

Identification and Evaluation of Strategic Decisions in Gas Industry Using DEMATEL Method

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Abstract

Given the fluctuations of oil price in international markets and its effect on global economy, it is expected that gas industry and use of gas as an alternative energy, have become more important. Therefore, identification of strategic decisions in this industry has attracted increasing attention of managers and researchers. This study aims to identify and evaluate strategic decisions in the National Iranian Gas Company, using DEMATEL method for the first time. For data collection, paired comparison questionnaire have been used. The results of the research show that expanding operations to enter a new market, opening and starting up a new plant or facility, expansion of capacity and restructuring are respectively the most important strategic decisions in the industry.

Keywords:

Decision making, Strategic decisions, DEMATEL method, Gas industry.

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Introduction

No other century in history, has witnessed such fundamental changes as those which have occurred in the twentieth century. Extremely varying environmental conditions and increasing competition among large and small companies in the current global business environment, compel managers to constantly make new managerial decisions. By examining various management activities, it is observed that decision-making is the essence of all management activities. Decision-making is one of the essential components of management which appears in all management tasks including determining organization policies, organization design, developing goals, selection, and evaluation across the board. One type of decision-making which underpins core of strategic process is strategic decision-making. Strategic decision-making is very vital and significant because it includes those fundamental decisions which form the main direction of a company. Over the past thirty years, numerous researchers have identified the pivotal importance of this issue in relation to organizational decision-making and particularly strategic decision-making. In general, the researches on this subject begun with the first thinker, Simon, and were followed by the works of a broad range of authors (Eisenhardt & Zbaracki, 1992).

According to the theories of Mintzberg, Raisinghani and Theoret (1976), in terms of actions taken, resources allocated or prerequisites set off, we define strategic decision as a significant decision. This means that in such decisions we focus on those rare decisions which are adopted by senior organizational managers and have a vital effect on the health and survival of an organization (Mintzberg et al., 1976).

Strategic decisions are the main decisions which are made at the highest organizational levels, because the impact of these decisions usually includes all aspects of an organization. Making a decision is accompanied by implementation and evaluation and insufficient attention to each of these stages can make proper decisions ineffective. One of the major challenges facing managers and decision-makers at Iranian organizations is identification of strategic decisions. In regard to time and cost, making wrong strategic decisions is costly and often irreversible and can inflict irreversible blows on the body of the organization as well as its survival within the competitive arena. Thus, strategic decisions not

only affect the organization at which they are made, but also affect the society within which these decisions are made as a whole (Colingnon & Cray, 1980). It is noteworthy that most strategic decisions fail (Seyed Kalali et al., 2011) and in spite of the excessive care taken during the decision-making phase, they occasionally face many problems when it comes to implementation.

In this study, the researchers have used DMATEL technique to prioritize strategic decisions in gas industry and to determine the relationship between these decisions in this industry. Therefore, the main questions of the current research are:

- What are strategic decisions in gas industry in Iran?
- What are the most effective and affected decisions among strategic decisions identified in gas industry in Iran?
- Is there a relationship between strategic decisions made in gas industry?

Literature Review

Strategic decisions are those decisions which usually occur within the domain of executive management (Hambrick & Snow, 1977). Strategic decisions are important to organizations in regard to the range of their effectiveness and/or their long-term implementation. Due to their significance, strategic decisions are quite related to each other and by forming a consistent pattern serve as the origin of directing and unifying the organization. This decisions pattern reflects the long-term strategy of the entire organization (Harrison & Monique, 1995). Strategic decisions are rarely made by senior managers; such decisions are rather the product of the organization's high management team. Strategic decisions with application of managerial perceptions, which are conditional on managerial experiences and values, are adopted for the sake of the vast range of information obtained from the external environment. Strategic choice is a vital factor in strategic management (Chandler, 1962; Child, 1972).

