

# An investigation on the factors affecting industrial clusters development (Case Study: Industry Cluster of Arak Railway)

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**ABSTRACT:** In today's competitive world, maintaining the industry competitive power, is the must to remain in the today's competitive scene. Some solutions to strengthen the competitiveness power of small industries in the two past decades which has been in the focus of the economic and industrial policy makers were Aggregation that creates them money to help them compete. The best structure that now more than ever is considered in the industry concentration policy is "industrial clusters", which means industry association in a geographical location with Waist institutions and resources and knowledge transmission channels .The relatively high concentration of rail industry factories and the huge size of investment in the Markazi province causes promotion and development of rail spikes to become important in the policy makers consideration in the province. Due to the importance of the rail industry clusters of Arak, the aim of this study was to investigate and detect the influencing factors in the development of Arak industrial clusters Railroad. This research in terms of purpose is applied research and is in the field of developing researches and in terms of nature and method is in the scope of descriptive research. The study population includes all active companies of rail industry cluster of Arak; the sample size was calculated using Cochran formula and 30 companies has been selected. For data analysis the SPSS software and EXPERT CHOICE is used And finally, due to studies were performed during this study 38 factors were extracted and selected and According to the results of factor analysis of all selected factors as affecting factors on Arak railroad industries cluster were confirmed as then by using paired comparison questionnaire of 15 factors that were most important were rated {Method of funding, reciprocity (social capital), specialized services, ease of access to finance, competitiveness, entrepreneurship, and ...} and at the End due to importance of industrial clusters, practical suggestions have been provided and some Research background for future research were suggested.

**keywords:** Industrial cluster, Rail industry, (SMES)Small and Medium Enterprise size, Development

## INTRODUCTION

The importance of industrial development in developing countries has led Most of these countries to consider the formation and strengthening of small and medium industries in the industrial zones and in form of clusters as a strategy of regional industrial development and use it as a Employment strategy while is able to improve companies competitiveness enabling and increase of their exports.

Studying the Contribution of small and medium agencies in the rate of employment, value added and gross domestic product of countries in the world suggests that more than 95% of total employment created from these agencies. Studies conducted on structure of Iranian manufacturing institutions show that over 93% of the companies and industries are small and medium. The employment Contribution of these agencies like the global Contribution of small and medium agencies is high, so that about 70% of the jobs created in the country are applied by these agencies. But on the other hand, the contributions of these agencies in creating industrial added value were only 33% and the contribution of large agencies is 67 %. Studying the performance of small and medium

manufacturing agencies enterprises that more than half of them are working at their least productive capacity, and by not paying attention to these units, many of them will declare bankruptcy.

Since fragmented and small industrial units support for the government and industry officials of the country in addition to being hard, has a very heavy cost, developing small and medium industries in the industrial cluster approach could lead these agencies by relying on their own internal capabilities without relying on the public system, with creating social capitals within the cluster, from a not very good current situation to a better situation in the next few years.

### ***Research theoretical framework***

Today the development through cluster model plays a prominent and significant role in the economic and industrial policies of developed countries. If the previous approaches have more focus on the macro economy, now small businesses, feel of responsibility to enhance the competitive ability of small and medium units, improvement of communication networks, emphasizing on indirect protection against subsidies, combining competition and cooperation in order to learning and innovation, improving the cooperation level between small and large agencies and strengthening cooperation triangular of clusters, government and university are placing higher. The more attention to solve the problems of international, national, regional level, proceed over all the local and regional, based on dynamic ability of formed social system based on natural processes-, the attention to small businesses in form of communication network can be defined according to the following form of small business development cluster that is of special importance.

Small industries in most of the world's countries, especially in developing countries have a special place. Experts of economic development due to limited manpower and resources and according to the today's world's industrial structure and due to benefits which these people of the countries have, are announced the best model developing small and medium industries. In development of small industries also today in the world different models have been proposed that the most important of these patterns are model-based development of industrial clusters.

