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## The Development of Education Clusters as a Tool to Enhance Economic Safety

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### Abstract

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The article deals with the research results of education clusters. At present time the subject is especially actual. A cluster is an integration of several homogeneous elements which can be considered as an independent unit with certain properties. The education cluster has the properties of the mutual competition of its members, cooperation of its members, formation of unique competences of the region, concentration of the enterprises and organizations in a certain territory. Thereafter the research results of relationship between educational institutions and manufacturing firms on the example of the Republic of Tatarstan are presented in the article. The research is based on the works of such scholars as M. Porter, M. Enrayt, S. Rosenfeld, V. Price, B. Dalum, K. Pedersen and G. Vilumsen, E. Bergman, E. Fezer and others. There are approaches to the definition of the education cluster, classification of the education clusters, the requirements for the composition and structure of the education clusters, the policy formation of the development of the education clusters in the works of the scholars. The actions to increase the demand for graduates of the educational institutions of the cluster are given. The actions to increase the effectiveness of training programs for staff within the education cluster are given. The actions to improve the interaction between the educational institutions and manufacturing firms in the cluster are given. In conclusion the recommendations concerning further research are formulated.

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**Keywords:** Education cluster, efficiency, economy, innovation.

### 1. Introduction

At present time, economic growth is based on innovation techniques. By-turn innovations are result of intellectual and creative labour of person. Educational and scientific sector become the elements of market economy. Economic safety of person, company, territory too much depends on knowledge and



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skills to apply innovative approaches in the activity. A trainee person is more important, than a trained person is.

Only effective, focused in the future education system, including general, professional, additional education and skills training can prepare such person. The modern concept of education is an education during all life (continuing education).

It is necessary to provide interrelation between education sector and enterprises. It is necessary to train experts who will be demanded by the enterprises. Methods of integration of science, education and production have the high practical importance. The world experience speaks about need to develop education clusters for increase of economic safety of the region.

## **2. Problem statement**

It is necessary to analyze experience of creation of education clusters and to reveal facilities for their development in the Republic of Tatarstan in the conditions of modern innovative economy and problems of increase of economic safety.

## **3. Research questions**

The cluster approach is used for a long time in the Republic of Tatarstan. One of the large-scale projects in this field is the Special economic zone "Alabuga" which is successfully realized now. By results of its work it is necessary to tell, that for effective work of cluster structure it is important to provide development not only the principal activity (production activity) of a cluster, but also to create necessary infrastructure for the decision social (housing, cultural, educational) problems. Ensuring a manufacturing sector with manpower resources with a high level of proficiency is a primary task.

Today training of highly qualified and popular specialists is the major task of the institution of higher education. The main problem consists in lack of the mechanism of determination of quantity and quality parameters training of specialists. There is a "gap" between needs of employers and potential of institution of higher education. There is no list of concrete educational specialties on which preparation has to be conducted, and no labour, qualification requirements to the graduate. It is possible to solve this problem through creation of an education cluster. The cluster has to include schools, educational institutions of primary, secondary, or higher vocational level, and enterprises, being potential employers for graduates. The cluster has to share common interests of employers and students. Education has to provide graduates with such knowledge and skills, which will be demanded in labour market. An employer has to present criteria, which the graduate has to possess to get a job.

## **4. Purpose of the study**

Purpose of the study is to work out indicators, tasks and stages of development of an education cluster for improvement of interaction efficiency of all its participants based on application of new educational technologies in educational process.

## **5. Research methods**

In the article the analysis of educational and economic potential of the Republic of Tatarstan with use of laws of dialectic is carried out. According to the dialectic method of cognition all phenomena and events have to be considered in their development and interrelation. Development of an education cluster has to be coordinated with the overall strategy of social and economic development of the region. (The Strategy of Social and Economic Development of the Republic of Tatarstan till 2030, 2016).

In the research the cluster approach is used. A cluster is integration of several homogeneous elements which can be considered as the independent unit possessing certain properties (Gambu, 1988). The basis of an education cluster is educational institutions and enterprises. At present time enterprises are interested in manpower resources with a high education level (Porter & Kramer, 2006).

Factor analysis consists in showing up of degree (strength) of influence of factors on the resulting effect of activity. Level of innovative development of the enterprises, competitiveness of educational institutions, level of development of social and technical infrastructure and existence of sufficient financial resources of the regional budget are major factors which provide development and high performance of an education cluster (Solvell *et al.*, 2003).

## **6. Findings**

The concept of an education cluster is already realized in the Republic of Tatarstan. For example, the structure of the education cluster of Kazan National Research Technical University named after A.N. Tupolev – Kazan State Technical University (KNRTU-KSTU) at patronage of Government of the Republic of Tatarstan and the public company Tatneftkhiminvestholding includes 11 enterprises of branch (the petrochemical, light, food industry), 6 institutions of secondary vocational level, 4 institutions of primary vocational level and the 236th specialized schools (The passport of the education cluster KNRTU-KSTU, 2016). Certain steps on elimination of "gap" between education (science) and the real sector of economy on the basis of the cluster approach have begun to be undertaken at other universities of the region. So, Kazan (Volga region) Federal University actively masters the budget program of combined researches of the institute of higher education and the enterprise started by the Government of the Russian Federation (Decision No. 218). The university on a competitive basis has got three grants on implementation of combined projects with such powerful corporations as "TNG Group", "Nizhnekamskneftekhim" and Tasma production association for the sum more than 1 billion 150 million rubles. A share of the university is over 570 million rubles (Gafurov, 2016). Creation of a belt of the small-scale innovative enterprises around the university happens in KNRTU- KSTU. At the moment Kazan State Technical University named after A.N.Tupolev have 16 small-scale innovative companies which together with research effort bring to the institute of higher education about 400 million rubles (Rožanova, 2016).

