The Study of the Effective Factors on Business of Industrial Cluster by Using Network Analytic Process

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Abstract

Nowadays competitiveness is a general topic in the world and it is used as a device to reach the optimal economic growth and stable development. Among the main problems for the development of industrial clusters in the absence of an obvious approach is to increase competitiveness. Competitiveness in the clusters is the mixture of endeavor both in company's level and the governmental level .This research has reviewed the effective factors on business of industrial cluster by using network analytic process .The GEM model was used to identify effective factors of competiveness in industrial cluster. The effective factors on competitiveness in public industry business were identified through questionnaire and since some of the effective factors are related to one another, by the technique of network analytic process, the relative importance of these factors were addressed and prioritized by the help of Super Decisions software.

Keywords: competitiveness, industrial cluster, network analytic process.

Introduction

Competitiveness is a very important concept and can be studied from different perspectives and definitions. One of the characteristics of successful companies today, is the ability of having the power of competitiveness more than anything, emanating from a new view on it. However, the context and the environment have caused dramatic changes in the indicators of competitiveness. Bearing in mind that conceptual framework of competitiveness can have permanent application when they are flexible enough for consistency of management processes and environmental changes (,2002 Ambashta and Momaya). Nowadays, competitiveness is considered a circular topic around the world which is used as a means to reach optimal economic growth and development .In global economy, being able to compete means the possibility to reach suitable and stable in international markets .in the era that globalization is extensively increasing, competitiveness is considered an important issue among different levels of policy makers (country, industry and company) in different parts of the world (Shercholo,т 2002).

Competitiveness at company's level can be defined as the potential of company in designing, producing or providing productions against the competition with lower price or higher quality against the same price(D'Cruz & Rugman, 1992).In the case of industrial competitiveness, the point which must be paid attention is one industry is capable of competing if its dependent organizations have high power of competition (Porter, 1990).

Competitiveness can be considered as a collection of assets and processes in which the assets can be achieved or made, the processes that turn these assets into economic results. In other words, the assets can be directly obtained through the nature(such as natural resources) and also processes turn these assets to outcome(including services and products) for sale and supply in the market (DC, 2001). Finally, the outputs will also lead to competitive advantage for industries and organizations (Buckley et al, 1991).

Competitiveness can be considered as a collection of assets and the assets available or to be established, the processes are processes that turn these assets into economic results. In other words, the assets can be obtained nature such as natural resources (and process assets to exit) services and products (for sale have become marketable) DC, 2001). Finally, the output of industries and organizations will lead to competitive advantage (Buckley et al, 1991).

Considering that in most countries a considerable part of the economic activity is carried out by small and medium enterprises, governments with different measures always try to support these companies rationally to increase their competitiveness in a way that they can compete in world markets to gain competitive advantage. According to the previous studies, one of the methods that have gained successful experience in increasing competitive power of small and medium firms in many countries of the world is clustering these firms in a frame of industrial clusters. Alfred Marshal (1890) in his book "principles of economy" has talked about the congestion and aggregation of specialized industry in local areas as industrial clusters (Adrian, 2002).

One industrial cluster includes a collection of centralized commercial and non-commercial agencies in one geographical location in an economic area that is for one or more similar and related final product to achieve output economic advantage with each other has contacted vertically and horizontally and while competing with each other in many cases has cooperation and common actions. Communication within the firm will reduce costs and facilitate access to inputs, knowledge and production technology, markets and support of customer needs.

Cluster development depends on transfer of technology, knowledge transfer, and development of a skilled workforce in the relevant industry, economic benefits and social infrastructure. Porter states the development and the growth of cluster relates to the competition and focuses on way of making competition through the key factors.

