

Formation and Development of the Training System for Innovative Development of Regional Industry

*Olga Kuznetsova*¹, *Svetlana Kuznetsova*¹, *Egor Yumaev*¹, *Vladimir Kuznetsov*^{1,*} and *Olga Galtseva*²

¹Omsk State Technic University, 644050, Omsk, Russia

²Tomsk Polytechnic University, 634050, Tomsk, Russia

Abstract. The paper determines tendencies of modern economy development. The key role in the expanded reproduction of innovation processes in the regions in modern conditions belongs to the enhancement of human capital. Regions are actively increasing their efforts in creating innovative infrastructure, knowledge-intensive industries, while success of regional development is directly related to the effectiveness and cohesion of all innovation infrastructure elements. An indispensable condition for the successful development of innovative infrastructure and high-tech industries is the region economy saturation with highly qualified personnel, particularly mining, trained in view of the projected trends of innovative development.

1 Introduction

Innovation economy requires transformation of intelligence, the creative human potential into the most important factor in the economic growth of regions and national competitiveness. The production of new ideas, technologies, and social innovation becomes a source of high income.

To improve the modern economy efficiency and competitiveness requires "innovative person" – a citizen having a high degree of adaptability to the constant changes in his own life, economic development, the development of science and technology, he is an active initiator and producer of these changes, considering the constant development as an integral part of his life principles. The regional economy has no such businesses and organizations that would not benefit from innovation and innovation can be both as technical as human relationships involved into the provision of services in the service organizations [1]. The staff of the organization is in constant search for innovations, and it is characterized with positive attitude aimed at improving and achieving more and more ambitious goals [2]. To do this, a culture of innovation in the organization should be cultivated [3]. Current trends of modern foreign researches are the employee psychological types, as a reserve of organization innovative activity increase [4].

*Corresponding author: mivladirvbk@rambler.ru

Modern high-tech enterprises impose more and more new requirements to their employees [5], therefore, to ensure the regional economy innovative productions with necessary staff and graduates with interesting, well-paid work, learning environment must quickly adapt to new conditions.

An organization or enterprise that wishes to maintain a stable position in the market must innovate constantly, not episodically, and it requires continuous training of employees [6]. However, in our opinion, from the regional economy perspective it is a mistake to talk about lifelong learning only for adult employees. Continuous education should begin in kindergartens, teaching to think creatively and continuously seek effective solutions to non-standard tasks from an early age. Creativity of any enterprise is formed from the union of the employees' creative abilities [7]; therefore, the higher the share of innovation-minded people will be in the region, the higher the stability of the economy will be characterized as a whole.

Modern science affirms the idea that the main task of the higher education systems must be not just to train highly qualified specialists, but production of creative highly qualified professionals, in particular, for the mining industry, and they would feel more confident in the "creative industries" [8]. It affirms the increasing role of regional educational systems in the education of professionals with competencies that will be needed in future [9].

Thus, it is necessary to intensify the search for effective modernization of regional educational environment, and not only the higher education system, but the entire system of education and training, starting from kindergartens and finishing with higher education.

2 Analysis

The European Union countries made great efforts to modernize the educational environment, to increase labor mobility, to train sought-after specialists, to reduce tensions on the labor market in recent years.

Among the leading countries of the world economy, the experience of France should be noted where the number of employees engaged in science as from educational institutions as from industrial enterprises is steadily increasing in recent years. Cooperation between educational institutions and production facilities expands, more and more new forms of cooperation of academic science and practice are being introduced. In fact, France generated environment where there are no any boundaries between academia and industry.

The achievements made were possible largely due to significant state expenditure on scientific researches; in 2013 they reached almost 50 billion Euros. However, it is impossible to work only with investment funds, so the approach to the formation and development of the training system for innovative development of regional economies is necessary [10].

In Russia, the events aimed at accelerating the development of innovative industries are in all regions of the country. However, the limiting factor is the lack of qualified specialists for modern innovation-oriented industry. The most important problem is the issue of implementation of mass retraining programs that will allow employees of enterprises of any form to obtain new spheres of competence. [11]. The proposed measure is correct, but only at the expense of retraining programs, neither in Russia nor in other countries of the world the labor market saturation problem with sought-after specialists in the innovation productions, is resolved.

