10-11-12-13-14	2-4-6	4	
5. Brand management system	1-5-11-12-13-14	1-2-3-4-5-6-7-10-13-14	1-5-13-14	
6. Innovative marketing	1-2-3-4-5-6-7-10-11-12-13-14	2-6-	2-6	Second
7. Strategic entrepreneurship	1-5-7-10-11-	2-3-4-6-7-	7	

	12-13-14			
10-Strategic knowledge management	1-5-10-11-12-13-14	2-3-4-6-7-10	10	
11-Inclusive quality	11	2-3-4-5-6-7-10-11-12-13-14	11	
12. Brand strength	11-12	1-2-3-4-5-6-7-10-12-13	12	
13. Strategic intelligence	1-5-11-12-13-14	1-2-3-4-5-6-7-10-13-14	1-5-13-14	
14. Brand attractiveness	1-5-11-13-14	1-2-3-4-5-6-7-10-13-14	1-5-13-14	

After placing exploratory marketing and innovative marketing at the second level to determine other levels of the table, by removing these two factors, it is re-leveled, the results of which are reported in the below table.

Final Accessibility Matrix Table (for Level 3) (Source: Researcher Findings)

Factors	Inputs	Outputs	Common	Level
1. Brand differentiation	1-5-12-13-14	1-3-4-5-10-13-14	1-5-13-14	
3. Customer relationship management	1-3-5-7-10-11-12-13-14	3	3	Third
4. Commercialization of innovation	1-4-5-7-10-11-12-13-14	4	4	Third
5. Brand management system	1-5-11-12-13-14	1-3-4-5-7-10-13-14	1-5-13-14	
7. Strategic entrepreneurship	1-5-7-10-11-12-13-14	3-4-7	7	
10-Strategic knowledge management	1-5-10-11-12-13-14	3-4-7-10	10	
11-Inclusive quality	11	3-4-5-7-10-11-12-13-14	11	
12. Brand strength	11-12	1-3-4-5-7-10-12-13	12	
13. Strategic	1-5-11-12-13-14	1-3-4-5-7-10-13-	1-5-13-14	

intelligence		14		
14. Brand attractiveness	1-5-11-13-14	1-3-4-5-7-10-13-14	1-5-13-14	

After placing the commercialization of innovation and customer relationship management at the third level to determine the other levels of the table, by removing these two factors, it is re-leveled, the results of which are reported in the table below.

Final Accessibility Matrix Table (for Level 4) (Source: Researcher Findings)

Factors	Inputs	Outputs	Common	Level
1. Brand differentiation	1-5-12-13-14	1-5-10-13-14	1-5-13-14	
5. Brand management system	1-5-11-12-13-14	1-5-7-10-13-14	1-5-13-14	
7. Strategic entrepreneurship	1-5-7-10-11-12-13-14	7	7	Fourth
10-Strategic knowledge management	1-5-10-11-12-13-14	7-10	10	
11-Inclusive quality	11	5-7-10-11-12-13-14	11	
12. Brand strength	11-12	1-5-7-10-12-13	12	
13. Strategic intelligence	1-5-11-12-13-14	1-5-7-10-13-14	1-5-13-14	
14. Brand attractiveness	1-5-11-13-14	1-5-7-10-13-14	1-5-13-14	

After placing strategic entrepreneurship at the fourth level to determine the other levels of the table, by removing this factor, it is re-leveled, the results of which are reported in the table below.

Final Accessibility Matrix Table (corresponding to Level 5) (Source: Researcher Findings)

Factors	Inputs	Outputs	Common	Level
1. Brand differentiation	1-5-12-13-14	1-5-10-13-14	1-5-13-14	
5. Brand management system	1-5-11-12-	1-5-10-13-14	1-5-13-14	

	13-14			
10-Strategic knowledge management	1-5-10-11-12-13-14	10	10	Fifth
11-Inclusive quality	11	5-10-11-12-13-14	11	
12. Brand strength	11-12	1-5-10-12-13	12	
13. Strategic intelligence	1-5-11-12-13-14	1-5-10-13-14	1-5-13-14	
14. Brand attractiveness	1-5-11-13-14	1-5-10-13-14	1-5-13-14	

After placing the strategic knowledge management in the fifth level to determine the other levels of the table, by removing this factor, it is re-leveled, the results of which are reported in the table below.

