

**THE ANALYSIS OF SYSTEM OF TRAINING OF QUALIFIED SPECIALISTS AND DIRECTIONS OF ITS IMPROVEMENT FOR PROVIDING THE INNOVATIVE DEVELOPMENT OF KRASNOYARSK REGION**

*In the article analysis of the professional-qualified structure and the market of educational services is given. The perspective directions of the training of qualified specialists for the innovative development of Krasnoyarsk region are defined.*

*Keywords: qualified specialists, educational system, educational institutions, demand.*

The needs of the economy of Krasnoyarsk region in high qualified specialists is determined by perspectives of the innovative development of the main branches of specialization, realization of investment projects, exploiting considerable natural resources of northern and eastern areas. The necessity of innovative development of regional economy influences modification of the structure of training of specialists on all levels of education. In present time in Krasnoyarsk region there is a problem of elaborating effective regional policy based on estimation of the situation on the labour market and improving the mechanism of training specialists in order to balance demand and supply of skilled workers.

For estimation possibility to satisfy the demand of the economy of Krasnoyarsk region in qualified specialists it is necessary to analyse the professional-qualified structure of employment and define professional characteristics of future specialists.

The professional-qualified structure of population of Krasnoyarsk region has changed with development of market relations (tab. 1).

So in the early 1990's in the structure of population 52,9 % people had elementary vocation and secondary general education. The majority was low-skilled workers. During considered period the share of workers reduced from 56,5 % in 1989 to 50,4 % in 2006. Also the share of high-skilled and skilled workers fell from 39,5 % in 1989 to 32,6 % in 2006. That situation was caused by changing activity of many industrial enterprises, reducing industrial production, liquidating large industrial enterprises.

In employment structure the share of specialists has risen. The number of people who have higher education increased from 12,6 % in 1989 to 22,4 % in 2006. The share of people with secondary vocational education fell. The increasing of the share of people who have higher education may be caused by rising demand for new «market professions». The needs in high-qualified specialists are increasing mainly in sphere of services; trade, insurance, bank sphere,

management and government. But in industry the low-skilled toil is kept.

As the analysis of employment demonstrates, there is the highest level of employment among population with higher education and the lowest level of employment among people without special education.

The training of qualified specialists in Krasnoyarsk region is determined by the level of development of educational system.

The educational system in Krasnoyarsk region is represented by great number of educational institutions (tab. 2).

The system of training specialists is considered as balanced if the number of institutions of secondary and elementary vocational education exceeds the number of higher educational establishments in 6–7 times. In Krasnoyarsk region this exceeding is more then 10 times. This fact testifies that it is necessary to reform the system of education.

In spite of great number of institutions of secondary and elementary vocational education the majority of students study in higher educational establishments (tab. 3).

The increasing quantity of students of higher educational establishments is not only regional, but also Russian and world tendency [1]. However, in Krasnoyarsk region this process has accelerated rate. So in 2000 the number of students in Krasnoyarsk region was 198 on a thousand of population, in 2006 that number was 203.

The quantity of students of higher educational institutions in Krasnoyarsk region is considerably lower than such index in high developed educational centers as Moscow, Tomsk, Novosibirsk. The level of Krasnoyarsk region is lower then Russian level. By 2006 this gap had increased. This situation may have negative consequences for future economic development of Krasnoyarsk region and result in deficit of high-qualified specialists.

The question of financing educational system is very important for analysis of the educational services market of

Table 1

**The distribution of number of population of Krasnoyarsk region on level of education, %**

№	Population	1989	2002	2006
1	The quantity of population including:	100	100	100
2	higher education	12,6	21,0	22,4
3	not graduated higher education	1,5	3,0	2,0
4	secondary vocational education	33,0	35,4	25,3
5	elementary vocation education	14,6	14,2	15,6
6	secondary general education	22,3	17,6	25,8
7	basic general education	14,8	7,8	8,5
8	elementary education, without education	1,2	1,0	0,5

Krasnoyarsk region. Increasing contradiction between requirement in qualified specialists and impossibility of qualitative training of specialists has following results:

1. The young people leave Krasnoyarsk region in order to get more qualitative education in other regions and in other countries.

2. The enterprises have deficiency of qualified specialists, that results in unreasonable economic loss.

3. The educational institutions are forced to open new «fashionable» specialities, which are not always in demand on regional market, increase payment for education.

4. The majority of educational institutions «washes out» their specialization, extending range of specialities, and so don't guarantee proper level of education.

Analysing the educational system of Krasnoyarsk region, it is very important to estimate professional-qualified characteristics of professional education. It is necessary to define the number of specialists trained in educational institutions on consolidated groups of specialities: industry and building, agriculture, transport and communication, economics and law, public health, education, culture and art. The distribution of students of higher education institutions into groups of specialities is given in tab. 4.