The characteristics of a strategic decision are its novelty, complexity and open-endedness, because in the beginning, organizations often have little understanding of the environment of the decision they are faced with or the path which would lead to a solution. For instance, decisions regarding production of brand new or different products, expansion and entry into other areas of business or decisions regarding investment in a

new technology are all among characteristics of an organized society. In this regard, five major indices which comprise the salient characteristics of strategic decisions in most organizations are mentioned:

1. Strategic decision must be directed in line with the definition of the relationships of the organization with its environment. A strategic decision is based on external environment and articulation of the nature of the common level between the organization and environment.
2. Strategic decision must consider its unit of analysis, the organization, as a whole.
3. Strategic decision must be multifunctional in nature, that is, it must receive its input from various task areas.
4. Strategic decision must direct the organization and include operational and executive activities throughout the organization.
5. Strategic decision must be vital to the organization's success (Shirley, 1982).

According to the definition, strategic decisions are very important. These decisions include a commitment regarding organization's important resources, have significant long-term consequences and are really difficult to change (Barwise et al., 1989; Chandler, 1962; Fredrickson, 1985). These decisions often lead to changes in organizational structures and processes and/or changes in organization's positioning (Bourgeois & Eizenhardt, 1988; Cowan, 1991; Kriger & Barnes, 1992; Shirley, 1982). Strategic decisions are novel decisions, lack structure, are complex and have interdependent consequences (Mintzberg et al., 1976), they are extremely risky and are highly unreliable (Bourgeois, 1980; Bourgeois & Eizenhardt, 1988). All the above-mentioned characteristics distinguish strategic decisions from operational decisions.

Unlike most decisions, strategic decisions are related to the ideal future of an organization and include three main characteristics: 1. Rarity: Strategic decisions are accidental and do not have a specific history to be pursued. 2. Result-orientation: Strategic decisions attract considerable resources and require serious commitment on the side of the organization. 3. Being directive: Strategic decisions can be considered and used at lower level decisions and in choosing future activities of the organization (Hickson et al., 1986).

In a study of ninety three companies, seventy two of which were among the Fortune 500 selection of the best companies, Alexander (1985) identified some strategic decisions as shown in Table 1 (Alexander, 1985).

It is noteworthy that in the third column of this table, the percentage of significance of each of these decisions by the senior managers of the aforementioned companies has been specified.

Table 1. Strategic Decisions (Quoted in Alexander, 1985)

Types of Strategic Decisions		Percentage	Number
1	Introducing a new product or service	%31	29
2	Opening and starting up a new plant or facility	%18	17
3	Expanding operations to enter a new market	%16	15
4	Discontinuing a product or withdrawing from a market	%12	11
5	Acquiring or merging with another firm	%11	10
6	Changing the strategy in functional departments	%7	6
7	Other	%5	5
		100	93

In another study, Miller et al. (2004) have identified fifty five strategic decisions in various organizations including road haulage, insurance, chemicals, glass, entertainment and also in organizations such as universities, municipalities, etc. (Miller et al., 2004). A list of the most important decisions has been chosen to be presented in Table 2:

Table 2. Strategic Decisions (Quoted in Miller et al., 2004)

Strategic Decisions		Strategic Decisions	
1	Business-wide systems innovation	19	Market re-direction
2	Centralization of core business	20	Massive plant investment
3	Change of key supply source	21	Market Segmentation
4	Company-wide quality initiative	22	Material substitution
5	Computerization	23	Merger avoidance
6	Diversification into new market	24	National restructuring
7	Diversification into repair/refurbishment	25	National/local government strategic alliance
8	Downstream diversification	26	New advertising strategy
9	Enforcing management control	27	New division
10	Expansion of capacity	28	New service
11	Fundamental production changes	29	Novel product and material
12	Fundamental redirection of main distribution channels	30	Plant redevelopment
13	Generating own power resources	31	Pricing strategy
14	Housing disposition	32	Product range expansion
15	Internal restructuring	33	Real estate expansion
16	Leadership restructure	34	Reorganization of core personnel
17	Location of headquarters	35	Take-overs
18	Major business expansion	36	Unique customer/supplier strategic partnership