It is almost two decades that industrial development based on clusters is considered as a new strategy to planners and programmers and policy makers in developing and industrial countries. International organizations such as ILO, UNIDO and World Bank, also have implemented and supported various models through the development of industrial clusters in various countries. industrial clusters is one of the Successful model of organizing of small and medium industries which eliminates the shortcomings of small and medium industries and strengthen various advantages of small industries such as flexibility and diversity. Industrial cluster is a set of manufacturing and service agencies in the industrial field, which is formed with an emphasis on social consistency capital in different geographical areas along the supporter organizations an through aggregate relationship between agencies (mansoori, 2005).

The biggest problem for small and medium agencies is achieving appropriate scale of production. Many of these units did not have the scale and due to this fact they cannot make a necessary condition for their sustainability and competitiveness in market. Another major problem for small and medium agencies, especially in our country is more severe is the poor and service supporting agencies or institutions or business service. Small units do not have the ability to independently solve their finance, technical, marketing, sales, etc problems, but it is required to receive these vital services from outside of the organization. The reason of Failing in many investments in small and medium industries returns to this fact, because investors primarily due to the lack of awareness of technical, economic, managerial, marketing and other neglected the costs related to these areas in their calculations and due to the complexity of these services have not the ability of performing them at optimum level (Badri and Kiani, 2006). In terms of industrial clusters, the above problems will be solved. Meanwhile, due to the accumulation of homogeneous units, production in mass and economic scales will be taken and on the other hand all types of business establishments and units in the form of technical advice, finances, marketing, purchasing, sales, and so on naturally or with guideline of government, formed within the clusters.

### ***Industrial Clusters and its constituent elements***

A new approach that today is raised in issues of industrial and regional development, is more comprehensive than Peru and Hirshman views. In this approach the regions that depend on the available natural, human, organizational and institutional advantages should have serious attention to the development of a limited number of clusters and should facilitate different aspects of the organization of these clusters. It is in the case that they can be successful in national and international markets and can capture the more valuable part of value chain of related products and be able to correct and reform existing structures in global ups and downs. (Iran Nejad and Razavi, 2002).

A cluster is composed of three main elements. 1 - Economic activities having focus on clusters including relationships within and outside the agency 2 - related service and supporting activities which are necessary for improving the performance and competitiveness of the central cluster 3 – related performing field of public institutions, social and political in order to support the central activities and services and supporting activities to promote social and collective capital and facilitating collective action.

These main elements together can reduce their costs by using below elements in addition to move towards specialization and accepting specific professional identity, and be able to exploit the internal and external economies resulting of scale and also static and moving advantages of assembly. Domestic agencies and institutions interdependencies of an industrial cluster are the success key of cluster identification. This dependence between agencies through linkages and cooperative atmosphere is created which public, governmental or local institutions will make them easier. Governmental agencies and infrastructure planners have a strategic role in the provision of physical infrastructure, services providing and multiple facilities such as funding providing through cheap loans, providing credit and financial services, provision of informative systems and coordination of different sections and political and regional industrial with economical and organizational institutions, banks and other institutions. Thus it is seen that the cluster-based industrial development with the involvement of regional institutions will facilitates formation and increase of material and spiritual capital (Majidi , 2002).

Today the railway industry role as an economic and also a key factor for growth and development for areas that have potential and background of such activities is not a secret. Arak railway industry cluster is one of the major industrial poles of country that is located near the highway of Tehran \_ Imam Khomeini Port and also the country's main linking roads and due to its high potential in steel industries is considered as highlighted industry of the country and can have a good performance in the Middle East. Also there is a possibility of competition with foreign products for a cluster. Since the cluster development model is a dynamic and holistic model, so present study attempts to evaluate the rail industry with a comprehensive view and in addition to factors affecting it, achieve a proper understanding of the Arak railway industry cluster state to what is happening in today's world. The main questions of this research are: 1 - What are the factors affecting the development of Arak railroad cluster? 2 - How these factors are ranked based on the importance?