The analysis of the distribution of students of higher education institutions demonstrates that number of students trained for industry and building in Krasnoyarsk region has fallen essentially. This is conditioned by changing

specialization of regional economy and decreasing its industrialization. The low demand for qualified specialists in industry has resulted in fall of the share of training specialists on 6,6 % during considered period.

Considerably decreasing number of students of education speciality is observed. On the one hand, it can be explained by falling demand for teachers because of decreasing quantity of children, on other hand, the institutions of secondary vocational education are competitors with higher educational establishments in training of qualified teachers.

In the distribution of students of higher educational establishments in Krasnoyarsk region on groups of specialties the share of students of economics and law speciality is increasing. The development of market relations has determined high demand for economists and lawyers of different specialization. Although many higher education establishments have opened economic law faculties, the demand for these specialists remains high. To speak about any surplus of these specialists is premature.

The number of specialties for agriculture and public health has remained the same for long time. This number is determined by not only demand for these specialists, but also possibility of narrow-specialized higher education establishments.

The share of students of transport and communication speciality has increased. The demand for specialists in sphere of culture and art remains low.

*Table 2*

**The number of educational institutions**

№	Educational institutions	2000	2001	2002	2003	2004	2005	2006
1	Higher educational establishments	14	13	14	14	14	14	14
2	Institutions of secondary vocational education	66	66	66	65	66	64	62
3	Institutions of elementary vocation education	89	91	92	93	93	92	89

*Table 3*

**The quantity of students in educational institutions of Krasnoyarsk region (thousand people)**

№	Educational institutions	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
1	Higher educational establishments	94,4	105,1	114,5	118,2	119,7	120,1	118,9
2	Institutions of secondary vocational education	59,2	62,2	62,1	62,1	62,1	61,5	58,8
3	Institutions of elementary vocation education	34,8	34,4	36,2	36,8	36,6	24,7	32,4

*Table 4*

**The distribution of students of higher educational establishments in Krasnoyarsk region on groups of specialties, %**

Year	Number of students, in total	Including						
		Industry and building	Agriculture	Transport and communication	Economics and law	Public health	Education	Culture and art
2001	100	53,6	12,0	–	7,0	3,0	23,6	0,8
2002	100	52,3	13,0	0,5	8,0	3,0	22,4	0,8
2003	100	48,6	12,0	1,6	12,5	3,0	21,3	1,0
2004	100	47,2	13,0	1,8	13,0	3,0	21,0	1,0
2005	100	47,6	12,5	2,2	12,0	3,0	21,7	1,0
2006	100	47,0	12,5	2,2	13,1	3,0	21,6	0,6

The distribution of students of institutions of secondary vocational education on groups of specialties differs from the distribution of students of higher education establishments. This difference is caused by following factors:

1. Training specialists in institutions of secondary vocational education is more oriented on industrial sector of economy.

2. The institutions of secondary vocational education in Krasnoyarsk region was founded for training specialists in accordance with needs and perspectives of development of industry of Krasnoyarsk region.

The distribution of students of institutions of secondary vocational education on groups of specialties is given in tab. 5.

As the analysis of the distribution of students of institutions of secondary vocational education demonstrates, the main part of students is oriented on industrial sector of economy. So in 2006 the share of students of industry and building, agriculture, transport and communication specialties was 87 % (in higher educational establishments the share of students of these specialties was 61,7 %).

However, the process of training specialists in institutions of secondary vocational education has such tendencies as process of training specialists in higher education establishments:

1. In connection with increasing demand of industrial enterprises the share of students of these specialties is falling. This tendency is typical for transport and communication specialties.

2. The share of students of economics and law specialties is increasing. Demand for these specialists determined the number of students of these specialties.

3. The number of students of pedagogical college is decreasing. This situation is caused by demographic processes, which have resulted in reducing quantity of children and decreasing demand for teachers.

The analysis of graduates on specialties gives possibility to estimate potential inflow of qualified specialists in branches of regional economy (tab. 6).

As the analysis of graduates of higher education establishments demonstrates, in Krasnoyarsk region in present time qualified specialists are primarily trained for industrial needs. Humanitarian specialties, as economics and law, public health, education, culture and art, is less then 50 % from total number of graduates. While in developed educational centers and in Russia on the average graduates of humanitarian specialties is 61 %.

However, in Krasnoyarsk region the tendency of increasing specialists of humanitarian specialties is observed. So in 2000 the share of graduates for industrial sector of economy was 60,7 %, in 2006 this share was 59,1 % from total number of graduates. The number of graduates of economics and law specialties is increasing. The number of graduates for agriculture is increasing too. This is result of reviving agriculture in Krasnoyarsk region, which determined the demand for these specialties. The high share of graduates for industrial needs is provided by building branch. The intensive development of this branch determines the high demand for specialists of building specialties.

