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DEVELOPMENT OF THE AUTOMOTIVE INDUSTRY ON THE BASIS OF FORMATION OF CLUSTERS WITH INNOVATIVE DOMINANT

The article investigates the prospects of development of the automotive industry through innovative clustering. The basic aspects of the process of cluster formation in the automotive industry are determined. The features of clustering the industry with innovative dominant are considered.

Key words: *engineering manufacture, green vehicles, cluster, clustering, innovation cluster, cooperation.*

Смолич Дарія

РОЗВИТОК АВТОМОБІЛЕБУДУВАННЯ НА ОСНОВІ ФОРМУВАННЯ КЛАСТЕРІВ З ІННОВАЦІЙНОЮ ДОМІНАНТОЮ

У статті досліджено перспективи розвитку автомобілебудування шляхом інноваційної кластеризації. Визначено основні аспекти забезпечення процесу формування кластерів в автомобільній промисловості. Розглянуто особливості кластеризації галузі з врахуванням інноваційної домінанти.

Ключові слова: автомобілебудування, екоавтомобілі, кластер, кластеризація, інноваційний кластер, співробітництво.

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РАЗВИТИЯ АВТОМОБИЛЕСТРОЕНИЯ НА ОСНОВЕ ФОРМИРОВАНИЯ КЛАСТЕРОВ С ИННОВАЦИОННОЙ ДОМИНАНТОЙ

В статье исследованы перспективы развития автомобилестроения путем инновационной кластеризации. Определены основные аспекты обеспечения процесса формирования кластеров в автомобильной промышленности. Рассмотрены особенности кластеризации области с учетом инновационной доминанты.

Ключевые слова: автомобилестроение, экоавтомобиль, кластер, кластеризация, инновационный кластер, сотрудничество.

Problem statement. Today for Ukraine as for most countries is relevant the transition to the production and operation of new transport modes, due to the high cost and scarcity of fossil fuels, significant pollution of settlements by emissions of transport, and thus a negative load on the atmosphere. Possible solutions of these problems is the creation, industrial production and active use of innovative and alternative forms of transport – green cars.

To promote the use of green cars and introduce their mass production is expedient due to the formation of the innovation cluster that can accelerate the development of green cars manufacturing. In Ukraine, such a cluster is proposed to be created on the basis of Zaporizhzhia region, which is the center of the domestic automotive industry.

Latest research and publications analysis. Clusterization processes, including innovation, were studied in the works of many Ukrainian scientists, in particular such as M. Voinarenko (2008), V. Dubnytskii et al., (2012), O. Tushchenko (2010), Y. Kovalova (2009), S. Sokolenko (2002), V. Chuzukov (2001), E. Yugas (2010) and others. In the works of foreign scientists, including M. Porter (2006), S. Rozelfild (2000), E. Fezer (1998), H. Swon (1996) the above mentioned issues are also reflected. However, remain unsolved questions about the formation of innovative clusters that would make it possible to detect competitive advantages and overcome the causes of inefficient management in regions using innovations.

Thus, **the research objective** is to improve theoretical and methodical approaches of formation of clusters with innovative dominant in automobile industry.

Key reseach findings. Considering the essence of the concept "cluster" in general, it is worth noting that for today there is no single, unambiguous definition of this concept, which can be explained as a feature of the nature of the formation of cluster theory and the incompleteness of cluster concepts. Based on the existing definitions of "cluster" given by leading foreign and Russian authors (Портер, 2006; Соколенко, 2002; Чужиков 2001; Войнаренко, 2008; Ковальова, 2009;

Мингалева, 2000; Тищенко, 2010) we can highlight the following features of such entities: geographic proximity of participants, industry specialization of the territories and the union of participants in the technological chain, the interaction within a cluster of government, business, institutes, cooperation of the participants and the synergetic effect from the cooperation.

The cluster approach in the automotive industry will contribute to the creation of fundamental conditions for innovation, knowledge and technology exchange, as a consequence, increase the productivity and efficiency of the industry. This will lead to increased economic competitiveness of not only the members of the cluster, the respective regions but country in general.

An important feature of any cluster is innovative orientation of its activity, respectively, all the clusters regardless of the type must be aware of the latest changes and current trends, look for ways of increasing their competitiveness. The lack of innovative aspect in the activities of the clusters will determine the uniformity of the regional territorial and production associations.

Among a variety of cluster formations at the present time special importance has the innovative type that uses innovation as a means of achieving success, as the technology of competitive advantage and as a strategy for future development (Югас, 2010).

It should be noted that the result of the development, functioning of the cluster with the dominant innovation is the obligation to create innovations that will contribute to the emergence of competitive advantages. If the usual cluster innovativeness can be manifested at a certain stage of the technological cycle, within the framework of the innovation cluster there should be ensured the implementation of innovative ideas from its occurrence to immediate implementation. Innovation clusters is expedient to form in certain areas of economic activity, be distributed to one (several) industries or even sectors of the economy and oriented on the production of the final innovative products.