Final Accessibility Matrix Table (for Level 6) (Source: Researcher Findings)

Factors	Inputs	Outputs	Common	Level
1. Brand differentiation	1-5-12-13-14	1-5-13-14	1-5-13-14	Sixth
5. Brand management system	1-5-11-12-13-14	1-5-13-14	1-5-13-14	Sixth
11-Inclusive quality	11	5-11-12-13-14	11	
12. Brand strength	11-12	1-5-12-13	12	
13. Strategic intelligence	1-5-11-12-13-14	1-5-13-14	1-5-13-14	Sixth
14. Brand attractiveness	1-5-11-13-14	1-5-13-14	1-5-13-14	Sixth

After placing the brand differentiation, the brand management system, strategic intelligence and brand attractiveness in the sixth level to determine the other levels of the table, by removing these 4 factors, it is re-leveled, the results of which are reported in the table below.

Final Accessibility Matrix Table (for Level 7) (Source: Researcher Findings)

Factors	Inputs	Outputs	Common	Level
11-Inclusive quality	11	-11-12	11	

12. Brand strength	11-12	12	12	Seventh
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After placing the brand performance at the seventh level to determine the other levels of the table, by removing this factor, it is re-leveled, the results of which are reported in the table below.

Final Access Matrix Table (corresponding to Level 8) (Source: Researcher Findings)

Factors	Inputs	Outputs	Common	Level
11-Inclusive quality	11	11	11	Eighth

Step 6: Formation of an interpretive structural model

The initial interpretative structural model is constructed after calculating the amounts of each element and taking into account the final availability matrix. Figure 4-6 depicts the completed model. The final model resulted in an eight-level structure. Factors at the top of the hierarchy are less important.

Formation of structural-interpretive model

After determining the levels of each factor and also considering the final availability matrix, the initial interpretive structural model is drawn. The final model is shown in Figure 1. The final model obtained formed of three levels.