The development of modern regions takes place under conditions of competition growth for resources, including highly qualified specialists. Knowledge-based industry presents regional demand in the field of management, commercialization, protection and intellectual property protection, as well as innovators, inventors and other professionals. The idea of innovative development should be widely promoted, including through various

international forums and conferences in the field of innovation. In the developed regions business incubators, techno parks, intercollegiate innovative business incubators become commonplace. Techno parks activities are aimed at the return of the engineering profession prestige, the formation of children and adolescents' professional competence and practical skills in the highly technical special fields: robotics, mechanics, electronics, automation, computer, printing and telecommunications sectors, economy. However, it is not enough to construct a building, the space is to be filled with real interaction, to attract innovators, and the economic results of their interaction will exceed investments in the construction of these buildings.

3 Results and Discussion

In the most diverse regions of the world in connection with the development of industry 4.0 it is required to step up the training of qualified personnel for the innovative development of the economy [12; 13]. In the course of study the weaknesses of qualified personnel training for the innovative development of regions were determined and proposals for solving problems were made.

1. Lack of coherent, formed region policy in the innovation sphere: it is necessary to conduct deliberate policy in the region in the field of innovation, promotion of innovative ideas development.

2. Undeveloped training system for innovation development of economy on the principle of continuous education: the creation of continuing professional education in the sphere of innovations "Kindergarten-School-University-Enterprise".

3. Inefficient use of foreign experience of training for the innovation development of economy: the decision is to promote international exchange and training of teachers in the field of innovation development in Europe, USA, Canada, Japan and other prosperous countries, with a view to practical application of positive foreign experience in the formation and development of the training system for the innovative development of the region's economy.

4. Low level of patent culture: it is required to adopt a program of development of patent culture in enterprises and society as a whole.

5. Inadequate integration of education, science and business: the problem can be solved through the development of effective integration ties of education, science and industry.

6. The presence of a language barrier: it is expedient to expand foreign language training system.

7 The problem of "innovative person "formation: carrying out purposeful work on formation in the period of study personal and professional skills needed to work in the sphere of innovations

While developing international exchange and training in innovation sphere, particular attention should be paid to the participation of students and teachers of higher educational institutions –the experience of foreign teaching should be not only shared , but also it should be acquainted in practice with the principles of conduct of innovation business in the advanced countries of the world that have achieved significant success in the formation of innovative industry and industry 4.0.

The links between education, science and business are essential for the commercialization of intellectual sphere objects. The practical orientation of specialists in the intellectual sphere training is equally important.

The economy and education depend on each other: education institutions train new qualified specialists for the innovative development of the economy, and the task of the regional authorities is to create conditions for the development of innovative industries, so that trained professionals would be in demand.

Higher education institutions have a special innovative mission - Universities are at the heart of technological transformation, activation of innovative activity in the economy without their participation is not productive [14]. A significant effect is obtained due to the introduction the specialty "Intellectual Property" in the largest research universities. The demand for specialists in the innovative development of regional economy increasingly manifests itself.

The area of professional activity of the graduate who has mastered the specialty "Intellectual Property" includes the creation of intellectual property; legal protection of intellectual property; control the results of creative activity; social and psychological support for innovation; study of social needs and the importance of intellectual property rights and socio-economic consequences of their use.

Objects of professional activity are the regional and local authorities whose activities are linked to the development of innovation; firms of patent attorneys; organizations of all forms of ownership associated with the creation and use of results of creative activity; societies for the collective management of rights; societies of appraisers; consulting companies.

Implementation of the basic educational program of the specialty must be provided with highly qualified scientific and pedagogical staff and teachers with practical experience of creation and development of innovative industries. Much attention should be paid to the use of distance education technologies. It is important for the project launching to have the support of regional and local authorities.

One obstacle in the training of qualified personnel for the innovative development of regional economy is the lack of continuing education coverage. The rate of emergence of new knowledge and technology has accelerated dramatically in the last decade [15;16], so apart from the systematic training and retraining the enterprises and organizations employees will lose the ability to generate innovations.