Competitiveness is considered as a key criterion for evaluating the success of countries, industries and firms in competitive fields of politics, economy and trade, which means that every country, industry or firm that its competitive market is highly competitive, we can say the competition is higher. Therefore, one of the biggest industries in the country today is a lack of competitiveness and one of the causes of this problem is having no specific approach to increase competitiveness. Thus, given the economic conditions prevailing in the country, the development of the industrial sector by increasing the competitiveness of industrial products is the most effective strategy is to overcome the challenges facing developing countries. Development of the industrial sector, especially manufacturing industries, due to the special status of industry in development, privileges and unique capability has got utmost importance whose concept is synonymous with development in economic literature .Therefore, development of this section in country is considered an inevitable necessity .So in this study, we have tried to understand the factors affecting competitiveness, comprehensive model for evaluating and measuring the competitiveness factors in its selection using analytic network process technique should be prioritized.

A review of the related literature

Cluster concept was first seen in 1890 in the theories of Alfred Marshall. Researchers have offered various definitions of industrial clusters. Industrial cluster is called to geographical centralization and some parts of small and medium agencies that besides having opportunities and threat are after completing its own support chain within that area (Mansouri,2008).

Cluster is a group of companies that form a series of regional institutes specifically located to provide some products or services, are connected by internal interactions Ketels, 2004).

A cluster consists of a group of companies associated with the interactions within the communication vertically and horizontally connected, and the products, services, data, technologies,

activities or outputs of, export, storage and communication, are supplemented or shared in (Porter,2000).

Shared in clusters, leads to internal interactions and trust building and therefore makes collective performance. These commonalities may be source of competitors' behavior, the development of new technologies and trends in their industry (Walker, Kogut and Shan, 2001).

Clusters in the most general sense note the spatial concentration of economic activity in a particular field. What causes that policy makers should consider clusters is related opportunities which derive from the collective performance of the external economic cost, low costs collective action and transactional. Thus, the spatial aggregation companies that simply do not communicate with each other cannot increase the collective efficacy. These external interactions and effects are considered. Thus, the cluster is a collection of relatively large firms, which locate on special places have specific background of expertise and where (clusters) trade between firms and specialized firms is significant (Altenburg & Meyer, 1999).

The local and geographical concentration of agencies is called a cluster .Such concentration causes to have the external benefit .The existence of cluster also causes to attract far work makers' markets and help the advent of specialized services in technical, financial and management fields (Humphrey & Schmitz,1998).

Industrial clusters is called to business units which are centralized in one geographical area and one industrial tendency and try to produce and supplement different goods and services by cooperating and complementing other actions and have the same challenges and opportunities (Mansouri,2009).

In Porter's book, the benefits of competition for different countries, some of the benefits of competition can be cited for the United Nations. The key factors that he noted include the effects of competition on areas, the growth of negotiation among agencies, internal dependencies of industrial agencies and governmental and half- governmental institutions, innovative growth and technology that interaction of these elements are considered as a result of competitiveness. In fact, in Porter's view competitiveness is a sign of the success of the cluster. Porter in the book the benefits of competition for countries has introduced four strategies to gain the competitive advantage that has been known as a Porter's diamond .These strategies are as follow:

Nature of firm strategy: strategy is related to structure and competitiveness of that country, including the tendency for competition, terms and conditions of market institutions and the degree of competitiveness of local firms. It also includes historic and cultural problems which affect the behavior of the agency in business with other agencies and the behavior of workers and government.

Environment factors: availability of state enterprises, and the way the firm chooses to compete or cooperate.

Circumstances demand: demand conditions and the nature of local demand

Related and supporting industries: it includes the presence of related and supporting industries, including suppliers and other successful competitors. Agencies are interdependent to production of intermediate goods firms and on the other hand, they are connected to agencies providing support services to firms with R & D institutions, universities and research institutions. Competition is very important; the competition will also include direct competition for supplies. This competition causes under a constant pressure, the firm has always used the best technology to explore new opportunities (Ketels, 2004). Besides, a country may create an environment that "creating a competitive advantage" by domestic firms had been inhibited and gradually local industries in competition with others are suffering from decline and demise. Porter (1990) believes that competitive advantage of Nations will be achieved through the interaction of four following factors:

- The internal factors
- Domestic demand conditions
- Related and supporting industries
- Strategy, structure and rivalry

Porter believes that the four factors are mutually interacted and changes in each of them can affect other factors. In addition, two external factors: government and unforeseen events influence the four factors and through the impact on them can be effective in competitiveness.

