



Part
4



ECONOMICS



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TOOLS OF BIOTECHNOLOGICAL SECTOR FORMATION IN THE REGION

At the present time in the world economy a constant increase of importance and influence of hi-tech branches takes place. As a result, appears the natural need in research of various scientific-technological development mechanisms, which correspond to modern views on scientific-technical progress.

Keywords: biotechnology, tools, state support, cluster.

The increase of importance and influence of hi-tech industries in national economies is connected with their considerable influence on all spheres of human activities, and one of such industries is biotechnology that penetrates into all industry branches of national economy: power, medicine, agriculture, building etc. Biotechnology is one of the directions of the fifth and sixth technological levels and the degree of its development defines a country's technological level.

Biotechnology has good prospects of development in Russian practice and will allow to solve many social and economic problems in the development of Russian economy: creation of new biologically active substances, medical products; creation of new technologies in deep processing of agricultural, industrial and household waste; using the country's energy potential more effectively, etc. The leading countries in the field of introduction of biotechnologies are the USA, EU, China, Brazil, and Japan.

In Russian practice the development of biotechnologies still remains at a low level. Their share in the export of high technology products is several tenths of a percent. At the same time it is noted in the program documents that with the development of biotechnological manufacture it is possible to achieve a serious technological breakthrough in many manufacturing industries and in other branches of national economy. The development of biotechnologies requires creation of regional programs considering specificity of natural resources potential of a region and providing the system with supportive measures to create high technology biotechnological manufactures.

A wide range of biotechnologies application requires their classification based on a defined classification criteria. To such classification criteria belongs a criterion that reflects the actual and potential raw-material base of biotechnologies development, for example, wood biotechnology, agricultural biotechnology, sea, secondary waste processing, etc. The second criterion includes the spheres of biotechnologies application: biomedicine, food-processing industry, biogeotechnologies, etc. The identification of such criteria allows to take into account not only the specificity of technological decisions, but also practical biotechnologies application depending on the quality and availability of raw-material base

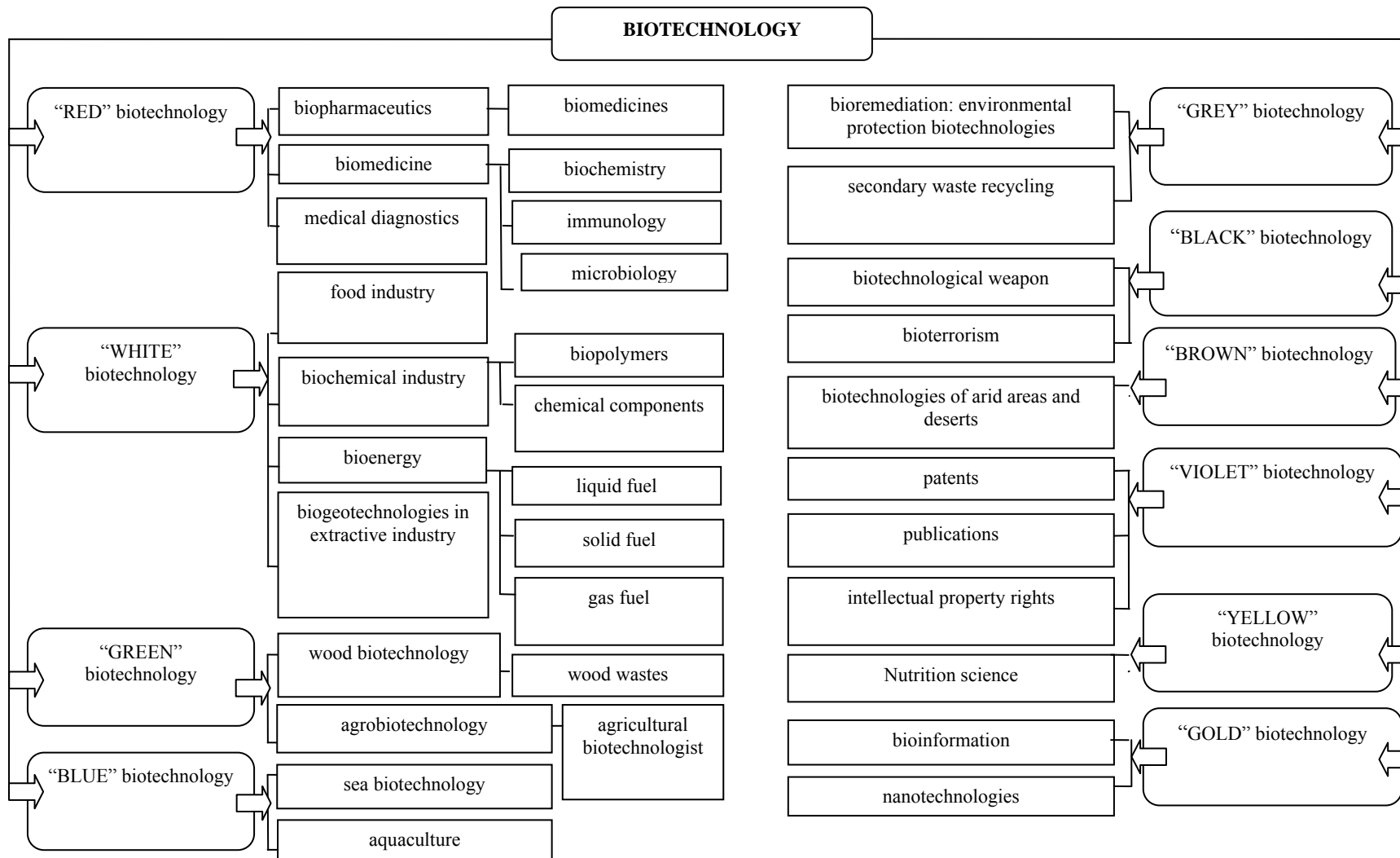
with respect to regional bio-resources, expediency to use them.