Strategic decisions are unstructured or non-repetitive as compared with routine operating decisions (Bower & Doz, 1977). For this reason, they are called unstructured decisions and processes of such decisions have not occurred in a similar way at organizations (Mintzberg et al., 1976). Dean and Sharfman (1996) have defined strategic decisions as “providing essential resources, preparing prerequisites and creating a spectrum of decisions of lower importance” (Mintzberg et al., 1976). Therefore, it must be taken into consideration that a decision which is considered strategic in one industry may be considered less strategic or not strategic at all in other industries (Hickson et al., 1986). For example, a decision for introducing a new product, an automobile, in automotive industry can be a strategic decision, whereas decision for introducing a product, for instance a toy for kids, in a factory which produces hundreds of new toys for kids is not considered a strategic decision. It has been long since studying strategic decision-making has become a part of the studies of researchers and managers (Ireland & Miller, 2004).

Research Methodology

With regard to the aim, the current study is applied and in respect to the data collection method, it is a descriptive/analytic one. In this research, after reviewing the literature of the subject and using the opinions of some experts in the industry, out of the extracted decisions, twelve strategic decisions were selected (Table 3) and in order to collect the data, paired comparison questionnaire was used. To this end, through a questionnaire, intensity of the relationship of strategic decisions were rated from zero to four, then means of experts' opinions were calculated and presented on the graph. Experts in this research were twelve distinguished specialists in the Iranian gas industry.

Table 3. Selected Strategic Decisions

Strategic Decisions		Strategic Decisions	
1	Introducing a new service	7	Restructuring
2	Opening and starting up a new plant or facility	8	New advertising strategy
3	Expanding operations to enter a new market	9	Expansion of capacity
4	Discontinuing a product or a service	10	Pricing strategy
5	Acquiring another firm	11	Location
6	Changing the strategy in functional departments	12	Real estate expansion

DEMATEL Method

Decision Making Trial and Evaluation Laboratory (DEMATEL) is a comprehensive method for constructing and analyzing a structural model of the causal relationships between the complex and numerous factors (Lin & Lin, 2008). This method was first used at Battelle Memorial Institute in Geneva between 1972 and 1976 in order to study and solve the complicated and intertwined problem group (Tzeng & Huang, 2011).

DEMATEL has been developed to solve complex problems. This method can enhance understanding of the specific problematic group of interacted factors, and criteria and provide a feasible solution by building a hierarchical relevant network system. This technique is widely used in solving complex problems (Lin & Tzeng, 2009; Hori & Shimizu, 1999; Huang et al., 2007; Lin & Wu, 2008; Liou et al., 2008; Seyed Hosseini et al., 2006; Tsai & Chou, 2009; Tzeng et al., 2007; Wu, 2008; Wu & Lee, 2007) such as user interface (Hori & Shimizu, 1999), e-learning evaluation (Tzeng et al., 2007), developing global managers' competencies (Wu & Lee, 2007), reprioritization of failures in analyzing FMEA system (Seyed Hosseini et al., 2006), the innovation policy portfolios for Taiwan's SIP small Industry (Huang et al., 2007), selection of knowledge management strategy (Wu, 2008), causal analytic method for group decision making (Lin & Wu, 2008), airlines safety measurement (Liou et al., 2008), and finally selection management systems (SMEs) (Tsai & Chou, 2009).

This methodology can confirm interrelations between variables/attributes and limit the relations which reflect the characteristics of a system (Amiri et al., 2011). DEMATEL method has been developed based on the belief that proper use of scientific research methods could improve understanding of certain problems and determine solutions with executive capability by a hierarchical structure (Lin & Lin, 2008). Using DEMATEL method for evaluating and processing individuals' perceptions leads to individuals' personal notions being involved in complex problems (Tzeng & Huang, 2011). The end product of DEMATEL process is a visual representation – mind map – based on which the respondent organizes his/her actions regarding the world (Amiri et al., 2011; Lin & Lin, 2008) or adheres to the priorities stated in it (Tzeng & Huang, 2011).