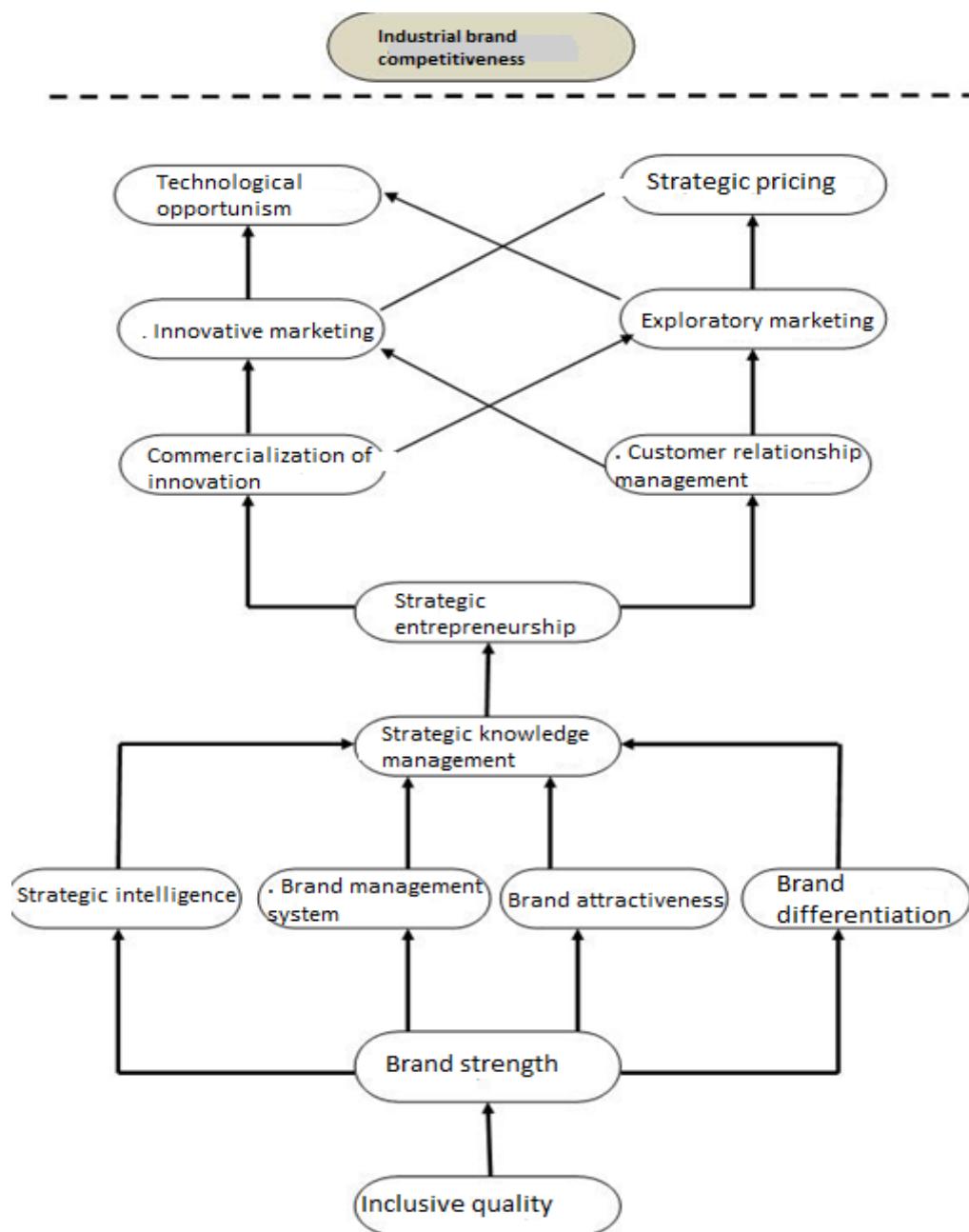


Figure 1 Structural-interpretive model of industrial brand competitiveness

After drawing the structural-interpretive model of industrial brand competitiveness by using structural-interpretive modeling and availability matrix, the table of permeability-dependency matrix is created and the variables are classified into 4 categories.

1- Autonomous variables: Variables with weak and moderate direction and reliance fall into this group. These variables have little or no contact with the system and are relatively disconnected to it.

2- Dependent variables: These types of variables have low conductivity but relatively high dependence. These variables are usually outcome or goal variables.

3- Linked variables: Variables with a high conductivity and high dependency fall into the third group. These variables are non-static because any change in them can have an impact on the system, and system feedback can eventually alter them again.

4- Infiltration variables: Variables that have high conductivity but low dependence.

The results of Mick Mac analysis showed that the ten elements of banking brand competitiveness in terms of permeability and dependency are divided into four categories of infiltrators, linkage, dependent and autonomous, which are reported below.

Summarizing the results of the quantitative section

The quantitative part of the research has been done in the form of three types of analysis. In this section have been used three methods of t-test, confirmatory factor analysis and structural model of identified factors. First, a one-sample t-test was used to evaluate the status of the identified factors in the statistical population. Then, using confirmatory factor analysis, the identified variables and their construct validity as well as their fit were confirmed. In this section were confirmed all the identified elements in the qualitative part of the research. In this section, it was found that all 14 main variables identified (which were presented as 14 variables affecting the competitiveness of the industrial brand) have a positive and significant effect on the competitiveness of the industrial brand. 14 identified variables were classified into 8 levels.