Such organizations as the Society of Biotechnologists of Russia named after Yu. A. Ovchinnikov, the Union of enterprises in biotechnological branch, Institutes of the Russian Academy of Sciences are engaged in scientific and technological studies in the area of biotechnologies. The society of biotechnologists of Russia named after Yu. A. Ovchinnikov has developed a Strategy of biotechnological industry development up until year of 2020 (project). They have identified the directions of biotechnologies development and carried out a foresight analysis. Biotechnology develops rapidly in all spheres of human activities and in the world, as they think. The "color" classification of biotechnology, which is presented on figure [1; 2], has been applied:

The classification derived by the specified sources allows to manage the formation of biotechnological development regional programs more purposefully, to define a choice of areas that correspond to population and biotechnological product market demands.

The presented classification of biotechnologies covers almost all spheres of human activities – from the development of medicine based on essentially new technologies to waste utilization, environment preservation and protection against possible negative use of the research results (biotechnological weapon, bioterrorism) [3]. It is necessary to develop biotechnology on a state level in all areas (from 35 technologies that are recognized as critical, 16 belong to the technologies where biotechnology is a key element), on a regional level those technologies are being chosen that have a sufficient bioresource, effective application and promote social and economic development of a region.

The basis of a program design for biotechnologies development as a target problem of the conceptual approach is a program-target method when a program is presented in the form of target subprograms which reflect application areas of separate groups of resources and includes subprograms: ecological, municipal, power, development of machine-building complex, social, power safety etc. The time framework is defined by the social and economic development Strategy of a region and biotechnological branch development Strategy. Program arrangements depend on the presence of investment projects, their economic efficiency.



Biotechnology classification

A modern form of organizing biotechnologies development in a municipal institution can be a cluster with specific features connected with a raw-material base of manufacture, the potential of manufacture capacities development and the importance of manufactured products, as for the municipal institution itself, as well as for the whole region. The purpose: to create highly profitable small and average business enterprises based on complex use of wood industry waste and industrial development of peat based on modern science intensive technologies with diversified manufactures.

The formation of a biotechnological cluster should be carried out considering several measures, such, as:

- considering innovation level of the offered projects, it is necessary to create a corresponding social infrastructure, including housing, objects of leisure and preschool and school establishments;

- it is necessary to co-ordinate the efforts and resources of investors, state and regional authorities regarding the development of engineer and transport infrastructure;

- to promote the development of domestic manufacturers of modern equipment through the system of state orders and creation of advantages for domestic suppliers.

The basis of cluster structure formation should include the principles defining the system of cluster participants' interaction and forming a potential of its sustainable development in a long-term period.