The creation and development of greenn cars' manufacturing in Ukraine is a promising direction of the automotive industry considering the most innovative

modern global trends. The economy will get a modern and advanced scientific and industrial complex of engineering, electrical, nano-technology and other industries. Considering the fact that Zaporizhzhia region is the largest producer of passenger cars in Ukraine, the production of which is sold both on domestic markets and is exported, we consider that establishment of production of innovative green cars should become another trademark of Zaporizhzhia.

The concept of "green car" usually has a meaning of environmentally safe and economical means of transport that does not emit harmful emissions into the air. Green cars include electric cars, cars with a combined engine, cars that run on alternative fuels.

It should be noted that in autumn of 2010 in Zaporizhzhia was presented "Lanos Electric" – the electric car-van of national production, created by the designers of CJSC "ZAZ" and scientists of the Institute of electrodynamics. Today, this machine exists in a single copy. The estimated cost of this environmentally friendly car is more than 24 thousand euros. The feature of "Lanos Electro" in that the car is charging from the wall outlet for 220 volts. This development confirms the practical significance, the reality and feasibility of the proposed cluster formation, because we see the obvious ability of Zaporizhzhia region to work in the specified direction, namely in the production of environmental version of cars.

However, today ZAZ is looking for partners, support, in particular national and regional authorities in the direction of green cars' manufacturing, investors. They are not able to start innovative industrial production themselves. Thanks to innovative cluster formation, in the short term can be improved and expanded the range, reduced the cost and launched mass production of eco-cars in Ukraine on the basis of the enterprises of the Zaporizhzhia region.

It should be noted that the selection of relevant participants for cluster formation must be based on compulsory isolation within the cluster of the technological cycle, the basis of which is a possible implementation of all stages of the innovation process.

Industrial manufacturing sector of the proposed cluster covers such industries as automotive, high-tech engineering and their enterprises, as well as related and supporting branches. In particular, as the flagship of cluster will act unquestioningly PJSC "Zaporizhzhia automobile building plant" – the only enterprise in Ukraine, which has a full cycle of passenger cars production, including stamping, welding, painting, equipment and the assembly of the car. The plant creates and constantly updates wide range of products, in accordance with the trends of automotive industry at the international level. The cars of PJSC "ZAZ" are exported to Russia, Kazakhstan, Georgia, Azerbaijan, Belarus, Egypt.

In addition to PJSC "ZAZ" an important place in the cluster should be given to Melitopol motor plant, which is a self-supporting enterprise of PJSC "ZAZ" and specializes in the production of powertrains and JSC "Pluton", which enables the production of high-tech electrical equipment.

We should note that in the framework of branch and manufacturing sector of this cluster we select only promising enterprises, which are appropriate to be established in the region, namely: research and production enterprise "Automobile electric motor", scientific research and production enterprise "Energy intensive element of battery" that will ensure the development of electric motors and batteries. In addition, it is appropriate to establish a sales network of innovative electric cars and a pilot project – "Network of charging and maintenance of eco-cars stations " that will help in the promotion of an innovative product.

Non-productive sector of cluster is represented by the following sub-sectors: educational and research institutions; the business support institutes; authorities; non-profit organizations. It is important to note that we have formed an innovative-intellectual cluster unit, combining innovative institutions of the region and the educational institutions (Офіційний сайт Запорізької обласної адміністрації) :

- innovative institutions, in particular in the region there are 2 business incubators and 83 business centers that can be involved in cluster formation;
- SE "Zaporizhzhia state centre of science, innovations and informatization";
- Dniprovski regional innovation development center;

- regional research organizations;

- institutions of NAS of Ukraine, including the Institute of electrodynamics;

- a number of specialized educational institutions, namely Zaporizhzhia National Technical University, Zaporizhzhia State Engineering Academy, Zaporizhzhia Electrical and Technical College, and the like.

The mentioned agencies and organizations will play an important role in the cluster, because they will ensure emergence, development and implementation of innovative ideas and solutions, carry out research work and prepare qualified personnel.

In addition, it is pertinent to note that the proposed cluster must involve the authorities, both at the state and regional levels. In particular regional authorities: Zaporizhzhya regional state administration, bodies of local self-government. State authorities that govern the specified area are: Ministry of economic development and trade and the Committee on industrial and regulatory policy and entrepreneurship of Verkhovna Rada of Ukraine. The authorities will contribute to the formation and development of the cluster, create conditions for the effective functioning of the cluster formation in the region, and will lobby for the interests of the cluster at the state level.

Along with the authority structures we present in the cluster public organizations, including public councils under the state bodies, unions and associations, including the Union of green cars' manufecturers of Ukraine, Ukrainian Union of industrialists and entrepreneurs, Association of Ukrainian automobile manufacturers "Ukrautoprom". Public involvement in the clusters, in our opinion, testifies the openness of the clustering process at the regional level, will contribute to the views of the public, independent experts, regarding these processes. NGOs will support the development of innovative clusters, ensure public control over the activities of the defining industries of the cluster formation and to protect the interests of the members of such formation.

Institutes of support of business include: financial institutions (credit, insurance, leasing companies, etc), information consulting institutions (legal,

brokerage, others), transportation and logistics organizations, regional chamber of Commerce, others who will provide support of activities of the innovation cluster.

