Business Cluster Development Feasibility
(Case Study: Khuzestan Agricultural Equipment)

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ABSTRACT

Today paying attention to industrial clusters and the essentiality of implementing cluster development projects are one way to improve businesses and empower relative advantages of every region. In fact, the objective of such projects is to update relational chain and to draw modern shape of cluster according to new business situations and conditions. In this study, which is conducted based on the regulations of UNIDO and with the cooperation of Industrial Towns Corporation of Khuzestan Province, entitled "Cluster Development Feasibility (Case Study: Khuzestan Agricultural Equipment)", not only the significance and requirements of industrial clusters development but also the conceptual model of cluster development strategic planning have been introduced. After investigating the cluster process, and the analysis of environmental conditions and the effective points on the business process, cluster map has been drawn in its good condition, and functional and structural strategies to achieve favorable status have been explained. With respect to the four-fold dimensions of the industrial cluster (namely geographical concentration, business tendency, supplementation, opportunity, and common threats), and compliance of business conditions of Khuzestan agricultural equipment with these dimensions, cluster development strategy has been adopted as the basis to organize and dynamize the activities of this industry. Among the most important challenges of the cluster before intervention is limited availability of primary materials in terms of quality and price, fragility of social relations, lack of trust between the cluster's stakeholders, and lack of support from the relevant institutions. Therefore, four key strategies were adopted for cluster development and its approaches, based on the results from conceptual model of cluster strategic planning. The priority and efficiency of the strategies, based on the analysis of acquired information, are as follows: 1) retrograde development strategy, 2) market deepening strategy, 3) joint cooperation strategy, and 4) innovation strategy. Comparison of general construct of the cluster before and after intervention shows that not only the number of manufacturing units and sectors, connected to the cluster's business, has increased, but also its competitiveness has relatively enhanced and become more efficient and cohesive.
KEYWORDS: Industrial cluster, Cluster development model, Cluster map

1. INTRODUCTION

In the economic analysis to produce a product, sometimes large industries have more advantages. However, small businesses may give more advantages than large industries in some instances. According to literature, the small and medium industries can be used except for producing petrochemicals and raw materials. These firms have many advantages over large industries such as greater value added, innovation, job creation and flexibility. In Iran, more than ninety-three percent of industrial institutions and companies are small businesses, but they create only thirty percent of the value added of the industrial sector [1].

The organization and direction of these industries seem to be necessary. Nowadays, cluster development plays a pivotal and significant role in the economic and industrial policies of developed countries. Industrial cluster is one of successful patterns for organization of small and medium industries eliminating the shortcomings of small and medium industries while strengthening the advantages of small-scale industry such as flexibility and diversity. Industrial cluster refers to a set of business units with a same industrial trend concentrated in a geographic area. The business units in an industrial cluster with common challenges and opportunities cooperate and complement their activities to produce goods and provide services [2].

Despite the introduction of industrial clusters in development literature in the past decades, unfortunately the literature and culture of cluster development have not been institutionalized for various reasons in many countries and there is no enough awareness on this issue. Concentration or clustering creates an advantage for the firms within the cluster compared to those which are working separately. The advantages include more suppliers, a series of expert workforce and the inevitable transfer of knowledge. Among all the benefits of

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clustering, neither is more important than innovation, knowledge and new skills through cluster development projects [1].

A cluster development project is a planned effort with the collaboration of local institutions to enhance clusters and improve its competitive advantage. A cluster development project, on the one hand, focuses on the interconnections of various sections of a cluster. On the other hand, it concentrates on the economic value chain including a cluster as a part of it. Therefore, the raw material to the output, i.e. product is guided to a right competitiveness path [3]. Promotion of social capital and collective cooperation and development of business networks within the cluster are among the most important activities in this process. Accordingly, the present study aims at developing agricultural machinery business cluster in Khuzestan province to define a new form of relationship within and outside the cluster using the recommendations of leading organizations in this field like the United Nations Industrial Development Organization (UNIDO).

2. Requirements and the importance of cluster development

Since 1990, industrial cluster development received much attention as a new strategy by planners and policy makers in industrialized countries and even in the developing countries. International organizations such as the United Nations Industrial Organization (UNIDO), International Labour Organization (ILO) and the World Bank implemented and supported several plans through development of industrial clusters in different countries. In Iran, cluster development in industrial centers is considered as a socioeconomic system given the economy's dependence on natural resources and lack of competitiveness in international markets. It is considered as an important step for regional and industrial development, raising the share of small firms in GDP and employment development to organize small and medium enterprises.