DEMATEL method consists of few steps which will be described along with the results of the current research.

Research Findings: The Results of Implementation of DEMATEL Method

Steps of DEMATEL method include:

1. Find the average matrix. In this study, we deal with H experts (twelve people) and n factors (twelve factors). Each expert is asked: "To what degree does factor i affect factor j ?" these pairwise comparisons between all the factors are made two by two and are represented with a_{ij} . It is noteworthy that integers 0-4 are ascribed to these comparisons (Tzeng et al., 2007) among which zero indicates "no influence" of i factor on j factor, one represents "very low influence", two indicates "medium/low influence", three represents "high influence" and finally four shows "very high influence". Also a range of 0 to 10 or 0 to 100 can be used. Scores given by the experts are ascribed to each of the factors in a matrix with nonnegative $n \times n$ answers, $X^k = [x_{ij}^k]$ in a way that, $1 \leq k \leq H$. Therefore, X^1, X^2, \dots, X^H is the answer matrix for each of the experts, and each X^k element is an integer which is represented by x_{ij}^k . The diagonal elements of each answer matrix X^k are all set to zero. Then, by calculating the formula below, we can calculate mean A , $n \times n$ matrix (Lin & Lin, 2008) for all the experts' opinions by obtaining the mean of H scores as follows:

$$a_{ij} = \frac{1}{H} \sum_{k=1}^H x_{ij}^k$$

It is noteworthy that the average matrix $A=[a_{ij}]$ is also called initial direct relation matrix (Lin & Lin, 2008). Matrix A presents the initial direct effects that one factor has on the other or the way it is affected by other factors. Furthermore, we can depict the causal relation between each pair of factors by drawing an influence map within a system. Table 4 presents the average matrix for strategic decisions. It should be mentioned here that this matrix is the result of interviewing twelve experts in the aforementioned industry.

Table 4. Average matrix (initial direct relation matrix)

Strategic Decisions	Average matrix												
	Introducing a New Service	Opening and Starting up a New Plant or Facility	Expanding operations to enter a new market	Discontinuing a product or a Service	Acquiring another firm	Changing the Strategy in Functional Departments	Restructuring	New advertising strategy	Expansion of capacity	Pricing strategy	Location	Real estate expansion	Sum
Introducing a New Service	0.00	3.08	2.50	1.58	1.83	2.00	2.83	3.08	2.25	1.33	1.67	1.50	23.7
Opening and Starting up a New Plant or Facility	2.50	0.00	3.17	1.25	1.42	1.83	2.67	2.25	3.25	1.50	2.00	2.25	24.1
Expanding operations to enter a new market	2.67	3.00	0.00	1.33	1.83	2.17	2.50	2.58	3.17	1.75	1.83	1.75	24.6
Discontinuing a product or a Service	1.67	1.42	1.33	0.00	0.83	1.92	2.50	1.50	1.33	1.33	0.67	1.17	15.7
Acquiring another firm	2.33	2.42	2.50	0.92	0.00	2.08	2.75	2.08	2.50	1.33	1.33	2.17	22.4
Changing the Strategy in Functional Departments	2.17	2.08	2.25	2.08	1.67	0.00	2.92	1.25	1.67	1.17	0.92	1.08	19.3
Restructuring	2.33	2.50	3.00	2.08	2.25	2.92	0.00	1.50	2.17	1.25	1.33	1.00	22.3
New advertising strategy	2.08	2.25	2.42	1.83	1.50	1.58	1.58	0.00	2.17	1.75	0.75	0.67	18.6
Expansion of capacity	2.25	3.25	3.25	1.17	2.00	2.17	2.00	2.42	0.00	2.00	1.67	2.00	24.2
Pricing strategy	1.67	1.92	2.17	2.17	1.50	1.83	1.75	2.58	2.75	0.00	0.67	2.08	21.1
Location	1.75	1.67	1.42	0.83	0.75	1.25	1.50	1.08	1.67	0.83	0.00	1.83	14.6
Real estate expansion	1.67	2.08	1.75	0.83	2.00	0.92	1.67	0.92	1.92	1.67	1.75	0.00	17.2
Sum	23.1	25.7	25.8	16.1	17.6	20.7	24.7	21.3	24.8	15.9	14.6	17.5	

