

Analysis of Industry Clusters in Iran; Case Study: Yazd Sub-province

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Abstract: All countries hope to achieve increasingly developments which grow fast. Nowadays many developed countries are using strategy of industrial clusters development because they influence the competitiveness of industrial clusters in the country as well as beyond national borders and show new ways of thinking about the place of dealing and earning. Industrial clusters influence competition through increasing of productivity based on settlement of companies and providing quick guidelines for development and innovation and encouraging of new business. Industrial cluster is one of new combined methods of various theories such as theory of economic geography, regional economics, national innovation system, transmitting knowledge theories, social capital theories and social networks. Recently this method in Iran attracted many attentions based on industries compatible with mentioned method which attempts to provide a better and competitive market place for the country, region and the world. In this study literature of industrial clusters is initially reviewed and then data analysis methods, used model and eventually results of this paper will be dealt with.

Key words: Industrial clusters; Small & medium enterprises (SME); Local production systems method; LQ

1. INTRODUCTION

All countries hope to achieve increasingly developments which grow fast. Nowadays many developed countries are using strategy of industrial clusters development because they influence the competitiveness of industrial clusters in the country as well as beyond national borders and show new ways of thinking about the place of dealing and earning. Industrial clusters influence competition through increasing of productivity based on settlement of companies and providing quick guidelines for development and

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*Received 5 January 2011; accepted 8 February 2011

innovation and encouraging of new business. Industrial cluster is one of new combined methods of various theories such as theory of economic geography, regional economics, national innovation system, transmitting knowledge theories, social capital theories and social networks. Recently this method in Iran attracted many attentions based on industries compatible with mentioned method which attempts to provide a better and competitive market place for the country, region and the world. As was mentioned above industrial clusters phenomena does not refer to a long period in the past and most developed models have some theoretical weakness and they are only theoretical patterns borrowed from other countries which are matched with internal situation of countries. Nowadays this approach attracted attention of many international organizations like the World Bank, International Monetary Fund, OECD, EU, ILO and other organizations. However, this approach has established its position as one of the economic development tools.

A new approach proposed nowadays in the discussions of regional and industrial development is that different regions depending on, natural, human and organizational advantages or available industrial should pay serious attention to the development of a limited number of industrial clusters and facilitate different dimensions for organization of clusters. In these situations they can be successful in international markets and hold more valuable sectors of related goods from their value chain and they can reform or reconstruct existing structures against world problems. Nature of the new cluster phenomenon is such that because of lack of explanation and the correct definition of these concepts there is no coherent classification. Some people consider it as a part of policy innovation that can be investigated in the form of national innovation system. Some people consider it as an economic phenomenon which is placed among the economic policy making factors because of its economical advantages. Some people put it in extended field of policy making and some people put it in industrial policy field. Different countries of the world understand various benefits and interests of industrial and use different strategies and policies in order to increase development of these industrial and also they use the results of their implementation in a better way. Considering the existence of industrial clusters of in Iran and by considering the successful implementation of industrial cluster strategies in other countries we clearly understand that there is a need for implementation of industrial clusters in order to achieve industrial development as soon as possible with more speed and less expenses.

2. LITERATURE REVIEW

2.1 Theoretical Basics

Industrial clusters or business clusters deal with small and medium enterprises; hence various studies have been directed specially by Italian authors in 1980's. Industrial upheavals of Italy were analyzed in terms of small and medium enterprises' perspectives. It is worthy to say that analyzing industrial clusters, as the present form, has been started by Michael Porter's Competitive Advantage of Nations (1990) and then completed gradually.

2.2 Cluster Definition:

Michael Porter, who is recognized as the founder of industrial cluster concept, defines the cluster: "Clusters are geographic concentration of interconnected businesses and associated institutions in a particular field".

United Nations Industrial Development Organization (UNIDO) defines industrial cluster as:

"Geographic and economic concentration of manufacturing activities which produce and sell a domain of interrelated and complementary products, hence they have common problems and opportunities. The aforementioned concentration gives rise to economic advantages including the necessity of formation of specialized distribution system of raw materials and parts or growth of experienced human resources in a specialized producing sections and promotion of specialized technical, managerial and financial services."

