Creating a cluster type partnerships between academics and professionals

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Abstract

In this work the perspectives of interaction between educational institutions and employers in Russian mono-cities is discussed. The possibility of using cluster approach in the development of academic and professional partnership is proved. The design expertise of cluster environment is shown through the example of Arseniev the mono-city of Far Eastern Federal District. The structure of academic and manufacturing cluster is presented, and the mechanism of its subjects' interaction is described.

Keywords: Educational institutions; Employers; Social partnership; Academic and manufacturing cluster

Introduction

In the modern social and cultural environment, the partnership of educational institutions and employers is considered to be an institutional arrangement of competitive human capacity formation and also a necessary institution for improving the quality of education. The modifications of the conditions and content of economic activity that have developed in our country have noted a range of requirements on the part of employers to ensure the quality of graduate training. Problem-solving ability and commitment to an occupational role in an appropriate sphere of science or business are considered to be some of the most important factors when concluding professional contracts. The educational system responds to these requirements with the selective development of intervention mechanisms for educational processes that contribute to the formation of professional self-determination indicators and personal characteristics [1]. Strategic cooperation is extensively implemented via rather local academic and manufacturing branches of “university-enterprise”. However, it is important to note that in the Russian Federation, there are territorial units for which the problems of the extension of entities' interactions and the identification of the statuses and functionalities of concerned parties are actualized. These territorial units refer to Russian towns (mono-cities) in which there are generally one or several core companies and a chain of educational institutions related to middle, middle-professional and high levels.
of qualification. According to the latest sociological studies [7,8], in most mono-cities, modern enterprises are experiencing staff scarcity not only in terms of top-level professionals but also in terms of blue-collar workers and middle-ranking specialists at the staff level. It is quite clear that the effective and dynamic development of such mono-cities requires the organization of a unified academic structure that is focused only on satisfying the staff needs of the current business entity.

It appears that one of the prospective approaches to solving this problem is the organization of strategic partnerships between employers and educational institutions that are organized in terms of cluster type. The cluster approach represents one of the directions of system concepts for solving problems concerning competitive regional growth, and this approach was initiated by Mr. Porter, a professor of the Harvard Business School [9].

In regional development, extra attention has recently been given to an approach based on clusters in Russia [2]. The principles of the organization and development of clusters are listed in the concept of cluster-based policy in Russia, which was adopted by the government in 2008. The application of the cluster approach as a strategy for social and economic development has assumed a leading role in a number of Russian regions. The occurrence and necessity of the formation of cluster-based educational milieus in Russian mono-cities is determined by the following factors:

➢ all parties of a strategic partnership are geographically isolated; in other words, current developments in education, production and information infrastructure are provided;
➢ all contributors adjust with a multilevel training system for specialists with the required qualifications;
➢ the enterprises and educational institutions are integrated into clusters in the mono-cities in a manner that is beneficial to cooperation in terms of the product's competitive growth, cost reduction and, most importantly, the training of qualified specialists who are suitable for the specific nature of the cluster.

This paper describes the experience of organizing an academic and manufacturing cluster-based environment in Arseniev, a city in the Far Eastern Federal district. The structure of the academic and manufacturing cluster is presented, and the mechanisms of the interactions of all of the cluster parties are outlined.

Brief description of the mono-city of Arseniyev

The population of Arseniev city is small, approximately 60 thousand people; thus, this city is socially positioned as a small town in Russia. However, its strategic importance goes far beyond the Far East region. This importance depends first on the presence of the two fastest growing economic entities that specialize in engineering, that is, the JSC Arseniev Aviation Company “Progress” and the JSC “Askold”. The products of these companies are highly valued in our country and abroad. In this regard, the city is in a favourable demographic situation (which is generally not the case for typical small towns in Russia); consequently, this town has its own personal capacities for core enterprises. Approximately 20% of the population is composed of young people of 20 years or younger.