2. Calculate the normalized initial direct-relation matrix. We turn matrix *A* into normalized initial direct-relation matrix which is called matrix *D* as follows.

$$m = \min \left[\frac{1}{\max \sum_{j=1}^n |a_{ij}|}, \frac{1}{\max \sum_{i=1}^n |a_{ij}|} \right] = \left[\frac{1}{24.6}, \frac{1}{25.8} \right] = \frac{1}{25.8}$$

Then:

$$D = m \times A$$

Table 5 shows matrix *D*:

Table 5. Normalized initial direct-relation matrix (matrix D)

0.000	0.120	0.097	0.061	0.071	0.078	0.110	0.120	0.087	0.052	0.065	0.058
0.097	0.000	0.123	0.049	0.055	0.071	0.104	0.087	0.126	0.058	0.078	0.087
0.104	0.117	0.000	0.052	0.071	0.084	0.097	0.100	0.123	0.068	0.071	0.068
0.065	0.055	0.052	0.000	0.032	0.074	0.097	0.058	0.052	0.052	0.026	0.045
0.036	0.094	0.097	0.036	0.000	0.081	0.107	0.081	0.097	0.052	0.052	0.084
0.084	0.081	0.087	0.081	0.065	0.000	0.113	0.049	0.065	0.045	0.036	0.042
0.036	0.097	0.117	0.081	0.087	0.113	0.000	0.058	0.084	0.049	0.052	0.039
0.081	0.087	0.094	0.071	0.058	0.061	0.061	0.000	0.084	0.068	0.029	0.026
0.087	0.126	0.126	0.045	0.078	0.084	0.078	0.094	0.000	0.078	0.065	0.078
0.065	0.074	0.084	0.084	0.058	0.071	0.068	0.100	0.107	0.000	0.026	0.081
0.068	0.065	0.055	0.032	0.029	0.049	0.058	0.042	0.065	0.032	0.000	0.071
0.065	0.081	0.068	0.032	0.078	0.036	0.065	0.036	0.074	0.065	0.068	0.000

Since the sum of each j row of matrix A represents the total direct effects which factor i has on other factors, the amount of $\max \sum_{j=1}^n |a_{ij}|$ indicates the total direct effects that a factor with maximum direct effect has on other factors. Also, since the sum of each i column in matrix A represents the total direct effects which factor i receives from other factors, the amount of $\max \sum_{i=1}^n |a_{ij}|$ indicates the total direct effects that the factor which is most affected by other factors, receives. Positive scalar matrix as the upper bound allocates the lowest value of these two to itself, and positive scalar matrix m as the upper bound allocates the lowest value of these two to itself, and matrix D is obtained through dividing each of matrix A elements by scalar matrix m . It is noteworthy that each d_{ij} element from matrix D is a value between zero and one.

3. Calculate the indirect influence matrix. Indirect influence matrix is obtained as follows:

$$ID = \sum_{i=2}^{\infty} D^i = D^2(I - D)^{-1}$$

Table 6 represents the abovementioned matrix for strategic decisions:

Table 6. Indirect influence matrix

0.392	0.423	0.431	0.272	0.300	0.348	0.402	0.352	0.412	0.272	0.253	0.290
0.390	0.445	0.434	0.277	0.309	0.355	0.409	0.364	0.414	0.277	0.257	0.293
0.397	0.441	0.457	0.283	0.312	0.361	0.419	0.370	0.423	0.281	0.263	0.302
0.260	0.290	0.294	0.188	0.206	0.235	0.271	0.242	0.279	0.183	0.172	0.195
0.368	0.410	0.413	0.263	0.294	0.333	0.385	0.343	0.393	0.261	0.245	0.276
0.318	0.354	0.357	0.223	0.249	0.295	0.333	0.300	0.343	0.225	0.212	0.242
0.366	0.406	0.406	0.256	0.283	0.327	0.396	0.344	0.392	0.259	0.242	0.280
0.310	0.345	0.347	0.218	0.243	0.283	0.331	0.297	0.333	0.218	0.207	0.239
0.394	0.433	0.436	0.280	0.307	0.355	0.417	0.366	0.431	0.276	0.260	0.297
0.345	0.383	0.384	0.240	0.269	0.310	0.363	0.316	0.363	0.246	0.228	0.256
0.242	0.270	0.273	0.172	0.192	0.219	0.256	0.227	0.259	0.172	0.163	0.181
0.286	0.317	0.321	0.202	0.221	0.261	0.301	0.270	0.307	0.200	0.188	0.221

This matrix and the graph obtained from it, in fact, represent indirect relations of strategic decisions with each other. It should be noted that in some cases, elements do not have a direct effect on one another and inevitably we need to calculate indirect effects so that finally we may show the effect of each element on other elements.

4. Sequence of occurrence of elements is met. To this end, in this step we determine the possible hierarchy or structure of the elements. The order of influence of presumed elements of one problem on other elements or their being influenced is definitely indicative of the possible structure of the hierarchy of those elements in improving or solving the problem. Therefore, in Table 7 which represents the sequence of elements (hierarchy) we use $D(I - D)^{-1}$ matrix.

Table 7. Matrix $D(I - D)^{-1}$

	1	2	3	4	5	6	7	8	9	10	11	12	Sum
1	0.392	0.542	0.528	0.333	0.371	0.426	0.512	0.472	0.5	0.324	0.312	0.348	5.064
2	0.487	0.445	0.557	0.326	0.364	0.426	0.513	0.451	0.54	0.335	0.335	0.38	5.159
3	0.501	0.558	0.457	0.335	0.383	0.445	0.517	0.471	0.546	0.349	0.334	0.37	5.264
4	0.325	0.345	0.346	0.188	0.239	0.31	0.368	0.3	0.331	0.234	0.198	0.24	3.245
5	0.458	0.504	0.51	0.298	0.294	0.414	0.492	0.424	0.491	0.313	0.297	0.36	4.853
6	0.402	0.435	0.444	0.304	0.314	0.295	0.447	0.349	0.408	0.27	0.248	0.284	4.2
7	0.456	0.503	0.522	0.337	0.37	0.441	0.396	0.402	0.476	0.307	0.294	0.318	4.823
8	0.391	0.432	0.441	0.29	0.301	0.345	0.392	0.297	0.417	0.286	0.236	0.265	4.092
9	0.482	0.559	0.563	0.325	0.384	0.439	0.495	0.46	0.431	0.354	0.325	0.375	5.191
10	0.409	0.457	0.468	0.324	0.327	0.381	0.431	0.417	0.47	0.246	0.254	0.337	4.523
11	0.309	0.335	0.328	0.204	0.221	0.268	0.314	0.269	0.324	0.205	0.163	0.252	3.193
12	0.351	0.398	0.389	0.234	0.298	0.297	0.366	0.306	0.381	0.264	0.256	0.221	3.761
Sum	4.964	5.513	5.551	3.499	3.867	4.486	5.241	4.617	5.315	3.487	3.257	3.75	

And finally, Table 8 also shows the sequence of elements which influence one another.

Table 8. The sequence of elements (strategic decisions)

(J)	(R)	(R+J)	(R-J)
3	5.551	3	5.264
2	5.513	9	5.191
9	5.315	2	5.159
7	5.241	1	5.064
1	4.964	5	4.853
8	4.617	7	4.823
6	4.486	10	4.523
5	3.867	6	4.2
12	3.75	8	4.092
4	3.499	12	3.761
10	3.487	4	3.425
11	3.257	11	3.194

Figure 1 represents the position of the elements in the possible hierarchy.