2.3 Competitiveness and various economic advantages of industrial clusters

Economic advantages are accompanied by production costs reduction and there is a mutual relationship between competitiveness and reduced costs. Although several factors affect on competitiveness, the most focal element is production with the lowest expense. industrial clusters aid to decrease costs through

developing different advantages. Such advantages are materialized when enterprises' production costs decrease with increasing production rate in a certain industry. In order to substantiate such savings (advantages) deploying enterprises of a certain industry in a row is essential. Some of such main savings, which would be utilized by cluster-based institutions in the member enterprises, are:

- (1) Advantages due to transportation;
- (2) Production advantages in intermediate materials (IM);
- (3) Internal advantages due to scale for the enterprise;
- (4) Advantages due to reputation;
- (5) External advantages due to scale for enterprise, but internal for industry;
- (6) External advantages due to scale or urban advantages;
- (7) Advantages due to workforce;
- (8) Advantages due to communications;
- (9) Advantages due to offering backup services;
- (10) Advantages due to spatial infrastructure elements;
- (11) Advantages due to governmental facilities (loans);
- (12) Advantages due to information flow;
- (13) Advantages due to supplementary activities formation.

The above mentioned factors have a great share to develop competitive ability. As a result, by developing these advantages and simultaneous presence of competition and cooperation, clusters burden semantic concept of "External Economies", "Low Transaction Cost" and "Collective Action" which would be emphasized. Clusters play an important role on formation of such advantages.

2.4 Cluster Objectives

According to statistical analysis of more than 500 clusters throughout the globe, different objectives have been mentioned for enterprises that intend to take part in an industrial cluster. They are spilt into six discrete classes as the following:

- (1) Networking all enterprises and conducting common studies;
- (2) Using politic instructions;
- (3) Forming inter-institutional commercial interactions;
- (4) Optimum using of proper education and training tools to meet enterprises' requirements;
- (5) Employing innovations and technologies of other enterprises;
- (6) Using interests due to more development of clusters.

In the case of realization of at least 4 objectives out of six ones in a certain cluster, a hopeful future would be predicted for that cluster. In the same direction, for developing industrial clusters various countries define one or more classes as their main objective to form cluster and other objectives will be considered as the secondary goals. Among other things, link and network formation are of the most important objectives of each collection. This objective is emerged automatically in some clusters while others entail appropriate policy makings.

2.5 Data Analysis Methods

Although numerous methods have been proposed to analyze and appraise size and importance of regional clusters, there is not any acceptable widespread technique to evaluate and measure them. Various countries and regions inclined to define clusters with different methods and a wide range criteria and research techniques.

Several models by economists have been designed to analyze behavioral and functional dimensions of (industrial-technological) clusters by which cauterization process, former and latter interrelations of enterprises within a certain cluster, upstream and downstream relations amongst clusters as well as overflow and clusters' overlapping would be studied. Bergman & Feser (1999) categorize clusters analysis methods based economic literature as the following:

- A. Expert viewpoint
- B. Location factor
- C. Matching based on input-output table
- D. Network-based analysis
- E. General census

These methods have strength and weak points which would be used according to the usage case. They are all suffer from limited access to the local data, so they are trusted based on accessibility rate or data precision. Expert viewpoint method is used whenever there is not proper and enough information and also enough time and budget to collect them or the present information is unreliable. In this case, simple survey and/or repeatable survey of experts would be used.

The second method is able to represent import or export states of the cluster rather other clusters and/or local parts and other regions using national information and particularly local factors of employment and its interference in local statistics, and then analyzes inter-cluster interference state by using of obtained factors. Third method scrutinizes national and regional input-output tables and their coefficients. Inter-cluster interference coefficient would be analyzed through upgrading and comparing with regional wages' level.

Network-based analysis is a method in which, because of lack of enough opportunity and cost, a main enterprise of a certain cluster is selected and then some decisions will be taken about state of the cluster through studying behavior of its enterprise. The fifth method is indeed the most expensive and most precise method to analyze clusters. It is able to bring about precise and reliable information for complete and precise analysis of clusters; hence it may be used as the basis of policy making.