Based on the study of cluster approach theories of modern management systems, the following principles of cluster formation of the potential product manufacturers are identified on the basis of the complex use of the available raw materials (tab. 1).

The successful formation of the mechanism of scientific-technological development is the result of economic and social conditions that are formed in a society. To create a new mechanism of scientifically intensive manufactures and to promote the formation of new innovative directions in Russian economy, it is necessary to use the existing experience in developed and even developing countries. The special attention represents the experiences of European countries where measures of the state support are actively used, including:

- creating an infrastructure favorable for innovative activity;

- direct state financing of scientific researches through allocation of target grants, providing credits, subsidies;

- providing tax stimulus and other forms.

The state support is provided to both manufacturers of high technologies and manufactures and consumers of high technology products under the condition of importance of creating the new areas of innovative economy (for example, renewed energy resources). That way Swedish house owners receive state grants for refusal from mineral oil heating, in Netherlands and Germany the installation of wind turbines, etc., is subsidized. A special attention is given to biofuel manufacture, as to the major direction to decrease energy dependency of the European countries: the usage of biofuel gives a right to state grants

(Belgium, France, Sweden, Italy); VAT discounts (Austria, Netherlands) and other forms promoting its application. Tab. 2 systemizes the tools of high technology manufactures support in foreign practice and identifies the supportive tools of biotechnologies as a new area of high technologies creation.

The basic tools are: granting tax privileges to private business; target management of corporations innovative policy through a stimulating amortization policy and a system of tax privileges; creating a legislative base to stimulate and support the areas of development that are necessary for the state; including innovative support into the system of infrastructural institutes privileges.

The target state support of biotechnologies development is presented in destimulating tools when using not renewed energy resources; setting quotas and "green" certificates; various grants from special funds, created from tax payments for electric power from traditional sources processing. A special attention is given to the development of agricultural production based on "clean" technologies and manufacture of bioproducts. The presented in tab. 2 tools allow to draw a conclusion that in the Russian practice it is necessary to develop target programs on the development of biotechnologies with creation of the corresponding legislative base.

The biotechnology development should become a priority direction of a state policy and include a system of target tools to support scientifically intensive branches of economy including biotechnologies.

The study of domestic and foreign experiences of high technology branches and technologies support, as well as the experience of biotechnologies introduction and the available offers in this sphere has allowed to identify the tools of biotechnological sector industries support (tab. 3).

Such instruments include: tax exemption for a certain period of time for bioenergy manufacturers, for some bioproducts; grants from a special fund; using a system of subsidized loans; grants for carrying out scientific works in this sphere; target support of ecologically clean products manufacturers, etc.

One of the major directions is to include regional programs in federal level programs and to define regional priorities in development stimulation. As the foreign practice shows, for the time biotechnologies require various measures of support due to the formation of a new direction of scientific and technical progress and their high social importance.

The formation of a new direction of innovative economy requires also the support of manufacturers of the equipment for biotechnologies and first of all machine-building branch. At the present stage, the energy saving products as the target problem, in its decision requires the corresponding support of projects and the programs connected with decrease of power consumption by several branches: agriculture, wood industry, housing and communal services etc. A special attention should be given to the usage of industrial and household wastes where support should also be provided and stimulation measures developed.