Aral (1986), in order to evaluate the competitiveness of the economic firms, considered industrial competitiveness effects as a function of the dominant firm, its cost advantage as well as economic and political environment in which the firm operates and show the competitiveness issues due to organizational issues within the organization and outside it (Man & Chan, 2002). Porter pointed out the effect of suppliers and customers on the competeveness and believes that firm's competitive advantage should be as part of a wider system and in contact with suppliers and distribution as well as examining end-users (Thompson, 2001).

In several studies, factors affecting industrial competitiveness have been studied. Kyoz, for the Study of Technology in 1981, examined thirteen industrial countries, including the industry-level SITC code cultivars. Grynvy et al (1984), with emphasis on the domestic industry structure, began to study determining specific industries of IIT and the competitiveness of UK industry. In 1993, Hughes, reviewed industrial factors influencing IIT and competitiveness among developed countries between the years 1987-1980 for 68 industries used the panel. Experimental results of Kyoz Studies (1981), Grynvy and colleagues (1984) and Hughes (1993) show that industry-specific factors including crop diversification, economies of scale in production, market structure and characteristics of the workforce.

Study of geographic and industrial competitiveness is another issue that has been of interest to researchers. At the same time that researchers' interest in studying the international competitiveness was increasing, number of industrial local areas integrated as "advanced technology," most prominent ones were in the U.S . These activities have worked regionally in collaboration with public policy and urban planners for international competitiveness (Stamer, 1998). Evaluating the competitiveness of regions has a major impact on the location and creating of industries, which together with the use of common required facilities establishes a competitive advantage .Important Factors in determining competitiveness in the area including the economic structure of the area (which includes indicators of income, domestic and foreign investment in the region, exports and productivity), human resources and blessings and privileges policies governing the area are listed (Tuerck, 2001). Clusters promote both competition and cooperation. Competitors are competing fiercely to attract and retain customers. Without serious competition, success for one cluster is inconceivable. Nevertheless, there is a vertical cooperation among them; this cooperation includes companies in related industries and institutions within the cluster. Competition can coexist through cooperation because it has different dimensions and among actors can happen differently. (Porter, 1998) within the cluster there is a set of cooperating among members and firms. There is competition within the cluster. This competition can be among cluster members in an advanced way in the international market. It is worth mentioning that reducing competition is the most important goal among members of the cluster. The idea of reducing competition means ensuring agencies to cooperate more clusters to have an easy access to commercial inputs. Reaching the above goals in cluster facilitates outer-cluster competition and also business and enterprise firms can make the cluster ready for international competition (Kim, 2002). It can be said that when forming clusters

cannot provide the necessity of competition for cluster at regional, national or international level, target and support of forming the cluster is not provided.

Research hypotheses

H1: Key factors have an impact on the success of competitiveness in industry cluster businesses.

H2: Priorities of the key factors will affect the competitiveness of industrial cluster businesses.

Methodology

The type of this study is a descriptive- survey study which is purposefully applicable; and also to identify sub-criteria of the basic framework of this study, the GEM model was used which is a quantitative model to evaluate the competitiveness of the cluster. The data in this study were experts and specialists in the field of industrial clusters. Sample consisted of 80 patients that judgmental sampling technique was used to determine sample size.

Methods of data collection

To collect data, two questionnaires were used in this study. In this section, we will examine these two questionnaires.