The effective measures for cluster development include:

1. The long-term clustering strategy
2. Development of competition along with cooperation
3. Clustering with targeting approach
4. Knowledge of clusters

Most agricultural economists argue that Iran's agricultural sector is experiencing serious difficulties from industry. In fact, the development of agricultural sector is dependent on the type of cooperation and development of industrial sector.

Given the crucial role of agriculture in the development process, it deserves to be seen from a proper perspective. To achieve food security for the community, agriculture needs a quick transition from traditional subsistence production to industrial and commercial production. Therefore, it should be modernized using professional measures. Among the most important measures for modernization of agriculture is development of technology and its application. To improve the quality and quantity of products and competition in the market for agricultural products, public and private sectors have to adapt themselves to new technologies [5].

One of the technological instances is equipment and mechanization of agricultural activities. Mechanization is one of the main factors in the development of agricultural and is essentially an approach to achieve industrial and commercial agricultural production. Although nearly half a century has passed since the optimization of agricultural machinery in Iran, the mechanization of agriculture is still not in its actual position. Despite various measures taken for the development of agricultural mechanization in recent years, the facts indicate a gap between supply and demand for agricultural machinery as well as many deficiencies in the equipment industry and development of mechanization [4].

3. MATERIALS AND METHODS

The aim of the present study is to provide a model for the formation and development of a specific socioeconomic and technical system. Accordingly, this is an applied study in terms of objective. On the other hand, it aims at evaluating the current status of production units in the cluster, behavioral motives of manufacturers, level of social capital and the relationships between stakeholders. Therefore, this is considered a descriptive-survey study in terms of nature and methodology.

4. Data collection tools

The first step to collect data was to review scientific books, articles, journals, reliable documentation and internet. In the second phase, two standard questionnaires by the United Nations Industrial Development Organization (UNIDO) were used. The first questionnaire was used to collect general information about the cluster such as cluster products and services, cluster structure, raw materials and other necessary information. The second questionnaire includes questions for interviews with managers/owners of small, medium and large enterprises as well as institutions, organizations and associations. The validity and reliability of standard questionnaires were approved by the Small Industries Organization and the United Nations Industrial Development Organization (UNIDO). Another questionnaire was used to assess the effectiveness of proposed

strategies. The questionnaire consisted of sixteen 5-option questions including 4 questions on the first strategy, 3 questions on the second strategy, 4 questions on the third strategy and 5 questions on the fourth strategy. Variables related to strategies are shown in Table 1.

Table 1: Variables of strategies

Strategies	Variables
Cooperation	Meetings between the cluster actors
	Seminars on cluster development
	CDs to introduce cluster development project
	Introduction of active units in the cluster
Backward development	Analyzing cluster needs to raw materials
	Creating a consortium to supply raw materials
	Negotiations with casting units in the province
Innovation	Training courses to enhance skills and quality of human resources
	Communications with academic and research units
	The use of high-tech production technologies
	Establishment of technical and technological business units
Market expansion	The use of business units specialized in marketing
	Exhibitions for introduction of cluster products
	Establishment of sales networks and regional sales representative
	Attempts to create a common brand
	Assessment of exports

The questionnaire was distributed among 28 manufacturers in the province. The solutions for each strategy were tested using a 5-option scale including strongly agree (5), agree (4), abstention (3), disagree (2) and strongly disagree (1). The answers were analyzed with the help of SPSS and the results were classified.

5. Data analysis

This applied-development study is a descriptive-survey research in terms of nature. Accordingly, descriptive statistics were used to describe the characteristics of socioeconomic relationships in the cluster. However, inferential methods were used to design an appropriate model for the cluster. The one-sample t-test and Friedman methods were used to analyze the questionnaires and assess the effectiveness of proposed strategies.

6. Conceptual model of cluster strategic planning

Most strategic planning models are mainly based on the features of large companies and few models have been developed for small enterprises. This is probably due to less important role of small business and strong needs of large corporations in the past. Nowadays, small companies play a very important role and there is a crucial need for planning and development of small businesses.