Table 1

Basic principles of regional biotechnological cluster formation

№ п/п	Principles	Content
1	Orientation on local raw materials	The offered biotechnological cluster is formed on the basis of the present peat and wood industry wastes availability in a municipal body. Peat reserves are sufficient for their long-term use
2	Complex approach to raw materials development and creation of processing manufactures chain	Such approach reflects the specificity of cluster creation with an industrial orientation and allows to considerably decrease production costs
3	Cluster approach to extraction and processing manufactures formation	Thus the system of the enterprises of different forms of ownership and size is specially projected: small, average. Preplanning of the cluster approach assumes the targeted management of cluster formation, reflecting its specificity – biotechnological cluster
4	Creation of a system that guarantees the realization of cluster approach advantages	To the elements of such a system we can relate synergy as an additional effect due to interrelations and interactions, general infrastructure: industrial, social, etc., creating a chain of the added value defining the economic interest of the businesses in a cluster
5	Targeting at innovative, hi-tech manufactures	This principle should underlie all new enterprises created in a region. It is necessary to draw a list of basic indicators, the fulfillment of which is obligatory for the projected enterprises. The enterprises-clusters should possess key competences, based on raw materials features and the innovative level of technologies
6	Step-by-step introduction of new enterprises and capacities	It is connected with the specificity of the used raw materials. Nowadays we have technologies of deep peat and wood wastes processing, however the creation of new hi-tech manufactures requires additional preparation, justification and search of investors and equipment
7	Orientation on interrelations with other branches of national economy	This principle reflects the features of biotechnologies realization which extends to many spheres of economy. The interrelation and projects justification should include agriculture enterprises, building, housing and communal services, mechanical engineering, etc.
8	Including of different level programming materials into the system	This principle allows to create a system of program activities realization due to the inclusion of a biotechnological cluster into the strategies of social and economic municipal bodies development, a region as a whole and programs of biotechnologies development at different levels of management
9	Creating a single control body for a biotechnological cluster	As experience shows, it is most effective to create an operating company at the municipal level. The available advantages of cluster approach can only be realized having a targeted management that is conducted using a single management body.
10	Advancing personnel development at biotechnological clusters enterprises	A cluster has a human resources specificity, the preparation of which should be carried out in the process of involvement of new manufactures into the system of cluster structures

Table 2

Instruments of supporting scientifically intensive manufactures

Country	Instruments	
	Scientifically intensive manufactures	Biotechnologies
Australia, Germany, Greece, Denmark, Spain, Luxembourg, Portugal, Finland, France, Sweden	<ol style="list-style-type: none"> 1. Granting tax privileges to private business. 2. Changing amortization policy to allow organizations to increase amortization funds as a source of investments and innovations. 3. Tax privileges to encourage those directions of corporate activity that are desirable from the state point of view. 4. Tax deductions for equipment acquisition and installation. 5. The majority of EU member states legislatively allow to reduce taxable profit for the sum of expenses on research and experimental work made during the accounting period. 	<p>Extra tariff charges for the energy received from traditional sources No taxes for “clean” energy manufacturers; Quotas and “green” certificates Grants for R&D in the field of nonconventional power State grants for those who stop using heating on mineral oil Fiscal measures guaranteeing tax deductions (10 %) when investing in manufacture</p>
The Netherlands, Slovakia, Czech Republic	<ol style="list-style-type: none"> 6. Measures of the state support: <ul style="list-style-type: none"> – creating an infrastructure favorable for innovative activity; – direct state financing of scientific research by allocation of grants, credits, subsidies; 	<p>Grants from a special fund created from tax payments for electric power from traditional resources processing. Clearing of manufacturers of “clean” energy from power taxes; Quotas and “green” certificates</p>
Austria, Bulgaria, the Great Britain, Hungary	<ul style="list-style-type: none"> – granting state guarantees; – support and development of the system of risk (venture) financing; 	<p>Grants from a special fund created from tax payments for electric power from traditional resources processing Grants for R&D in the field of nonconventional power</p>
Brazil	<ul style="list-style-type: none"> – Granting tax stimulus 	<p>State target support of an industry: <ul style="list-style-type: none"> – granting of subsidies; – tax privileges; – credits </p>
Italy		<p>Tax exemption (volume of fuel production up to 300 thousand tones per year)</p>