The prognosis of graduates of higher education establishments for economy of Krasnoyarsk region is made on basis of following suppositions:

1. For prognosticated period the innovative character of economic development of Krasnoyarsk region will determine high demand for specialists with higher education.

2. The part of state financing will decrease on the average on 6 % a year and by 2025 it will have been 47, 8 % from total number of students.

3. The state financing of training qualified specialists will be within the framework of filling state order.

The prognosis of needs of economy of Krasnoyarsk region is made taking into consideration the policy of perspective economic development of the region [2].

Table 5

**The distribution of students of institutions of secondary vocational education of Krasnoyarsk region on groups of specialties, %**

Year	Number of students, in total	Including						
		Industry and building	Agriculture	Transport and communication	Economics and law	Public health	Education	Culture and art
2001	100	46,3	12,2	11,6	11,0	9,4	7,0	2,5
2002	100	47,0	12,2	11,0	11,6	8,8	6,9	2,5
2003	100	47,0	12,8	9,4	12,0	9,0	7,4	2,4
2004	100	46,5	12,9	9,3	12,0	8,9	7,9	2,5
2005	100	45,0	12,9	9,7	12,4	8,9	8,6	2,5
2006	100	44,6	12,8	9,6	12,2	10,0	6,5	4,3

Table 6

**The graduates of higher educational establishments on specialties, %**

Year	Number of students, in total	Including						
		Industry and building	Agriculture	Transport and communication	Economics and law	Public health	Education	Culture and art
2000	100	50,4	10,3	–	7,7	3,4	27,4	0,8
2001	100	51,1	11,5	–	6,8	3,8	26,0	0,8
2002	100	47,0	12,0	0,6	11,3	2,6	25,8	0,7
2003	100	44,7	13,3	0,6	15,1	2,3	23,2	0,8
2004	100	42,5	14,0	0,5	16,6	2,5	22,8	1,1
2005	100	41,3	17,3	0,5	14,0	2,9	23,1	0,9

The calculation of number of students was made on group of specialties [3].

The prognosis of graduates of higher education establishments on group of specialties is given in tab. 7, 8.

To satisfy the needs of the economy of Krasnoyarsk region in high qualified specialists it is necessary to change the structure of training. The share of graduates for industry will decrease. This tendency will be caused by modernization and change of specialization of some large enterprises of Krasnoyarsk region. Graduates of traditional professions must provide only replacement of leaving qualified specialists of industrial enterprises.

In connection with perspective development of agriculture in Krasnoyarsk region the number of graduates for this branch will increase. The number of graduates for transport and communication will increase too. This will be caused by developing transport infrastructure. The tendency of increasing number of graduates of economics and law specialties will remain until 2015. The number of graduates for public health, culture and art will be stable.

As a result of our investigations the following directions of improving educational system have been offered:

1. The demand for qualified specialists will increase in branches orientated on innovative development, as building, transport and communication, agriculture and sphere of services. This is conditioned by necessity of changing technology of production. It is supposed that using new technology will result in ousting toil. In estimation of researchers the toil in building is 50–70 %, the toil in agriculture is 70–80 % of total expenses of labour. Using new technology and qualified labour will improve quality of produced goods and services.

2. The investigating market of educational services in Krasnoyarsk region demonstrated that the demand for qualified specialists may be satisfied by local educational institutions, which can quickly respond to changing demand of employers.

3. It is necessary to reduce the number of institutions of secondary and elementary vocational education and make the correlation between number of higher education establishments and number of institutions of secondary and elementary vocational education as 1:7 (in present time this is 1:11) for conformity in training qualified workers and specialists with higher education.

4. To satisfy the needs of economy of Krasnoyarsk region in qualified specialists it is necessary to modify the system of training specialists. Firstly, practical orientation in training specialists must be on first place. Secondary, it is necessary to intensify orientation on specialization of training specialists.

5. It is necessary to change the structure of training specialists: to increase the share of specialists of humanitarian specialties. As the analysis demonstrated, the orientation of training specialists for industry doesn't satisfy the needs of perspective economic development of Krasnoyarsk region. The training of specialists for sphere of services does not developed. Perspectives of development of some branches of economy (oil-gas complex, forest industrial complex, food industry, road-building) determine the necessity of training specialists of these specialties.

6. The regional program of support and development of socio-important and demanded specialties for higher educational establishments must be elaborated. It is necessary to create system of stimulation of students of these specialties by means of giving special grants, paying probation.