The territorial entity called Arseniev received a boost to its development in the early 40s during the Great Patriotic War when there was a need for strategic defence enterprises that were geographically distant from the western borders of the Soviet Union. Almost simultaneously two engineering businesses were founded, the “Progress” and “Askold” factories, and contributed to a sharp increase in the population primarily because of the well-organized relocation of highly skilled professionals from the western regions of the country. At the same time, these businesses opened a vocational school for the operational training of workers from the local population for specific positions. After the war, the plants did not stop their activities, and most of the new specialists stayed in the city, which consequently initiated the development of a network of educational institutions beginning from pre-school. In 1952, Arseniev was granted the status of a city with priority development due to the specific features of the business production entities [10]. By the early 1990s, Arseniev city was among the most successfully developing small towns of the Far Eastern region. However, the sharp economic downturn that occurred in the post-Soviet era affected this city particularly harshly. The conversion of defence enterprises caused by a decrease in government contracts launched a huge outflow of highly qualified specialists into the neighbouring and western regions of Russia, where plants with a certain profile were functioning. The situation worsened due to the outflow of young people from the neighbouring large cities Khabarovsk
and Vladivostok and resulted in a demographic decline. The city appeared to be on the brink of extinction. At this time, a very risky (but ultimately very wise) decision was made to establish a branch of the Far Eastern State Technical University in Arsenyev with the plan of training its own highly qualified specialists in economic and engineering faculties.

Currently, this educational institution is a branch of the Far Eastern Federal University (FEFU). The presence of an institution of higher education and the gradually improving economic situation of the business units of the city were due to growing industrial orders an identified need for the full coordination of actions to launch a multilevel system of training. Moreover, it was quite obvious that members of such cooperation educational structures from different levels of training should be involved to strategically cooperate with one another.

The study of the domestic and foreign experiences of strategic partnerships between employers and educational institutions in small territorial units [4,5] conducted by the authors and associated sociological and job analyses determined the shape of the following partnership, i.e., the organization of the academic and manufacturing cluster [6]. It is commonly known that each cluster member can function separately, but effective interactions occur when the conditions of educational and productive partnership are met by the achievement of the common goal of improving the efficiency of the education system. Thus, the cluster-type educational environment in a single-industry town is an effective tool for ensuring the preparation of highly skilled professionals who are focused primarily on the customer and the needs of the labour market of the city.

Design strategy for the educational and working environments of the cluster type

The main subjects of the educational environment of the city cluster are employers, educational institutions and the bodies of the state and municipal administration that provide the legal frameworks for educational, personnel and industrial policies in the city. For clear definitions of the statuses and authorities of all of the stakeholders and mechanisms of their interactions, the projected cluster was nominally divided into the following three domains: the domain of “the buyer of education services”; the employers; domain or “the provider of education services”, that is, the educational institutions of the city; and the domain—compiler, that is, the educational processes that provide high-quality training for required qualifications.

The first domain was formed as a training and production centre based on the JSC “Progress”, which consists of three sections: forecasting, experts, and production and training. The centre includes representatives of the two major economic entities of the city and only 15 people. The main activities of the centre are as follows:

➢ determination of the size and structure of the required human resource capacities based on analyses of the current and future production volumes;
➢ delegation of the authority to participate in the formation of the second domain of the educational cluster;
➢ development of the categories and structure of the professional competencies required of adequately trained specialists;
➢ organization of the industrial areas that provide career guidance, training and production activities with all of the potential members of the educational environment.

The second domain of the cluster is the main supplier of the labour resources required by the employers. The core of this domain is a branch of Far Eastern Federal University in Arsenyev city that trains specialists of the highest category in the three educational areas that meet the customer’s requirements, that is, aircraft and helicopter construction, the software design and engineering, and the economy. Simultaneously, predictive examinations conducted by representatives of the customer allow for the establishment of the need of the labour market of the city for highly skilled specialist workers, such as riveters of the 4th category, turners and millers of the 5th and 7th categories, and operators of CNC machines. The training of such specialists is traditionally performed in vocational school № 32 and in the college of the FEFU branch, and these two educational institutions were also included in the educational-industrial cluster.

Solving the problem of labour market saturation with specialists is impossible without systematically organized career guidance to identify preferences regarding future professional lives. It is obvious that this human resource work must be initiated in school and begin from an average level of general education. Therefore, a competition among the 9 municipal educational institutions for the right to conduct joint educational and career-oriented activities with the customers of the educational services and educational
institutions of higher-level training was held in the city. The contest was organized by the bodies of the state and municipal governments. Consequently, four schools that “closed’’ all possible levels of interaction between the suppliers and customers of the educational services were selected.

It is clear that the educational processes in all of the structural elements of this domain were performed under the relevant state standards. Moreover, for their effective interaction in a clustered environment in the traditional practice, a number of organizational, structural, scientific-methodical and professional activities were introduced to ensure the compliance of all of the parties involved in the strategic partnership across the levels of pre-service, secondary, tertiary, and post-professional training. The contents of these innovations are presented in the third domain of educational environment cluster.

For students in grades 10–11 of general education schools to gain deeper knowledge of physics (particularly of some of the mechanics) and chemistry, as well as for vocational guidance purposes, practical exercise are held at the training centre of the JSC plant “Progress”. In the laboratory, a FEFU materials science course is held for the same students who study in the applied program series of master classes for metallographic analysis; this course represents one of the methods for improving quality and reliability of the production of helicopter parts.

