

The Study of Industrial Clusters Performance in Islamic Republic of Iran (The Case Study of Yazd Basic Metal Clusters)

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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 because Industrial clusters influence competition through increasing of productivity and introduce a new perspective toward the location of business establishment. Industrial clusters have been also considered in Iran and the industries adapted to and coordinated with the mentioned approach have tried to locate their business at the better conditions of competition and market gain within the country, region and throughout the world. In this article, at first industrial cluster, its advantages and disadvantages have been defined, and then, the history of industry and industrial cluster of Yazd province and Yazd basic metal clusters performance examination tools and at the end, the strengths, weaknesses, opportunities and threats Yazd basic metal clusters have been investigated.

Keywords: industrial clusters, Yazd basic metal cluster, strength, weaknesses, opportunities & threats (SWOT), YAZD

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 innovation and encouraging of new business. 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.

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.

Industrial Cluster Definition

Using various definitions provided by the thinkers, industrial clusters can be defined a set of correlated firms, professional suppliers, service providers, the firms consisting of dependent industries, and interconnected institutions each one of which is linked to another one to save the added value supply. This set works in a common field, is concentrated in a certain geographic area, is able to synergy, and has created the possibility to use external savings and has common challenges and opportunities.

Forming industrial clusters has many advantages, a number of which are mentioned below:

- Regional economic growth and encouragement of more investment in the region
- More effective cooperation between public and private sector
- Improvement of efficiency and increase of productivity in small and medium enterprises
- Development of adaptability and flexibility in small and medium enterprises in the fields of product, market, technology, management and organization considering trade liberalization across the world and economic globalization
- Possibility to achieve criterion-driven interests, market knowledge, local interaction-dependent innovation and technological progress
- Make the education endogenous, development of new skills, professional and efficient division of labor, use of external savings, reduction of transaction costs, elimination or reduction of market entry restriction
- Easier and faster access to suppliers of raw materials, services, specialist human resources
- Economic justification of establishing and strengthening service and support centers in various areas such as marketing, reference laboratories, technical and financial and consultations ...
- Proportion to indigenous social structures
- The most appropriate development path
- Facilitation of the developmental process

Shortcomings of Industrial Clusters

- They fail to act properly if there is inappropriate copying of models without considering specific conditions
Of performed model in other countries.
- Adjustment of products according to customer demands may cause problems in the cluster interests

History of industry and industrial clusters in Yazd province

Yazd's name has been long associated with industry, productivity, and industrial activities and artisans of the province have had a distinguished and considerable role in providing the goods required throughout the country since many years ago. Hard work, compassion, contentment and saving have been associated with the essence of the people of this desert province and underlies their elevated culture in terms of work and production and this has provided the good cultural groundwork along with other relative advantages such as competent and experienced managers and employers, optimal growth of higher education, richness of the mines, being located in the center of the country and infrastructural facilities and appropriate services regarding ways, railways, airports, energy, telecommunications, etc. have provided suitable setting to develop industry in the province. Yazd province has an exclusive place in Iran's industry and a significant part of the country's industrial products; especially in the textile and non-metallic minerals sector, is produced in Yazd Province.

A Review of the History of Steel Industry in Iran

1-1. Ironware production in ancient Iran. Production of ironware from iron ore in Iran dates back to the first millennium B.C.

Among the oldest ironware discovered in Iran are bayonets found in the Assyrians Guards Center on the mound of Hasanlu, which is located around Lake Urmia.

During the reign of the Achaemenids and the Seleucids (200 B.C.), Iranians imported precious metals that were highly used from the foreign countries. But they not only produced iron, copper, and lead for domestic markets but also exported these products overseas.

1-2. Ironware production in post-Islamic Iran. Muslims knowledge of metalwork production techniques and sciences is basically based on the Sasanian civilization. During the reign of Sasanian dynasty Iranian scientists, having access to other countries and their resources, could largely contribute to the development of this science.

In the Safavids age, from 1501 to 1722 A.D., blast furnaces existed in Iran and Iranians had also great knowledge of steelmaking.

In the eighteenth century, when Nader Shah ruled Iran, iron production in Iran was more or less common. During this period tall blast furnaces were used, which had a length of less than 10 feet. But in the late seventeenth century and eighteenth century, metallurgy industry in Iran started to collapse.

During the reign of Fath Ali Shah Qajar, gun and artillery manufacturing industries were started in Isfahan and Tabriz. Besides, artilleries in Mazandaran province were also restarted.

In the early years of Nasser al-Din Shah Qajar's reign (from 1848 to 1896), Mirza Taqi Khan Amir Kabir and his like-minded friends more seriously sought for establishing

infrastructural industries though after the deposition of Amir Kabir the development set off in the steel industry of Iran was ceased. The official birth of steelmaking industries in Iran came in 1959 by establishment of the first steel and iron production factory.

After the Islamic Revolution of Iran, the National Iranian Steel Company was founded in 1979. The units founded by the private sector were also under the supervision of Iran Ministry of Mines Ferrous-Metals Deputy. Establishment of steelmaking units in Iran was actually started in 1960 by setting up the first Iranian cast iron casting factory in Khuzestan.