3. MODEL

Although numerous methods have been proposed to analyze and appraise size and importance of regional clusters, there is not any acceptable widespread technique to evaluate and measure them. Various countries and regions inclined to define clusters with different methods and using a wide range criteria and research techniques.

Identification methods of industrial clusters are posed as qualitative, quantitative and combination of them. Quantitative methods are split to two general parts. General local statistics and other partial information about current enterprises in a certain industry and other economic information as well as geographic properties such as employment are used in the first part methods. In the second part, information of input-out-put tables is used to identify industry clusters of various industries. Information due to opinion polls across enterprises is employed in qualitative methods to identify industry clusters. In this method, locality indicator is focused while industrialism element, industries classification and mutual relations amongst industries are underestimated.

3.1 Local Production Systems Method

There is a close relation amongst local production systems method and industrial zones' concept; it embarks to identify local production systems based upon current processes and specialties of a certain activity. In this method, local statistics and partial information of enterprises are used to identify industrial clusters. Presence of at least five enterprises with a same activity in the region is necessary. At least 100 workforces should be active in such economic activity. Enterprises concentration in each kilometer must at last two

times more than national concentration average. The main quantitative tool to estimate specialty rate of each cluster is LQ^5 which is calculated as the following:

$$LQ = \frac{E_{ij} \sum_i E_{ij}}{\sum_j E_{ij} / \sum_i \sum_i E_{ij}}$$

Where:

E_{ij} : employment rate in the industry (i) and in region (j)

$\sum_i E_{ij}$: Whole employment in the region j.

$\sum_j E_{ij}$: national employment in industry i, and

$\sum \sum E_{ij}$: a symbol of national employment.

LQ compares an industry share in the certain region with its share in the nation. $LQ > 1$ values represent a relative specialty of the region in the certain industry. In most studies about identification of industrial clusters, when $LQ > 1.25$ means there is an undeveloped cluster in the region.

4. RESULTS AND DISCUSSION

As it was mentioned previously when LQ is more than 1.25 means there is an undeveloped cluster in the region and related industries are inclined to export and they are ranked in terms of their possible importance in export and wealth creation. This method is relied on some limiting assumptions about similarity of national and regional production paradigm such as homogeneity of technical structure of a province with nationwide technical structure, relative similarity and equality between proficiency and provincial and national workforce. In this paper LQ was measured using current statistic resources and their proper categorization. Considering their LQ values, > 1.25 , the following eight industries have industrial cluster property in Yazd Sub-province:

As it is seen in the table1, textiles industry with $LQ = 4.09$ in Yazd has the highest value amongst industry-cluster based industries and it covers 39% of all companies and factories in industry cluster class of Yazd. In the second rank rubber and plastic products with $LQ = 2.4$ is placed. The third rank is occupied by generators, transformers and unclassified electrical machines in somewhere else with $LQ = 1.8$. Paper and paper made products, non-metallic mineral products, official, accounting and calculator machines, furniture and uncategorized artifacts in somewhere else, and substantial metals with $LQ = 1.54, 1.48, 1.48, 1.32$ and 1.31 are placed in 4th to 8th ranks respectively.

In spite of most conformity with industrial clusters definition, this method encounters with some limitations and shortcomings. First, it shows only concentration point of special industries in special regions and ignores their relations with each other or other industries, on the other word former and later relations are being underestimated here. If there is not any previous and clear information about current links among industries, denoting industry cluster to mentioned concentrated points will be failed undoubtedly. Another problem is that if standard classification systems are used, then it is possible that those activities which are not suited in on of classes of the mentioned system would be deleted.

Regarding shortages of the mentioned industrial cluster identification method, so using other potential methods for identifying industrial clusters is suggested.

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APPENDIX

Table 1: Industries have industria

ISIC Group	Industries with cluster property in Yazd Sub-province	No. of factories and companies	Measured LQ
17	Textiles	458	4.09
25	Rubber and plastic products	271	2.4
31	Generators and transformers and unclassified electrical machines in somewhere else	43	1.8
21	Paper and paper made products	48	1.54
26	Non-metallic mineral products	273	1.48
30	Official, accounting and calculator machines	30	1.48
36	Furniture and uncategorized artifacts in somewhere else	16	1.32
27	Substantial metals	34	1.31
	Grand total	1173	