Questionnaire prioritizes factors affecting the competitiveness of industrial clusters

GEM model is used to design the questions in the questionnaire. It is noteworthy mentioning that according to that fact that the spectrum used in this questionnaire is Likert spectrum, based on the idea of experts in this field, choosing criteria was according to the coefficient of variation .Besides, the software Super Decision is used in this study.

Research model and factors of each dimension

The dimensional model of this research includes basis and foundation (resources and infrastructure), Corporate Business (Supplier / associated companies, the Company / strategies) and markets (local markets, foreign markets. The reliability demonstrates all factors are within an acceptable range.

Results

By the help of the questionnaire assessing the relative importance of criteria affecting the competitiveness of industrial cluster of businesses using expert opinion and governmental industry experts the relative importance of these criteria were identified. The following table shows the values of the sub criteria, criteria and priorities of sub criteria related to the goal of this study can be seen.

According to GEM evaluation, the dimension of basis and foundation from the importance of grading is 0.4582 which shows the high degree of its importance especially in the field of sub-structures ; Also, the environment of business and enterprise has got high amount (0.2022), which signifies the strategic importance of business and enterprise in cluster .Government and related institutions' strategy in this field is making a general policy and providing a suitable material and spiritual environment for cluster companies in order to encourage corporation and contribution, help make ways to communicate among economic institution and avoid low construction and negative competition . Thus, the convention and related institutions must be made to lead and direct business and enterprise companies. Some of factors' sub-structures like cooperation with related firms has got a higher degree of importance. Identifying the week points in cooperating with the suppliers of first materials in different layers, such as interior part of the supply chain in which all activities of

changing first materials to product are done and also the lower level of the chain supplements related activities to delivering the products to the costumer.

Table 1. Values of sub-criteria and criteria related to the goal of the study

Dimension	Sub-dimensions	Sub-criteria	The values of each sub-criteria	The values of each criteria related to the goal
Basis and foundation	Resources	Human resources	0.7523	0.32163
		Capital	0.1221	
		Technology	0.03221	
	Sub-structures	Communicative sub-structures/transportation	0.0218	0.2063
		The environment of business and enterprise	0.2315	
Business and enterprise	Suppliers and related industries	Strong suppliers	0.03143	0.1852
		Corporation or dependent companies	0.1095	
	Company's structure indices/strategy	Sale policies	0.23141	0.21522
		Being competitive of ended part	0.02178	
		The presence of strong rivals	0.03125	
		The capability of management	0.04739	
Markets	Local markets	The size of local markets	0.0356	0.11092
		Local markets' view	0.0786	
	Foreign markets	Distance to foreign markets	0.06143	0.12786
		Foreign markets' view	0.0647	
		Obstacles and limitations of foreign markets	0.04612	

The cluster ,with innovative blend in technology and products ,can go forward to global standards . Main cluster companies should take the main responsibility in this process and accompany smaller firms, research institutions ,colleges, local government, suppliers and relevant firms and follow the innovative strategy in cluster by helping each other .The strategy about the foreign efficient market can be a combination of strategy with the chain of global value .The cluster should analyze the international categories of relevant industry and it should be mixed in order to make a suitable use of resources in global chain.

Discussion and conclusions

Industrial clusters are present in almost all countries of the world. In Iran ,the trends in the industrial clusters in scientific gathering and decision-making and also programs to develop country have been addressed. The important question in clustering and cluster-based policy is creating competitive necessity. In fact, competitiveness represents the success of a cluster.

Competitiveness is considered a key criterion for evaluating the success of countries, industries and firms in competitive fields of politics, economy and trade, which means that every country, industry or firm that its competitive market is highly competitive, we can say its competition is higher. In general, improving the competitiveness of industries situation, is a gradual and long_ term process which is merely possible under the shadow of suitable and consistent scientific planning over time. Thus applying an approach focused on competitiveness in planning national, regional and sectorial development is mandatory. Obviously, in this process, the government and private sector, each responsible for specific and critical tasks which require special attention.

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