Statistical population and sample

Statistical population of the study is all small, medium and large active textile industrial units in the city of Yazd based on 3ISIC code.

Sampling method:

For this research, after conducting the required studies, two classification-sampling methods are selected with appropriate and systematic allocation.

Determination of the **Classification Sample** size (n) with proportional allocation:

Since in the main definition of cluster, units are divided into small, large and medium categories, the following formula applies and in other words, each class has been relatively shown with Q_h and P_h and $P_h = \frac{A_h}{N_h}$ where A_h is volume of large units of each class and N_h is

the total volume of each class. V is the estimating variance which has been assumed to be a constant value and when the estimating variance of value sum of the units is already determined, sample size will be estimated from the following method:

$$s_h^2 = \frac{N_h}{N_h - 1} P_h Q_h$$

$$n_0 = \frac{N}{V} \sum_{h=1}^L N_h s_h^2 = \frac{374 * 77.197}{41} = 702$$

$$\hat{n} = \frac{n_0}{1 + \frac{n_0}{N}} = 244$$

Also Sample size estimated through Kakran method with error volume of ($E = 0.037$ and $0.05 = \alpha$ and $p = 0.5$) is as follows:

is obtained from the following formula: Size of the classes of (n_h)

$$n_0 = \frac{Z_{\alpha/2} * p(1 - p)}{E^2} = 702$$

$$\hat{n} = \frac{n_0}{1 + \frac{n_0}{N}} = 244$$

$$n_h = n * \frac{N_h S_h}{\sum_{h=1}^L N_h S_h}$$

Research tools:

To investigate the function of Yazd textile cluster, we used a questionnaire tool including human resource pivots, raw material supply network, technology, network access to markets, financing and capital provisions and coordination agency; the collected data indicates that:

The human resources employed in the **Yazd** basic metal cluster

Data from the questionnaires on human resources shows that:

- Regarding use of technical power and skill of human resources of other similar units by basic metal cluster units 58.3 % of basic metal cluster products units have used technical power and skill of human resources of other similar units.
- Regarding the time of using technical power and skill of human resources of other similar units by basic metal cluster units, 28.6% basic metal cluster manufacturers stated that they have continuously used technical power and skill of human resources of other similar units.
- Regarding the question of how do you evaluate the result of using the human resources skill of the similar units? 88% of basic metal cluster units have evaluated it to be desirable.
- Regarding the question of whether the basic metal cluster units are content with other similar units using their human resources skill or not? 58.3% of basic metal cluster units have expressed their interest in lending their human resources skill to their counterparts.

Raw material supply network in **Yazd** basic metal cluster

Information provided by the basic metal cluster units on raw material supply network indicates that:

- 32% of basic metal cluster units purchase their required raw materials directly from the raw material manufacturers.

In response to the question of “if raw materials are provided directly from the manufacturers, where these units belong to”?

- 14% of the basic metal cluster units have stated that they are within the city of Yazd.
- 86% of the basic metal cluster units have stated that their raw materials suppliers are outside the city of Yazd.

Regarding the question of whether basic metal cluster units desire to cooperate with other similar units regarding raw material supply or not?

- 63.6% of basic metal cluster units have expressed their willingness to cooperate with other similar units on raw material supply.

Technology in **Yazd** basic metal cluster

Basic metal cluster units were asked whether all the operational levels of their production are performed in their own units or not? The responses provided by the basic metal cluster units were as follows:

- 83.3% of basic metal cluster units department announced that all the operational levels of their production are performed in their own units

Basic metal cluster units expressed their reasons for assigning a part of their manufacturing operations to other units as follows:

- 75% of basic metal cluster units referred to their lack of required machinery to perform certain desired operations as their reason for assigning a part of their manufacturing operations to other units.

Regarding the exchange capability of technology, basic metal cluster units were asked whether they have ever used their own machinery to complete the production of other units or not? The responses provided by the basic metal cluster units were as follows:

- 75% of basic metal cluster units have responded that they have used their own machinery to complete the production of other units.

Their response regarding the cooperation of units on technology exchange indicates that:

- 100% of basic metal cluster units have periodically used their own machinery to complete the production of other units.

Regarding the question of whether basic metal cluster units are willing to provide their counterparts with machinery services or not, the answer is:

- 63.6% of basic metal cluster units have expressed their willingness to provide their counterparts with machinery services.

Regarding the cooperation of units on the exchange of technical methods and knowledge of production, the units' comments are as follows:

- 40% of basic metal cluster units have announced that they have cooperated with other similar units on the exchange of technical methods and production know how.

Market access network center in **Yazd** basic metal cluster

Regarding the market access network, basic metal cluster units was asked about their marketing methods. Their responses indicated that:

- 67% of basic metal cluster units have declared that their products were marketed directly by themselves.

In response to the question of "if the goods are sold by basic metal cluster units, where will these products be presented?" basic metal cluster units responses are as follows:

- 50% of basic metal cluster units have stated that they market main part of their goods outside the city of Yazd and a part of it in the city of Yazd.