### ***Collection and extraction of factors***

first some studies was conducted in context of industrial clusters , and also studies on clusters that were fulfilled in developing countries like India , Brazil , Vietnam and Indonesia were examined and 52 factors were extracted , then general condition of industrial railways in Markazi Province , according to the documents available on the company's industrial towns of the province and statistics presented in this review were examined and in the end with opinions of respected professors, advisors , interviews with industry managers and associated experts with the rail industry section and also the Forum heads of railroad industries 38 factors of 52 factors were examined that include: 1. Level of skill and expertise of manpower 2.Availability of skilled labor 3.Human Resource Management 4.Labor productivity 5.Training and research centers 6.Professional Services 7. Access to technology and business services centers (BDS) 8.Market access 9.Availability of initial capital 10.Ease of access to financial resources 11.competitors technology 12.competition 13.condition of Entrepreneurship 14. Business conditions 15. Transport condition 16. Situational factors such as geography, climate, and regional facilities 17.Ability of research & development centers(R & D) 18.Sharing technology (technology) 19. The presence of prominent and leading companies in markets 20.Innovation in technology 21.IT 22.Natural resources availability 23.Power provision condition 24.Type of Organization leadership 25.availability of specialized labor market 26.Economic policy of the country 27. Government and its structure 28.Media 29.Partnerships with other companies 30.Mass production 31.Reciprocity (social capital) 32 .supporting rail Industry 33 .Establishment of Strategic management 34.Openness amount of the economy (ease of export and import) 35 .methods of funding 36.Financial ability to invest in new and foreign companies 37.Cooperation of financial institutions, especially banks, 38 .Professional associations and business associations (Catalin, 2011; Ivars, 2011; Mark et al, 2000).

## **RESEARCH METHOD**

This study in terms of purpose is applied research, and in terms of nature and method is descriptive. The statistical population of this study includes all active agencies which are the member of the rail industry cluster that their number is 33. Based on the results obtained from Cochran sampling formula 30 companies which were the active member of the cluster and have also been member in the Railway Board were elected. The data collection tool in this study is questionnaire. This questionnaire was based on five -degree scale of Likert rating ( very low,

with a score of 1 , low with a score of 2, the average with a score of 3 , many with a score of 4 and too many with a score of 5 ) consisted of 38 closed questions was prepared .

**Research findings**

In this study, first the factor analysis method was used. Factor analysis is a statistical technique that its aims of use, is the provision of a set of variables based on smaller number of hypothetical variables. Eigen values obtained for each of the factors suggested that all elements of the questionnaire are the factors that affect the development of rail clusters.

Table 1. Table of Subscriptions

value	question	value	question	value	question	value	Question
.985	Q37	.943	Q25	.960	Q13	.653	Q1
.954	Q38	.982	Q26	.978	Q14	.839	Q2
		.979	Q27	.950	Q15	.801	Q3
		.891	Q28	.871	Q16	.878	Q4
		.871	Q29	.949	Q17	.923	Q5
		.924	Q30	.978	Q18	.961	Q6
		.977	Q31	.864	Q19	.857	Q7
		.952	Q32	.959	Q20	.907	Q8
		.959	Q33	.991	Q21	.808	Q9
		.876	Q34	.996	Q22	.990	Q10
		.994	Q35	.914	Q23	.934	Q11
		.951	Q36	.994	Q24	.981	Q12

**DATA ANALYSIS BY HIERARCHICAL ANALYSIS METHOD**

In this level In order to determine the significance, 15 factors which have contributed the largest special amount in the hierarchical analysis will be used. By help of hierarchical analysis method the weight of each factor will be determined. Paired comparisons questionnaires have been used for this purpose. The final values of Paired comparisons (software entry) from the mean of the experts are shown in Table 2 and the weight of 15 factors is visible in Table 3. Incompatibility rate of judgments is 0.04 since it is less than 0.1 so it is acceptable.

**CONCLUSIONS AND RECOMMENDATIONS**

To determine affecting factors some studies was conducted on industrial clusters and 38 factors were extracted and selected by comments of professors and advisors, then the AHP method was used and according to the results of factor analysis all selected factors have influence on Arak Cluster Railroad Development.