Continuing education, aimed at training the "creative person" must be effectively organized in all components of the system "Kindergarten-School-University-Enterprise". This is the key condition for progress and innovation-based economy, creating new high-tech industrial enterprises. The development of new, modern programs together with leading foreign educational institutions is of great interest.

At the stage of learning in kindergartens the purpose is to familiarize children with the basic terms of the innovation sphere in the process of immersion in fairy tales. At school students learn knowledge about inventions and innovations, master methods of obtaining new knowledge.

When organizing the work with schoolchildren authorities should promote the policy of popularization of the most promising areas of economic development in the long term. The requirement today is to ensure equal access to quality education for all students regardless of where they live and the level of material security. The main role is given to distance education technologies and the creation of a unified system of students online-learning in the region. In small towns and rural districts a resource center should be created on the basis of school for the implementation of one or more specialized areas (Physics and Mathematics, Philology, Chemical, etc). If the school education is implemented with the help of distance learning technologies, the training of students in remote areas to contests, competitions, and exams will be improved significantly. The development of distance learning technologies and change of thinking of authorities and high school teachers, whose participation is required for the creation of online education system, will allow all children from remote areas to gain knowledge at the level of the leading schools in large cities. It will eliminate the shortcomings of education in areas far from major cities, and it significantly enhances the potential of future skilled workers.

In future, it is necessary to secure and expand the activities of regional innovative infrastructure objects to work with schoolchildren and students. In large cities, specialized centers should be established where schoolchildren and students are helped to develop skills to create their own high-tech productions.

The accumulated positive experience of the past is to be accumulated with modern technologies. Foreign studies show that the online (e-learning) latest technology and mobile (m-learning) training can improve young people's interest in conducting research, stimulate the creative activity [17].

4 Conclusions

Thus, in regions a deliberate policy is to be carry out to develop children and young people skills of scientific research and new knowledge generation, as well as the ability to put into practice their own projects, to create small innovative enterprises to communicate effectively in a team of innovators. In recent years, many regions around the world spend a lot of preparatory work, there are positive results, and they set the stage for accelerating the development of innovative economy. In the course of study the recommendations were made and they will enhance the ability of the staff training system for the innovative development of industry in the region, also they will enhance the creation and development of new science-intensive industries, and in the end they will lead to the creation of highly-paid jobs and increase the share of high technology products in the gross regional product and increase of economic competitiveness of the region as a whole.

References

1. R.L. Dhar, *Tourism Management* **57**, 139 (2016)
2. H.-T. Chang et al, *Personality and Individual Differences* **96**, 260 (2016)
3. M. Ali, K. Park, *Journal of Business Research* **69**, 1669 (2016)
4. B.Wisse, D.Barelds, E.Rietzschel, *Personality and Individual Differences* **82**,158 (2015)
5. K. Charmondusit, S. Gheewala, T. Mungcharoen, *Journal of Cleaner Production* **134(B)**, 443 (2016)
6. D. Suarez, *Research Policy* **43**, 726 (2014)
7. Y.-S.Chang, K.-C. Yu, *Computers in Human Behavior*. **49**, 38 (2015)
8. N.Yachina, G.Fahrutdinova, *Procedia - Social and Behavioral Sciences* **177**, 213 (2015)
9. K. Hartley, J. Plucker, H. Long, *Thinking Skills and Creativity* **22**, 142 (2016)
10. V.Chassagnon, N. Haned, *Technological Forecasting and Social Change* **91**, 194 (2015)
11. J. Yeleneva et al, *Procedia - Social and Behavioral Sciences* **214**, 779 (2015)
12. A. Trappey et al, *Advanced Engineering Informatics* (2016)
13. Th.D. Oesterreich, F. Teuteberg, *Computers in Industry* **83**, 121 (2016)
14. E. Shutenko, A. Shutenko, *Procedia–Social and Behavioral Sciences* **214**, 332 (2015)
15. L. Huo, N. Song, *Physica A: Statistical Mechanics and its Applications* **461**, 73 (2016)
16. J. Stoutenborough, A. Vedlitz, *Energy Policy* **96**, 206 (2016)
17. Y.-S. Chang et al, *Computers in Human Behavior* **63**, 988 (2016)