The strategic planning model for agricultural machinery cluster in Khuzestan province aims at analyzing the pressure points through cluster mapping and identifying relationships between stakeholders. While reviewing internal and external conditions of the cluster, it provides appropriate development strategies. Finally, the developed cluster map is provided.
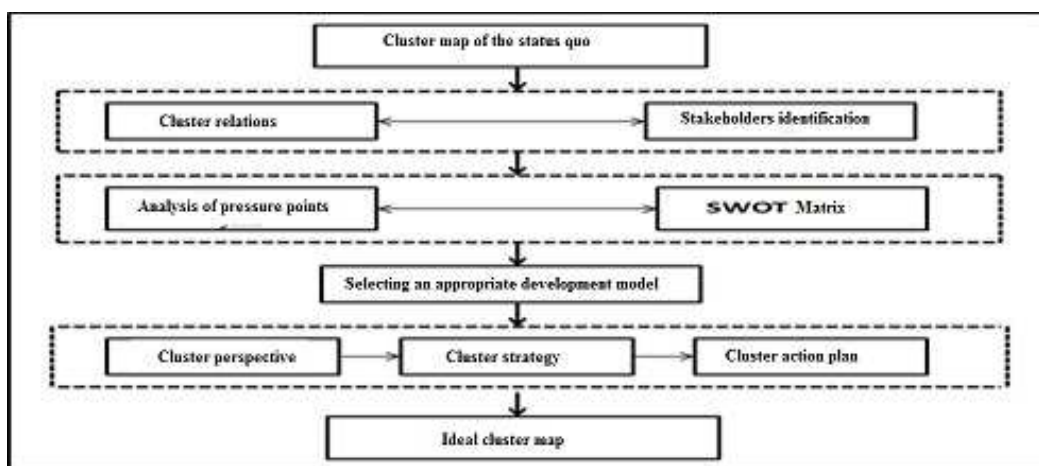

Figure1: Conceptual model of cluster strategic planning

7. Cluster Map

Cluster map is one of the best tools for analyzing various parts of a cluster. Cluster map shows a brief description of the types and number of stakeholders, the nature of their relationships with major companies and the strength of relationships.

The primary business cluster map of Khuzestan agricultural machinery is designed as follows:
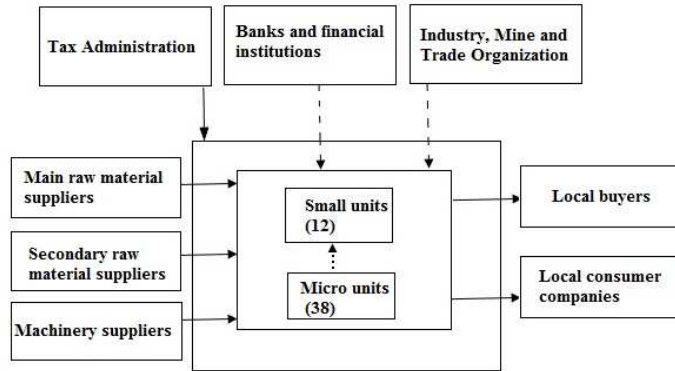

Figure2: The primary cluster map

8. Strengths, Weaknesses, Opportunities and Threats (SWOT)

Any business unit has its own strengths, weaknesses, opportunities and threats that may encounter in the future depending on the type of activity and environment. The common strengths, weaknesses as well as opportunities and threats for those active in the cluster can be summarized as follows:

Table 2: SWOT model

Strengths	Weaknesses
Geographical location and high capacity of agricultural production **Historical background of the cluster and expertise in production** **High level of local demand**	Weak financial strength of manufacturers Lack of technology for economic-scale production High price of products
Opportunities	Threats
Availability of an environment for business development **The growing potential of local and national market** **Exporting opportunities**	Old structure and deterioration of machinery A negative competition between manufacturers and lack of social capital The weakness of governmental institutions to support business units

9. Cluster development strategies

To develop the business cluster, development strategy (increase or expansion of activities) was taken based on the developmental nature of the research. The following strategies were defined:

1. Cooperation or joint venture: taking advantage of synergies and coordination of cluster units to provide common products with higher quality

2. Market expansion: Raising the share of the market for existing products and services of agricultural machinery cluster of Khuzestan province through increased marketing efforts

3. Innovation: innovation in services and providing new or improved products to lead the market and leave the passive condition