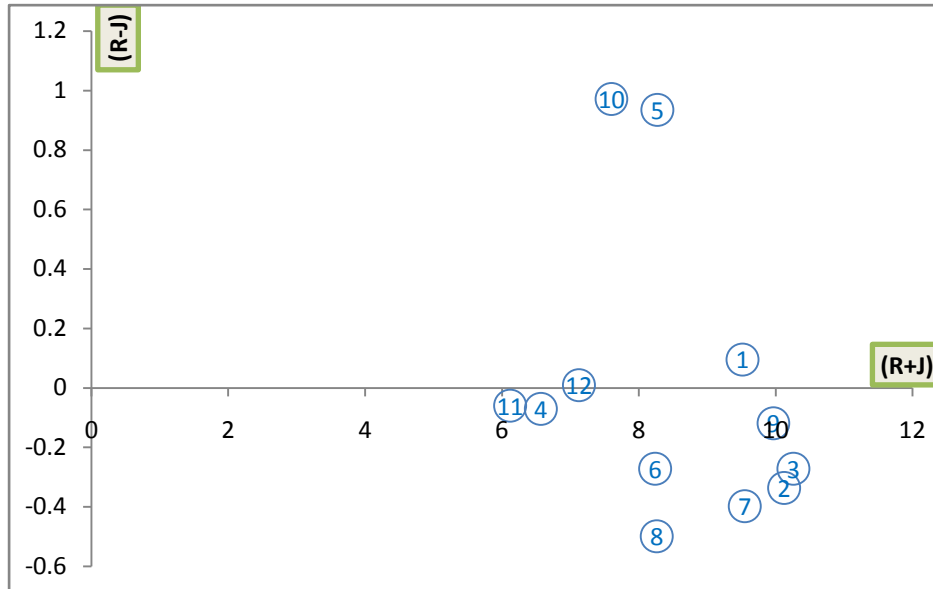


Figure 1. Position of elements (strategic decisions)

As inferred from the above figure, decisions which along the horizontal axis of $(R+J)$ coordinate tend towards infinity are among decisions which according to the experts participating in this study have the highest effect on the other strategic decisions in the area of gas industry in Iran. These decisions include expanding operations to enter a new market, opening and starting up a new plant or facility, expansion of capacity and restructuring of the company.

The Results of the Research and Recommendations

The Results of the Research

The aim of the present study is to identify and evaluate strategic decisions, prioritize them and finally study the relationship between these decisions and the degree to which they affect or are affected by one another in gas industry in Iran.

As it is evident from the results of this research, the highest (R) row sum indicates the order of decisions which strongly influence (dispatcher) other strategic decisions. For instance, by seeing the results of Table 8, it is

realized that decisions regarding expanding operations to enter a new market, expansion of capacity and opening and starting up a new plant or facility (third column of the above table) are decisions which have the maximum effect on other strategic decisions identified in this research. Also the highest column (J) sum indicates the order of decisions which receive the highest effect (receiver) among other decisions. For example, decisions regarding expanding operations to enter a new market, opening and starting up a new plant or facility and expansion of capacity (first column of the above table) indicate decisions which receive the highest effect from other strategic decisions identified in this research.

Column ($R-J$) represents the position of an element (along the lateral axis) and in decisions where this number is positive, it indicates that that decision is influential, and in cases where it is negative, it shows that those decisions are influenced by other decisions. Also, ($R+J$) column indicates the total sum of the influence of an element (on the longitudinal axis) with regard to its influence and the influence exerted on it. Therefore, through the above analysis we select the decisions which have a great influence on other strategic decisions and also, receive the highest influence from other strategic decisions as the most important strategic decisions in the aforementioned industry. The decisions regarding expanding operations to enter a new market, opening and starting up a new plant or facility and expansion of capacity and restructuring are among decisions which have the highest score in regard to both the highest row sum (R) and highest column sum (J) and sum of influence of an element ($R+J$), that is, both with regard to their influence and their being influenced. Therefore, for this reason, these decisions were selected as decisions of highest priority among the decisions studied by the researcher in the gas industry. By studying the graph in Figure 1, it is revealed that decisions 10, 5, 1, and 12 in this structure are also definitely influential on the whole system.