Table 3

Instruments to support biotechnological sector of industry

№	Area	Instruments
1	Legislative support	Introducing the program of biotechnological industry sector support in a region. Creating target programs taking into account the priorities in stimulation development
2	Development of biotechnological industry	Compensating a part of the expenses directed at the application of innovative technologies connected with waste recycling of the agrarian complex and intended for independent agricultural production power supply. Compensating a part of the expenses directed at preservation (improvement) of fertility soils. Compensating a part of the expenses directed at the extraction of organic-mineral fertilizers from local raw materials
3	Tax stimulation	VAT decrease or exemption for socially significant types of products. Granting property, profit taxes privileges. Introduction of tax vacations for the period of new technology installation
4	Ensuring a stable growth of domestic products competitiveness	Supporting domestic manufacturers of biotechnologies equipment. Development and support of the agricultural machinery-building complex program regarding the organization of peat extraction machinery manufacture
5	Customs legislation improvement	Decreasing export customs duties: for organic-mineral fertilizers from local raw materials; for liquid and gas biofuel from local raw materials sources; for peat products; for various types of solid biofuel (pellets, briquettes etc.)
6	Legislative support improvement	The priority to approve the Federal Law "About the renewable sources of energy" The priority to approve the Law "About peat". The development of legislative support in intellectual property evaluation and protection
7	Development of the energy saving technologies	Supporting projects and programs connected with the decrease of power consumption by agricultural productions; manufacture in the wood complex. Development and improvement of the program concerning the advancement in wood mechanical engineering, including the organization of manufacture of the power equipment intended for wastes recycling
8	Support of integration communications	Creating an incorporated leasing company to supply peat enterprises with peat extraction and processing equipment. Formation of "technological corridors". Support of enterprise networks formation in clusters. Support of the steady cooperation communications
9	Human resource management	Training and consultation of managers and specialists
10	Solving environmental problems	Compensating a part of the expenses aimed at innovative technologies application, connected with wastes recycling of the wood complex and intended for independent power supply of the housing-and-municipal complex

The offered instruments of biotechnological sector formation support cover the whole cycle of biotechnological products creation and stimulate the usage of bioproducts in separate spheres of national economy, for example, in agriculture for soil restoration, manufacture of ecologically clean products, export development. Stimulation of integrated communications formation, and creation of biotechnological clusters in particular as the most effective organizational form allowing to provide complex usage of bioresources and the production of competitive products.

Thereby, biotechnology development should be recognized as the state priority policy: adequate forms of organizational, financial and information support, both on federal and regional levels, legislative support, business stimulation and private-state partnership. That is,

the question concerned is a national project where all key structures of the state and society should be integrated [4].

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FORECASTING OF THE LEADING INDEXES OF SOCIAL-EKONOMIC FACTORS ON YENISEISK DISTRICT

In this article presents the forecast of social and economic factors influencing Yeniseisk district over 2009–2012. The main supposition of the forecast is following the existing linear trend of the main social-economic factors' development with permanence of external factors. This results in the positive track record of the growing investment in the fixed capital that is stipulated by involving large-scale investment projects.

Keywords: forecast, social and economic factors, time row, confidence interval, exponential curve, investments.

Nowadays for being included in the world economic system every region must develop and form strategies of social and economic development, which would allow to find forms and ways of realization of the given regional advantages with the purpose to increase the standard of population living and also entering the markets of commodities, services, labour and capital of other regions. For this purpose it is necessary to expose steady tendencies and conformities to the law of social and economic processes, and also influencing factors and reasons predict their impact on the state and development of regional economy and vice versa.

Prognostication of social and economic development is the starting point of work to handle regional economy. The purpose of social and economic prognostication of region development is the adjustment of policy events and priorities in the development of regional and economic complex.

Yeniseisk district is a municipal district of Krasnoyarsk region which is located in the middle flow of the Yenisei river. Since 1998 the quantity of population here has gone down by 7 017 persons and makes 26 324. The average age of the population is 42.4 years. On the one hand, it is the most active age to work. At this age employees achieve the peak of their professional level. On the other hand, in 5–10 years their labour productivity decreases but in future young employees are expected to relieve and that does not imply a mere substitution.

In this research the social and economic indexes of Yeniseisk district were taken over 2000–2008 as the basis for the local prognoses (tab. 1).

During 2000–2008 the number of registered unemployed persons fluctuates and makes about 1295 persons in 2001, then peaks in 2004 at the point of 2286. Also the analysis to provide the number of organizations in Yeniseisk district was proceeded. Over the period under research there is reduction of enterprises by 18 % in average that negatively effects the economy of district with growing investment in the fixed assets with every period by approximately 8.5 % [1]. Next on the basis of the obtained data the prognosis of the explored indexes was made for 2009–2012 by means of the analysis of basic tendencies in dynamic rows.

The basic pre-condition of the prognosis is saving in the future existent linear progress of basic socio-economic indexes trend at invariability of external factors.

Prognostication for 2009–2011 it is determined the quantity of the registered unemployed persons on equalization:

$$y = -40.16t^2 + 474.7t + 688.7$$

where y is the quantity of the registered unemployed persons; t is the period; R_2 is the index of determinates, in this prognosis it makes 0.901, that testifies to high exactness of trend model.