Discussion and conclusion

In this study, a total of 14 variables were identified for industrial brand competitiveness, which are: Technological opportunism, brand strength, brand differentiation, total quality, innovation commercialization, strategic entrepreneurship, exploratory marketing, innovative marketing, brand attractiveness, strategic knowledge management, customer relationship management, brand management system, strategic intelligence and strategic pricing.

Nowadays, the brand may perform as a strategic point for a corporation as a valuable resource. The brand may lead to company development by harmonizing organizational and environmental characteristics. In recent years, the importance of brand competitiveness has been underlined in management and marketing literature. This emphasis is due to the impact of competitiveness on the growth of national productivity and as a result the economic growth and development of countries and increasing welfare and living standards. Today's world and the need for economic development for a country like Iran, requires a study of competitiveness, especially in the field of industries that have a special role and place in the economy, including the petrochemical industry.

Competitiveness is a hot topic in the globe right now, and it's often highlighted as a way to accomplish the necessary economic growth and development. In today's dynamic and competitive climate, one of the most essential issues of company and activity is competitiveness. Today, the brand of a corporation is often its most valuable asset. Many scholars and researchers nowadays believe that building great brands is one of the most important components in gaining a competitive edge and assuring a company's long-term survival. The intensity of competition in the petrochemical industry has caused these companies to try to create a kind of brand differentiation in gaining a competitive advantage over their competitors. Brand differentiation has a competitive advantage for companies. According to Acker (2003), if one brand is not different from the others, customers have no basis or justification for choosing that particular brand over others. The aim of this study was to identify and categorize the factors affecting the competitiveness of the industrial brand in the petrochemical industry with a structural-interpretive modeling approach. After performing the steps of the structural-interpretive method, it was identified that 14 main factors that affect the competitiveness of the industrial brand

These 14 factors are: Technological Opportunity, Brand Strength, Brand Differentiation, Innovation Commercialization, Strategic Entrepreneurship, Exploratory Marketing, Innovative Marketing, Brand Attractiveness, Strategic Knowledge Management, Customer Relationship Management, Brand Management System, Strategic Intelligence and Strategic Pricing. They were categorized into eight levels: the first level (technological opportunism and strategic pricing), the second level (innovative marketing and exploratory marketing), the third level (innovation commercialization and customer relationship management), and the fourth level (strategic entrepreneurship) and in the fifth level (strategic knowledge management) and in the sixth level (strategic intelligence, brand management system, brand attractiveness and brand differentiation) and in the seventh level (brand strength) and in the eighth level (overall quality)

According to the obtained results, the following suggestions are provided for the managers of petrochemical companies to improve the competitiveness of their brand:

- ✓ Improving the quality of products to strengthen the market performance of the brand in order to attract and retain customers.
- ✓ Increasing brand equity through various means such as increasing perceived quality and also creating a strong structure in order to achieve brand value in the market.
- ✓ Creating a strong and long-term relationship with customers by providing quality products and reasonable prices.
- ✓ Apply new techniques and methods (such as new advertising) to improve the delivery of new and quality products to customers.
- ✓ Due to the high level of competition in the petrochemical industry, managers are advised to carefully monitor the behavior and activities of competitors to operate in these markets and use appropriate advertising, promotion and pricing methods compared to their competitors.

References

Safari, Hossein and Ebrahimi, Abbas. (2012). Measuring the competitiveness of banks in the Iranian banking system, *Quarterly of Business Research*, 64, 221-187.

Abbasi, M

hammad Reza and Rahimi Klor, Hussein. (2012). Structural Equation Model Design for Competitiveness Factors of Insurance Companies, *Journal of Marketing Management*, 14, 88-75.

Hosseini, Seyed Mohammad (2016). Creating competitive advantage in industry with the approach of key success factors, *Business Research Journal*, 45, 178-147.

Mehri, Ali and Khodadad Hosseini, Seyed Hamid (2004); Designing a Competitive Advantage Model for the Iranian Automotive Industry, *Quarterly of Humanities Teacher*.