**Therefore, the following suggestions are offered**

The factor of methods of financing according to conducted analysis was recognized the first (most) analysis of the Rail Industry Cluster Development of Arak. Therefore, these related authorities could consider ways for methods of financing such as: the provision of creating a common fund box, attempt to provide the creation background and establishment of local banks, using foreign investment in providing financial needs, providing conditions for state banks to obtain liquidity through low-interest long-term loans.

The Interaction factor according to performed analysis was recognized as the second factor affecting the development of the rail industry clusters of Arak. So the related authorities can consider actions in this regard including: holding common meetings, seminars, workshops and technical meetings between raw material suppliers, manufacturers and distributors of products for creating effective and face to face connections, guiding and encouraging units to cooperate in various ways, including prioritization of providing facilities, Tax relief or reduction of bank interest, making culture to encourage production units to work together.

The Specialized Services factor According to conducted analysis considered as the third factor affecting the development of the rail industry clusters of Arak. So the related authorities can take action in this regard,

including: the creation of specialized consulting services units for solving problems of industrial clusters in finance, feasibility studies, internal and external marketing, human power, legal issues and labor laws, technology of manufacturing, communications and so on.

Thus, the ease of access to finance resources, competitiveness, entrepreneurship conditions, sharing technology, information technology, economic politics of the country, , business conditions, the leadership of the organization, government and its structure the presence of natural resources, establishment of strategic management and cooperation of financial institutions, especially banks adopted the fourth to fifteenth rank.

Table 2. the average of experts views in relation of pair comparisons among affecting

	Professional Services	Ease of financial access	competition	Entrepreneurship condition	Business condition	Technology sharing	IT	Natural resources availability	Type of organizational leadership	Country Economic policies	Government and its structure	Reciprocity (social capital)	Establishment of strategic management	Methods of financing	Cooperation of financial institutions, especially banks
Professional Services	1	1.69	1.95	1.8	2.12	2.2	1.44	2.14	1.96	2.88	2.19	(1.74)	1.12	(1.25)	1.52
Ease of financial access		1	1.69	1.4	1.66	2.1	2.25	2.95	3.02	1.87	2.05	(1.22)	3.12	(2.14)	2.65
competition			1	2	2.15	1.5	2.19	2.45	2.88	2.19	3.45	(1.3)	3.45	(2.05)	2.98
Entrepreneurship condition				1	2.14	3.1	2.18	2.45	2.66	2.77	2.88	(1.63)	2.65	(1.95)	2.88
Business condition					1	2.19	(1.12)	1.55	1.25	(1.45)	1.18	(3.12)	3.15	(1.45)	2.18
Technology sharing						1	1.19	2.95	1.18	(1.66)	1.98	(2.25)	3.19	(1.55)	2.99
IT							1	2.65	1.32	(1.39)	1.45	(1.55)	2.15	(2.95)	1.95
Natural resources availability								1	(2.15)	1.02	1.25	(2.12)	1.15	(1.95)	1.18
Type of organizational leadership									1	1.12	1.56	(1.39)	2.11	(2.05)	1.77
Country Economic policies										1	1.1	(1.25)	1.65	(1.93)	1.33
Government and its structure											1	(1.65)	(1.19)	(1.45)	(1.22)
Reciprocity (social capital)												1	3.19	(1.25)	2.25
Establishment of strategic management													1	(2.15)	2.66
Methods of financing														1	3.15
Cooperation of financial institutions, especially banks															1

Table 3. the amount of importance of effecting factors on the developing of rail clusters of Arak

Rank	Weight)Value(	Factors
3	0.099	Professional Services
4	0.097	Ease of financial access
5	0.095	competition
6	0.091	Entrepreneurship condition
10	0.050	Business condition
7	0.063	Technology sharing
8	0.053	IT
14	0.036	Natural resources availability
11	0.049	Type of organizational leadership
9	0.052	Country Economic policies
12	0.038	Government and its structure
2	0.100	Reciprocity (social capital)
14	0.036	Establishment of strategic management
1	0.111	Methods of financing
15	0.032	Cooperation of financial institutions, especially banks

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