7. To improve quality of training specialists the possibilities to open specialties which do not correspond to specialization of a higher education institution must be restricted.

8. The state order must be important instrument of training specialists. The state order must be formed on the basis of perspective needs of economy of Krasnoyarsk region in high

*Table 7*

**The prognosticated estimation of graduates of higher educational establishments on group of specialties until 2025 (thousand people)**

№	Specialties	2008	2010	2015	2020	2025
1	Industry and building	9,0	9,5	10,6	11,0	11,5
2	Agriculture	3,9	4,5	6,4	7,2	8,3
3	Transport and communication	0,1	0,11	0,13	0,15	0,17
4	Economics and law	2,9	3,4	5,0	5,8	6,0
5	Public health	0,7	0,9	1,2	1,6	1,8
6	Education	5,0	5,4	6,2	6,5	6,8
7	Culture and art	0,2	0,25	0,45	0,6	0,8
8	In total	21,8	24,06	29,98	32,85	35,37

*Table 8*

**The prognosticated estimation of graduates of higher education establishments on groups of specialties till 2025, %**

№	Specialties	2008	2010	2015	2020	2025
1	Industry and building	41,3	39,2	35,4	33	33
2	Agriculture	17,9	18,9	21,3	23	23,5
3	Transport and communication	0,5	0,5	0,9	1,5	2
4	Economics and law	13,3	14,5	16,7	16,4	16,4
5	Public health	3,2	3,7	4,0	5,0	5
6	Education	23,0	22,4	20,7	20	19
7	Culture and art	0,8	1,0	1,0	1,1	1,1
8	In total	100	100	100	100	100

qualified specialists. It is necessary to make prognosis of development of productive forces of Krasnoyarsk region, taking into account realizing large scale investments and innovative projects.

9. The main source of financing of educational system must be private. The state financing must guarantee filling state order, training needy students and opening socio-important and demanded specialties.

10. Requirements of businesses, which determine perspectives of development of certain spheres of economy, should play an important role in forming of state order.

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## АНАЛИЗ СИСТЕМЫ ПОДГОТОВКИ КВАЛИФИЦИРОВАННЫХ СПЕЦИАЛИСТОВ И НАПРАВЛЕНИЯ ЕЕ СОВЕРШЕНСТВОВАНИЯ С ЦЕЛЬЮ ОБЕСПЕЧЕНИЯ ИННОВАЦИОННОГО РАЗВИТИЯ КРАСНОЯРСКОГО КРАЯ

*Проведен анализ профессионально-квалификационной структуры и рынка образовательных услуг в Красноярском крае. Определены перспективные направления подготовки специалистов для инновационного развития Красноярского края.*

*Ключевые слова: квалифицированные специалисты, система образования, образовательные учреждения, спрос.*

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## ФОРСАЙТ КАК ИННОВАЦИОННЫЙ ИНСТРУМЕНТ ПРОГНОЗИРОВАНИЯ И РЕАЛИЗАЦИИ НАУЧНЫХ И ТЕХНОЛОГИЧЕСКИХ ПРИОРИТЕТОВ

*Рассматривается инновационный инструмент долгосрочного прогнозирования форсайт – процесс систематического определения новых стратегических научных и технологических приоритетов, которые в долгосрочной перспективе смогут оказать серьезное воздействие на экономическое и социальное развитие страны.*

*Ключевые слова: форсайт, технологический мейнстрим, партикулярные интересы, прогнозирование, стратегия, нанотехнологии.*

Глобальный финансовый кризис, разразившийся для многих отечественных аналитиков экономического будущего как гром среди ясного неба, заставляет оторвать взгляд от компьютерных графиков динамики виртуальных экономических успехов и искать реальный ответ на вопрос, как расставить научные и технологические приоритеты при переходе России от сырьевого к высокотехнологичному пути развития, к экономике, основанной на знаниях.

Для описания, объяснения и предсказания экономического развития вновь становятся востребованными теории цикличности Николая Кондратьева и Йозефа Шумпетера в части, касающейся долгосрочного научно-технологического прогнозирования. Все чаще используется циклический процесс: сначала идет выбор приоритетов,

затем следует оценка возможных инноваций и технологических решений, строятся технологические «дорожные карты», идет внедрение полученных результатов, их оценка и оценка методов использованных форсайтов.

Такой стратегический маневр требует активного участия и государства, и бизнеса в процессах формирования современной и эффективной национальной инновационной системы, которая призвана обеспечить конкурентоспособность, повышение уровня жизни населения и увеличение человеческого капитала. В такой модели для существенного повышения конкурентоспособности национальной экономики на мировых рынках помимо масштабных инвестиций необходимо своевременное выявление технологических возможностей и угроз и определение научных и технологических приоритетов, а затем и