4. Backward development: increasing control over raw material suppliers

After studying the relationships within the cluster and determining the pressure points, to develop the agricultural machinery cluster in Khuzestan province, some strategies were taken to achieve the targets. These general strategies are a basis for a practical plan to develop new relationships and cluster dynamics. This results in an ideal cluster map. As shown in Figure 2, the following items can be recognized for development of the cluster.
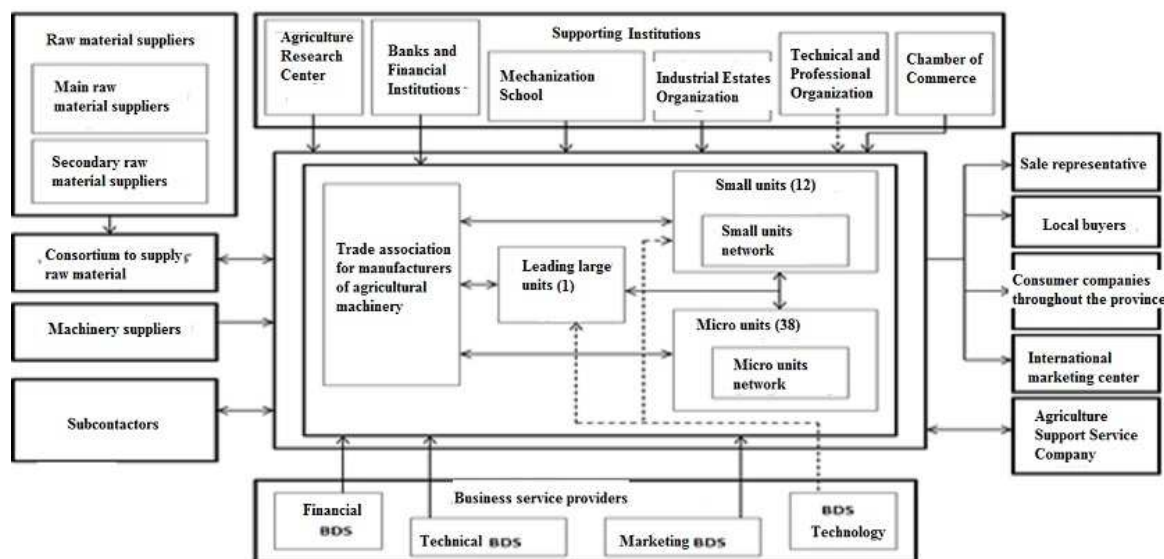
Figure3: Ideal cluster map

- Creating a leading medium manufacturer and activating the micro and small production networks in the cluster.
- Creating a network of subcontracts relating to manufacturing units for completion of products
- Establishment of specialized business service providers
- Adjustment of sale mechanisms, client-seller relationship and building stable relationships with customers
- A network of suppliers of raw materials through the creation of a consortium of required raw materials

10. RESULTS AND CONCLUSIONS

Based on data obtained from the Success Inventory, the following solutions are proposed according to the conceptual model of strategic planning.

1.10. Priority of strategies
The effectiveness and priorities of cluster development strategies are presented as follows:

Table 3: Priority of strategies

Strategies	Average rank	Priority
Backward development	3.18	1
Market expansion	2.82	2
Cooperation	2.36	3
Innovation	1.64	4

11. Ranking Solutions
The responses were analyzed to determine the priority and effectiveness of the four strategic guidelines.

1.11. Backward Development

Table 4: Ranking backward development solutions

Solution	Average rank
A consortium or network for supplying required raw materials	2.11
Analyzing cluster needs to raw materials to identify capabilities and shortcomings	2.02
Negotiations with the casting units to supply the required parts	1.88

2.11. Market Expansion

Table 5: Ranking market expansion solutions

Solution	Average rank
The use of business units specialized in marketing	3.07
Exhibitions to introduce cluster products	3.23
Creating regional sales networks and representatives	2.68
Attempt to create a common brand	2.59
Assessment of exports	2.43

3.11. Cooperation

Table 6: Ranking cooperation solutions

Solution	Priority	Average rank
Meeting between cluster actors	1	2.93
Seminars on the cluster	2	2.93
Introduction of active and leading manufacturing units in the cluster	3	2.18
CDs and brochures to introduce cluster development project	4	1.96

4.11. Innovation

Table 7: Ranking innovation solutions

Solution	Average rank	Priority
A consortium or network for supplying required raw materials	3.07	1
Analyzing cluster needs to raw materials and identifying capabilities and shortcomings	2.95	2
The use of novel technologies for economic-scale production	2.41	3
Communicating with academic and research centers	1.57	4

Table 8: Pre- and post-intervention conditions of the cluster

Sector	Before intervention	After intervention
Main production system	12 small manufacturing units 38 micro manufacturing units	A network of small units consisting of 12 manufacturing units A network of micro units consisting of 38 manufacturing units 1 large leading manufacturing unit Trade association for manufacturers of agricultural machinery
Subcontractor	Lack of subcontractors	The presence of subcontractors for completion of products and horizontal cooperation relationships
Raw material supply	Supply of raw materials mainly from outside the province with high prices	Establishment of a consortium to supply high quality raw materials at competitive prices
Supporting institutions	Poor cooperation and support	Establishment of appropriate relationships with relevant institutions including the Agricultural Research Center, industrial estates, academic and financial institutions, etc.
Forward relations	Direct referral of costumers to manufacturing units	Sales representatives, international marketing and relationships with agro-industrial companies and agricultural support services
Business development services	Lack of business development service providers	Technical, technological, financial and marketing units

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