Haghshenas Kashani, Farideh and Saeedi, Nima. (2011). Ranking of Factors Affecting the Competitiveness of the Country Carpet Industry by Fuzzy TOPSIS Method, *Quarterly of Modern Marketing Research*, 1 (1), 154-127.

Soltani, Morteza., Zare, Hamid and Parnian Khoi, Mohsen. (2015). Investigating the role of individual capabilities of human resources in creating competitive advantage, *Journal of Organizational Culture Management*, 13 (2), 414-393.

Karimi, Hussein (2017). Globalization, Competitiveness and Development of Non-Oil Exports: A Causal Study in the Iranian Economy, *Quarterly Journal of Economic Studies*, 4 (1), 134-117.

Mehregan, Mohammad Reza., Asgharizadeh, Ezatullah and Safari, Hossein. (2009). Designing a Model for Investigating Competitiveness at the Enterprise Level Using Structured Equation Modeling Case Study: National Iranian Petrochemical Company, *Business Research Journal*, 64, 1-36.

✓ - Crick, D. & Kaganca, G. E. (2011). A study into the international competitiveness of low and high intensity Tanzanian exporting SMEs, *Journal of Small Business and Enterprise Development*, 18(3), 594-607.

- ✓ - Corte, V. D., Zamparelli, G. & Micera, R. (2017). Innovation in tradition-based firms: dynamic knowledge for international competitiveness, *European Journal of Innovation Management*, 16(4), 405-439.
- ✓ - Huhtala, J.P., Sihvonen, A., Frosen, J., Jaakkola, M. & Tikkanen, H. (2014). Market orientation, innovation capability and business performance, *European Journal of Marketing*, 48(1/2), 170-192.
- ✓ - Liberali, G., Urban, G.L. & Hauser, J.R. (2013). Competitive information, trust, brand consideration and sales: Two field experiments, *International Journal of Research in Marketing*, 30(2), 101-113.
- ✓ - Merrilees, B., Rundle-Thiele, S., & Lye, A. (2011). Marketing capabilities: Antecedents and implications for B2B SME performance, *Industrial Marketing Management*, 40(3), 368–375.
- ✓ - Porricell, M.S., Yurova, Y., Abratt, R. & Bendixen, M. (2014). Antecedents of brand citizenship behavior in retailing, *Journal of Retailing and Consumer Services*, 21, 745-752.
- ✓ - Ren, L., Xie, G. & Krabbendam, K. (2017). Sustainable competitive advantage and marketing innovation within firms, *Management Research Review*, 33(1), 79-89.
- ✓ - Seo, S. & Jang, S.C. (2013). The roles of brand equity and branding strategy: A study of restaurant food crises, *International Journal of Hospitality*, 34, 192-201.
- ✓ - Soivell, O. (2015). The Competitive Advantage of Nations 25 years – opening up new perspectives on competitiveness, *Competitiveness Review*, 25(5), 471-481.
- ✓ - Subram, N., Gunasekaran, A., Yu, J., Cheng, J. & Ning, K. (2014). Customer satisfaction and competitiveness in the Chinese E-retailing: Structural equation modeling (SEM) approach to identify the role of quality factors, *Expert Systems with Applications*, 41(1), 69-80.
- ✓ - Tan, V., Ochoa, J.J., Langston, C. & Shen, L. (2015). An empirical study on the relationship between sustainability performance and business competitiveness of international construction contractors, 93, 273-278.
- ✓ - Uggla, H. (2014). Make or buy the brand: strategic direction of brand management, *Strategic Direction*, 30(3), 1-3.
- ✓ - Yoon, J., Yong Lee, H. & Dinwoodie, J. (2012). Competitiveness of container terminal operating companies in South Korea and the industry–university–government network, *Transportation Research Part A*, 80, 1-14.
- ✓ - Zanakis, S. H. & Becerra-Fernandez, I. (2016). Competitiveness of nations: A knowledge discovery examination, *European Journal of Operational Research*, 166, 185–211.