The University conducts systematic work with students through the system of pre-university training in the following core subjects: mathematics, physics, and the Russian language. Undergraduates majoring in Engineering Technology receive optional lessons of plotting school. Companies provide a working platform for practical and laboratory classes, internships, and field trips for the college, university and vocational school students.

Teachers in the branches, colleges and high schools cooperate closer with the enterprises and complete internships when required. Schoolteachers have the opportunity to undergo training courses at the university. In turn, the representatives of the plants function as teachers of special subjects and also as members of the certification and examination committees for the state protection of the final qualified student works. The training division of the cluster production centre is responsible for the quality of the preparation of the students who are enrolled in the target direction of the company. The proximity of the training centre to the University College allows for tracking student learning. When the students achieve satisfactory marks at the end of the session, the contract can be unilaterally terminated.

In the educational institutions of the city that are included in cluster, 86% of the students in 10th–11th grades receive specialized education, and more than half of the students prefer technical directions that meet the needs of the labour market of the urban district. To enable a responsible choice regarding an individual’s developmental trajectory and the expansion of social partnerships based on the school component, the hours for the elective courses are allocated, and 15 elective courses have already been sold. One-hundred per cent of the students in the ninth grade have completed pre-profile training. As part of the additional education focused toward the JSC “Progress”, a technical class that included 129 students from the 9th to 11th grades was established. The training is conducted in three areas: turnery, turner, and miller. At the end of grade 11, 83 (64%) high school students received a certificate for their first profession. Additionally, specialized practices were organized and conducted with the following social partners: the JSC “Progress” Department of Automated Control Systems, Lyceum number 9; and the JSC “Askold” lab, school number 4.

In recent years, the schools of the city have hosted an annual “Steps to Success” conference that presents the students' research in a variety of scientific branches. The winners of the conference are invited to a higher scientific level, that is, the student “Youth of the XXI century” conference, which takes place at the base of the enterprise JSC “Progress”. At this point, the scientific and professional partnership has involved college students from a branch of the Far Eastern Federal University and the young company's employees and teachers. Organizers and direct participants are the two main bodies of the student government, the Student Scientific Society and Student Design and Technology Bureau. As independent experts, they are the heads of the departments of machine-building, enterprises and faculty. Many students and teachers are members of the Engineering Union and display the results of the scientific and technological work during helicopter industry exhibitions.

Thus, all of the mechanisms of interaction between the actors in the cluster function not only for the professional development of teaching staff but also for the efficient educational training of future specialists. Operative networking, that is, the coordination of all parts within the cluster of the educational environment, is achieved through the information block (portal). This information block provides information about
vacancies in enterprises, joint activities and results to promote the advancement of educational technologies and achievements.

Conclusion

This article described an experience of social partnership between employers and educational institutions in an example production and education cluster that operates in Arsenyev in the Far Eastern Federal District.

At the heart of the development of the learning environment of this cluster type is the principle of proximity, which determines the efficiency of the interaction. The proximity of the participants allows for the creation of a single information space for professional communication, dissemination of knowledge, and exchange of new technologies and innovative products. The utilization of this principle logically leads to mutually beneficial cooperation in the implementation of joint projects that strengthen the position of each unit of the cluster not only in terms of the labour market but also in the market for the products.

According to the proposed scheme, in the organization of a social partnership between employers and educational institutions, all participants control the multi-level system of specialist training. The employer determines what to teach, where to teach it, and how to teach it, but vocational education is considered to be a process that is based on the integration of education with production. Thereby, the time spent on the training of high quality specialists and the duration of their professional adaptation are reduced.

The uniqueness of the cluster approach is that the future specialist is immersed in the “professional environment” from an early age and gradually acquires common practice and professional knowledge, which allows future specialists to better obtain knowledge of the production process and significantly shortens the period of entry into the profession. Trained professionals not only meet the needs for labour personnel of the enterprises of the city but also experience rapid promotion and become business leaders. Currently, the numbers of graduates working in some positions are as follows: in main metrology, there is 1 deputy chief designer, 2 deputy chief engineers, 12 work managers and 12 deputys; 13 people are heads of departments or their deputys; 35 people are heads of bureaus; 34 are engineers; and 7 are section engineers [3]. The average age of the employees has decreased from 55 years to 45 years. The number of pensioners in the structure of the staff has decreased significantly, but the number of young professionals below the age of 30 years has increased.

References