The education cluster can have such tasks as:

– Creation of a medium-term forecasting system of personnel requirements of economy field of the Republic of Tatarstan. It will allow carrying out comprehensive planning of structure and volumes of training;

- Increasing attractiveness of professions and specialties demanded by economy of the Republic of Tatarstan on all education levels;

- Introduction of mechanisms of working out, examination and realization of educational programs of vocational education with direct participation of employers and their associations;

- Introduction of a training system that plans significant increase in practical part of training on workplaces in real economy;

- Modernization of a career development system of the leading and pedagogical employees of vocational education system.

The education cluster can have such target indicators as:

- A share of educational institutions mastering new educational programs;

- A share employed in the economy completed extension courses;

- A share of school leavers who have entered educational institutions of primary, secondary, or higher vocational level;

- A share of students who is studying in educational institutions on the co-financing terms at the expense of the employer;

- A share of leading and pedagogical employees who have undertaken an internship at the enterprises of the leading employer of the chosen field;

- A share of graduates who have been registered on labour exchange within no more than one year after graduating class.

Stages of development of the cluster can be integrated with the following:

*1. Improvement of forecasting personnel requirements of cluster's enterprises, formation and distribution of the state task and order for training.* At the same time it is important to organize monitoring of employers' judgments for presence at school leavers and graduates necessary professional and personal qualities. Monitoring allows defining requirements and expectations of both external and internal consumers of educational services, comparing expectations and testing quality of vocational training. Monitoring allows correcting in time and defining the perspective vectors of social development partnerships, improving the quality of training of specialists of gas industry and satisfying the needs of customers in labour market.

*2. Increase of demand in graduates of the cluster's educational institutions of vocational level in republican labour market.* Performance of this stage will be promoted by the organization of educational activity according to requirements of the international quality management system. It will allow developing and carrying out quickly and effectively systematic correcting actions for improvement of the developing system of social partnership on the basis: continuous access to information on labour market; timely specification of structure of demand for specialists in labour market; requirements accommodation of employers for the content of vocational training of specialists for its timely correction; the effective organization of practical training for students at the enterprises of the industry; quality assessment of training of specialists independent experts, etc.

We consider that advancing training of specialists in the promising direction of development of production has to be organized today. At the enterprises it is expedient to create departments of training of specialists and departments responsible for practical training of students. At the same time joint

research activities and scientific research results with involvement of experts of the enterprises and students have to be carried out. Transfer of skills from specialists of the enterprises for students, creation of education and business training centers, educational science and technology parks, information systems of search, recruit staff is necessary (Vasilev & Akhmetshin, 2014).

*3. Improvement of the territorial-sectoral organization of resources of the system of vocational education system focused on requirements of the leading industries of the Republic of Tatarstan.* Special attention should be paid to the organization of industrial (vocational) practice on the basis of integration of theoretical knowledge and innovative technologies of industries of economy in the production environment. It will allow increasing a motivation level to the chosen profession, correcting and updating the matter of types the practical training and study programs, increasing percentage of the integration into the world of work of graduates at the enterprises of gas industry and providing their career advancement.

It is necessary to introduce programs of further vocational education on the basis of secondary general school in various directions. It is necessary to organize various centers of children's crafts, and to hold public seminars, presentations and master classes. There is the need to create different hobby groups for identification of the preferable directions of students' training.

*4. Raising the effectiveness of implementation of the programs of vocational education focused on requirements of national economy.* It is expedient to organize work of permanent scientific and methodical seminars of the education cluster's subjects that would be sent for harmonization of requirements of the corporate customers to professional knowledge and skills of school leavers and graduates. It is useful to create training programs in the directions of various profiles: as it is natural – scientific and humanitarian. It will promote satisfaction of a wide range of interests of students. To improve the quality of teaching it is necessary to complete faculty only with the qualified employees who are constantly increasing the level of theoretical knowledge and practical skills.

*5. Creation of cluster state and public system of an assessment of quality of vocational education.* Realization of this stage will be promoted by carrying out combined actions and conferences, business meetings, excursions exerting influence on development of mutual cooperation (Akhmetov *et al.*, 2015).

*6. Development of staff resources of vocational education system of the cluster.* Development of sector of further vocational education which includes training of specialists on working specialties with awarding of skill category, on further specialties of vocational education, organization of extension courses and vocational training, probation of teachers at the enterprises is provided.

## **7. Conclusions**

It is expedient to carry out quality problems monitoring of standard legal support of the cluster's activity. This process can include all kinds of activity – investment, educational, scientific, innovative, and social. For example, questions of providing tax benefits for the enterprises which realize innovative projects in the territory of the cluster can be considered. It is necessary to register criteria of such innovative projects in the legislation accurately. It is possible to consider use of the stimulating procedures for the enterprises of the cluster putting investments into the decision of the social,

educational and scientific problems of development of the cluster. After that the exact goals and objectives of the education cluster will be defined. In development of the education cluster the described stages can be corrected and be supplemented. After realization all above-mentioned stages there will be confidence that requirements of the enterprises will be satisfied, and students will study interesting to them subjects and master skills which will be demanded in the labour market.

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