Basic metal cluster units were asked whether they have ever enjoyed the cooperation of the other similar units to identify new markets for their products or not? Their responses have been as follows:

- 16.7% of the basic metal cluster units have stated they have enjoyed the cooperation of the other similar units to identify new markets for their products.

Regarding the time the basic metal cluster units spent to cooperate in identifying new markets, their answers have been as follows:

- 100% of basic metal cluster units have had long-time cooperation

The financial issues in **Yazd** basic metal cluster

Basic metal cluster units were asked some questions regarding the financial issues which are as follows:

Basic metal cluster units were asked whether they have faced serious financial issues to continue the activities of their own units or not? The answers of basic metal cluster units have been as follows:

- 80% of basic metal cluster units have been facing serious financial issues.

Regarding the desirability or undesirability of the result of financial assistance of basic metal products units to similar units, the answers of basic metal cluster units have been as follows:

- 67% of basic metal cluster units have evaluated the result of financial assistance of basic metal cluster units to similar units and helping them to be desirable.

Regarding getting facilities from the banking system, basic metal cluster units were asked whether they have used banking facilities to establish industrial units or not? The answers given are as follows:

- 100% of the basic metal cluster units have used banking facilities to establish their own industrial unit.

Basic metal cluster units were asked whether they agree with establishment of finance fund which is formed through membership and investment of units and aims to help to meet the financial needs of the partner units or not? The answers of basic metal cluster units have been as follows:

- 63.6% of basic metal cluster units have agreed with the establishment of finance fund which is formed through membership and investment of units and aims to help to meet the financial needs of the partner units.

Regarding the establishment of finance fund, the basic metal cluster units have been asked whether they agreed to join the fund or not? The answers provided by basic metal cluster units are as follows:

- 77.8% of basic metal cluster units declared their intention to become a member and invest in the fund.

Coordination in **Yazd** basic metal cluster units

Regarding the topic of harmony and establishment of a non-governmental organization for this purpose basic metal cluster units were asked whether there is any trade or professional association in their industry or not? Their answers have been as follows:

- 67% of basic metal cluster units have stated that there are trade or professional associations in their industry.

Basic metal cluster units have been asked that at which level do the trade or professional associations work in their industry (city, province, and country) and the answers provided by basic metal cluster units are as follows:

- 0% of basic metal cluster units have announced that their trade association works within the city.
- 0% of basic metal cluster units have announced that their trade association works at the provincial level.
- 100% of basic metal cluster units have announced that their trade association works at country level.

Basic metal cluster units were asked whether they are a member of their own trade association or not? The answers provided by them have been as follows:

- 80% of basic metal cluster units are a member of their own trade association.

Regarding the coordination, basic metal cluster units have been asked "if the issues related to the manufacturing units are supposed to be organized through the formation of a non-governmental organization in order to increase their share of national and international markets and solve existing problems, what combination is appropriate for it?" the answers of the units have been as follows:

- 20% of the basic metal cluster units believe that the mentioned organization should be established through the presence of the similar industrial units.

Evaluation of the points of strength & weaknesses and opportunities & threats of **Yazd** basic metal cluster

SWOT analysis can be performed in various fields such as marketing, supply chain of information systems, and etc. Essentially, this analysis proves to be valuable when used for the current situation, but this analysis can also be used to formulate the strategies. Using SWOT analysis (strengths, weaknesses, opportunities and threats), it will be possible firstly to analyze the internal and external environments and also to be able to make strategic decisions which balance the organization competitions through appropriate job opportunities.

Evaluation of strengths, weaknesses, opportunities and threats of **Yazd** basic metal cluster
Strengths of **Yazd** basic metal cluster

- Rich mines
- Skilled and specialist manpower
- Numerous universities and scientific centers
- Good technical Knowledge
- Appropriate industrial infrastructure
- Modern equipment and machinery
- The existence of Iran most modern alloy steel plants in Yazd city
- The existence of Iran largest manufacturer of various types of steel alloy volume sections in Yazd city
- Ability to build steel plants

- Ability to design and maintain automation systems
- Strategic plans in the steel alloy
- Facilities for proper railway transportation
- Environmental laws and regulations

Weaknesses of **Yazd** basic metal cluster

- Weaknesses in the productive management of capital
- Lack of proper planning in the production of basic metals other than alloy steel
- poor customer care services
- Weaknesses in a comprehensive human capital plan, including hiring, maintenance, training, etc.
- Lack of clear standards in alloy steels
- Lack of development of downstream industries
- High interest rates

Opportunities of **Yazd** basic metal cluster

- Wide constructional steel markets in the country
- Consumption markets throughout the world especially the neighboring countries
- Suitable location and ecological position of Yazd city to get industrialized
- Development of upstream industries in Yazd province including pelletizing, sponge iron and rich iron ore mines
- Worn out vehicles recycling
- Decreased interest rates in recent years

Threats of **Yazd** basic metal cluster

- Imports of cheap and low quality products
- Low currency rates
- Increased energy prices
- Low import tariffs
- Labor and social security Laws
- Tax laws
- Lack of adequate knowledge and awareness of consumers about alloy steels
- Economic sanctions in the field of machinery and its parts

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