In addition, we have selected potential partners – participants of the cluster from neighboring regions of Ukraine, namely: OJSC "Southern electric machine building plant" (Kherson region), NGO "Dnipropetrovsk electric locomotive building plant" (Dnipropetrovsk region) who have experience in manufacturing electric motors, particularly traction; International Scientific Industrial Corporation "Vesta" and NJSC "Ista" (Dnipropetrovsk region), which are leaders in the battery industry.

Since the cluster will be formed in terms of cross-border cooperation, it is objectively logical to attract foreign partners to cooperation. In this case we primarily consider foreign partners among the automotive centers of the Black sea region (particularly Turkey carmakers – Toyota, Ford, Honda, and Russian limited liability company "Taganrog automobile plant" and others) who have experience and possess advanced technologies. It is appropriate to involve the cluster of foreign scientific institutions and Associations of the Black Sea Euroregion for cooperation, mutually beneficial contacts and exchange of experience and technologies.

A significant advantage is the placement of the proposed cluster in terms of cross-border cooperation, because it gives you the opportunity to attract foreign funds. Joining of foreign partners to the cluster will contribute to the emergence of investments from the private and public sectors from abroad; the region is also included in the Black Sea Euroregion, which makes it possible to get the funds of the European Union for relevant development.

The innovative effect of the formation of such a cluster in the region consists of the creation, improvement and industrial production of environmentally friendly and cost-effective innovative green cars. Such production should be aimed at import substitution and the export of finished competitive innovative products and the improvement of the environmental condition and reducing dependence on energy. In addition, is expected the development of the latest green cars infrastructure in the region and the state, which is of course the progressive phenomena, by building a network of charging and maintenance stations for green cars.

The proposed green cars will be in demand among people, especially among the urban population, since as of today the cost of 100 kilometers on innovative green cars is 8 hryvnas, whereas on a traditional car this amount on average is about 120 USD. We should note about necessity of creation of innovative clusters in the domestic production of green cars, because today in the Ukrainian market actively are sold Chinese counterparts – two ecomodels BIO evA-2 and evA-5 (НИСД, 2012).

We pay attention to the importance of equipping of future green cars with domestic motors. Unlike the sample ECOCAR 2010, where we have used the Italian motor, currently there are all necessary preconditions for the respective engine development and their realization on the territory of Ukraine. Organization of domestic innovative production of new generation batteries and other promising power sources for green cars at the enterprises of high-tech engineering is an integral part of creating promising models of green cars, because the cost of a complete set with batteries and resource exploitation determines the basis of the economy of operation of green cars. Therefore, the question of creation of innovative production of traction batteries in the cluster must be solved in conjunction with the organization of industrial production of promising models of green cars.

The formation of an innovative automotive cluster will give the opportunity:

1. to create, including the participation of leading foreign partners, industrial capacity and to organize a modern production ecomobile machinery, spare parts, electric accumulators, etc. In particular, by updating in general and conversion of existing domestic capacities for the production of automotive and other equipment for the production of eco-cars and creation of conditions for effective use of these capacities and their development, and through with the help of foreign partners, new enterprises in the region for the production of ecomobile equipment can be made;

2. to develop advanced models of green cars within the innovation cluster. Bringing innovative institutions and research and educational institutions to create a platform for developing and testing innovative products of the cluster;

3. to organize mass industrial production of green cars, with subsequent increase of production volumes. It is necessary to create conditions for attracting

companies from other industries to the production of construction and engineering maintenance materials and to provide conditions of formation of personnel potential on the enterprises of ecomobile and related industries;

4. to meet domestic demand for modern automotive equipment and ecomobile technique and to provide export markets for products of created and reshaped enterprises of the automotive industry, in particular promoting innovative products at the government policy level;

5. to modernize the infrastructure of the region, including the establishment and construction of charging stations and maintenance of the new cars and their sales. Relevant is the development of leasing, for the implementation of ecomobile technology, including common areas;

6. to create the preconditions for improvement of the ecological situation in the region and the state as a whole, especially in large towns and industrial regions;

7. to increase the level of employment in the region, reduce the unemployment rate, additionally creating new jobs within the cluster. In addition it is necessary to promote at the regional level the development and implementation of training programs for highly qualified personnel for ecomobile industry, production of accumulators and other batteries of eco-cars;

8. to provide the possibilities of scientific sector in the region to implement research and development by upgrading their technological base and the emergence of additional sources of funding.

In general, due to the formation of the proposed innovation cluster is expected acceleration of scientific-technical progress of industry in the region and the country by uniting the interests of government, business and the creative capabilities of scientists of Ukraine and foreign partners.

Conclusions and perspectives for further research. The formation of innovative clusters of the national green cars will give you the opportunity to use and enhance scientific and technical, intellectual potential that will contribute to the development of national industries, reducing their energy intensity. Thus, the development and introduction of innovative manufacturing in Ukraine is quite

promising due to the formation of innovation clusters, in particular in Zaporizhzhia region. Innovation clusters at the expense of commercial and non-commercial cooperation, use of synergies, research and innovation, education, training, and policy support in the automotive industry will increase domestic and international competitiveness of its members, regions and the state as a whole.

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