After the oil shock during the 1970s and unprecedented increase of oil price in the global markets (Mohammadifar, 2008), it is expected that gas industry in the world market and use of gas as an alternative source of energy will be of double importance. In the meantime, global competition for controlling the energy markets among countries and powerful unions including United States of America, China and Japan as two great consumers and exporters, Europe as a poor gas region and Russia as the owner of the largest gas resources will increase (Mohammadifar, 2008). It

is noteworthy that Iran is the second owner of the largest natural gas resources in the world (Ashrafi, 2007), therefore, according to the experts in the gas industry who participated in this study, decisions regarding expansion of operation of gas industry for the purpose of opening new plant or facility and expansion the extraction and production capacity and also restructuring of the company were identified as the most important strategic decisions in the gas industry in Iran.

Recommendations

According to the obtained results, the current research can be pursued in many areas. Firstly, the results of this research can be tested through other specialists' survey in different organizations and geographical regions to see if it can be generalized. Besides, a quantitative, qualitative or combined methodology can be used for identifying effective decisions or even delineating the relations among these decisions. Secondly, other strategic decisions which have not been studied in this research can be selected and their significance can be investigated. Thirdly, the results of this study can be examined in various industries and these questions can be answered: What are strategic decisions in different industries? Are strategic decisions in various industries of the same significance? Fourthly, the relationship among strategic decisions studied in this research and the method for explaining the issue of failure or success can be presented in a more comprehensive model in which the interrelation of various research factors may be included. Finally, each of the strategic decisions at the level of businesses, units and task departments can be analyzed and priority of the identified strategic decisions in these sections can be examined. For instance, strategic decisions of businesses (gas refineries in Iran) can be identified and their significance can be studied. Thus, the subject of this research has a great potential to be pursued and expanded in future researches. Also, the researchers recommend that the factors affecting success/failure of implementation of these decisions in gas industry to be seriously studied.

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شناسایی و ارزیابی تصمیمات استراتژیک در صنعت گاز با استفاده از روش DEMATEL

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چکیده

با توجه به نوسانات قیمت نفت در بازارهای جهانی و تأثیر آن در اقتصاد جهانی انتظار می‌رود صنعت گاز در جهان و استفاده از گاز به عنوان یک انرژی جایگزین، از اهمیت دوچندانی برخوردار شود. بنابراین شناسایی تصمیمات استراتژیک این صنعت توجه روزافزون مدیران و محققان را به خود جلب کرده است. بدین منظور این پژوهش قصد دارد با استفاده از روش DEMATEL، برای نخستین بار به ارزیابی و رتبه‌بندی مهم‌ترین تصمیمات استراتژیک در صنعت گاز کشور بپردازد. لازم به ذکر است که به منظور گردآوری داده‌ها از پرسشنامه مقایسات زوجی استفاده شده است. نتایج پژوهش گویای آن است که از میان تصمیمات شناسایی شده در ادبیات موضوع، تصمیمات گسترش و توسعه عملیات برای ورود به یک بازار جدید، گشایش یا راه‌اندازی یک واحد جدید، افزایش ظرفیت تولید و بازاریابی و تغییر ساختار سازمانی در صنعت گاز کشور به ترتیب در میان سایر تصمیمات استراتژیک صنعت، از بیشترین اهمیت برخوردارند.

واژگان کلیدی

تصمیم‌گیری، تصمیمات استراتژیک، روش DEMATEL، صنعت گاز.