



## **Priority Directions of Development of Innovation Education Cluster in the Regional Agro-industrial Complex**

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### **ABSTRACT**

Article is devoted to definition of a vector of development of an innovative and educational subsystem of agrarian and industrial complex of the region. Problems of integration interactions in system “Education – Science – Production” are investigated. The purpose of article is justification of recommendations about formation of multiplicative mechanisms of modernization of innovative and educational infrastructure of regional agrarian and industrial complex. The special attention is paid to questions of cluster reformatting of the scientific and educational sphere and innovative sphere on the basis of the numerical analysis of dependence between changes of parameters of development of branches of agrarian and industrial complex and the amounts of investments into the intellectual capital and technological innovations. As a result of the carried-out calculations the economic-mathematical models are received proving priorities of financing of cluster development of regional system of agrarian education. Application of system approach to research allowed to carry out differentiation on process productively sign of tools of development of an innovative and educational cluster of agrarian and industrial complex of the region. This aspect is supplemented also with consideration of possibility of acceleration of modernization processes due to generation of synergetic effects in block model on the basis of use of adaptable multiplicative mechanisms of ensuring system stability of an innovative and educational cluster. One of advantages of the offered model is the network form of representation of the mechanisms capable involved in its realization to transformations for practical use to plans of concrete actions and actions.

**Keywords:** Regional Agrarian and Industrial Complex, Innovative and Educational Cluster, Multiplicative Mechanism, Network Model

**JEL Classifications:** A2, I25, Q5

### **1. INTRODUCTION**

The socio economic and intellectual potential of each state directly is defined by a condition of the scientific and educational environment and existence of prospects of its development on an innovative basis. In the context of this prerequisite the state has to show interest in improvement of mechanisms of stimulation of research and educational activity.

At the present stage of development of system agrarian education needs of modernization of innovative and educational infrastructure as platforms for expeditious introduction of the advanced achievements of science and technology in agricultural production is staticized. This process is followed by formation of innovative clusters which kernel is research establishments and

high school science. As shows world experiment, such cluster, finally, is transformed to the center of innovative development and increase of regional competitiveness. Development of an innovative and educational cluster promotes preservation and effective use of scientific and technical capacity of the leading branch of the region. Educational and research establishments are integrated into points of growth of regional economy which, in turn, according to the law of feedback, catalyzes scientific and technical break in system of agrarian science and education (Edel, 1985).

Emergence in labor market of highly qualified specialists even if they are competitive, masterfully use professional skills, and also we are competent of adjacent spheres of activity, automatically doesn't mean their employment. This requires vacant workplaces,

relevant not only on the profile of training of the expert, but also gives a high level of payment and social security. Achievement of necessary level of regional social and economic and institutional efficiency, in our opinion, is possible within realization of cluster initiatives in an education system and staffing.

## 2. OBJECTIVES, METHODOLOGY AND RESEARCH DESIGN

The research objective consists in justification of recommendations about improvement of the mechanism of functioning of an innovative and educational cluster of regional agrarian and industrial complex.

The technique of research includes the following stages: Statement of a problem of formation of an innovative and educational cluster in regional agrarian and industrial complex; a quantitative assessment of dependence between parameters of agrarian economy and the amounts of financing of scientific and educational and innovative activity; results of a quantitative assessment and their interpretation; a technique of practical use of economical and statistical models at regulation of innovatively educational activity; development of model of functioning of an innovative and educational cluster; modernization of tools of management of an innovative and educational cluster due to use of multiplicative mechanisms and algorithm of realization of opportunities of practical use of network counts.

## 3. DISCUSSION OF THE RESEARCH OUTCOMES

### 3.1. Statement of a Problem of Formation of an Innovative and Educational Cluster in Regional Agrarian and Industrial Complex

The qualitative essence of educational activity is a state priority, the personal importance, integrity and that is especially important, productivity that is receiving at the exit of certain results in the form of non-material values. The continuity as basic property of education is realized in the personal focused and institutional aspects. The personal basis of a continuity of education aims to reach the goal of educational policy of valuable character: Motivation of the personality and formation of the favorable environment of its performance. The infrastructure of the network of educational institutions providing coherence of steps and education levels for satisfaction of the corresponding needs of the personality and society works at a basis of institutional realization of continuity is provided (Buldakov and Subetto, 2001).

Spatial and economic, socio cultural and climatic factors affect development of a regional education system because the organizational and economic structure of the region needs the qualified personnel defining the scheme of placement educational and research establishments.

Priority reference points of a state policy in the studied sphere at the present stage are:

- Ensuring science funding and education and support of

the status of the teacher, the research associate, associate professor, professor;

- Integration of university and academic science with orientation to strengthening of universality of vocational training;
- Creation of zones of the advancing development of systems of the higher education in regions on the basis of industrial and high school or agrarian and high school complexes with use of technopolises, agrotechnopolises, science cities, science and technology parks;
- Formation of economic mechanisms of stimulation of processes of cluster modernization (The Federal Law of 29.12.2012 No. 273-FZ).

Integration of education, science and production is the methodological basis of training of the competitive expert on condition of formation of uniform educational space of higher education institution, science and production through the scientific and educational centers by means of productive interaction of all interested structures.

Interrelations in a technological chain “education – science – production” designed to solve a number of questions, belonging to the sphere of interaction of the market of education and labor market: The order mechanism is built, i.e. there is an accurate formulation of requirements of society, including business. Business realizes importance of investments of investments into the human capital that is reflected in positive tendencies both on macro- and at the micro levels. Social mobility of the student as subject of an innovative and educational cluster increases. There is a regulation of labor market of branch within which this cluster according to the existing requirements is created (Enright, 2002).

Training of the modern expert on the basis of integration of education, science and production is the process of professional formation of the identity of the trainee caused by the high level of professionalism of the research and educational personnel, innovative technologies of training and education, own educational and research activity, and directed on formation of readiness for training through all life, abilities to self-organization and competitiveness in labor market.

### 3.2. Quantitative Assessment of Dependence between Parameters of Agrarian Economy and the Amounts of Financing of Scientific and Educational and Innovative Activity

Strengthening of the managing director and the coordinating influence from the state institutes of the power both on federal, and at the regional level, at active partnership with business owners has to become the important direction of modernization of innovative and educational infrastructure of agrarian and industrial complex. The solution of this problem happens in the conditions of limitation of financial resources. Therefore to the forefront there is a problem of definition of priorities of financing of development of scientific, educational and innovative infrastructure of regional agrarian and industrial complex on the basis of establishment of cause and effect dependence between a variation of indicators of real sector of economy and the amounts of financing of scientific and educational and innovative activity (Asadullin, 2009; Akinin and Frolova, 2012).

As dependent variables parameters of functioning of regional agrarian and industrial complex – the volume of gross output of agriculture, productivity of grain crops, production of milk on one cow on which variation various factors have impact are taken. The significant role in this process is played the parameters of implementation of innovative and educational activity. Calculations with use of methods of the correlation and regression analysis were made on the example of agrarian and industrial complex of Stavropol region during 2004-2013 (Figure 1).

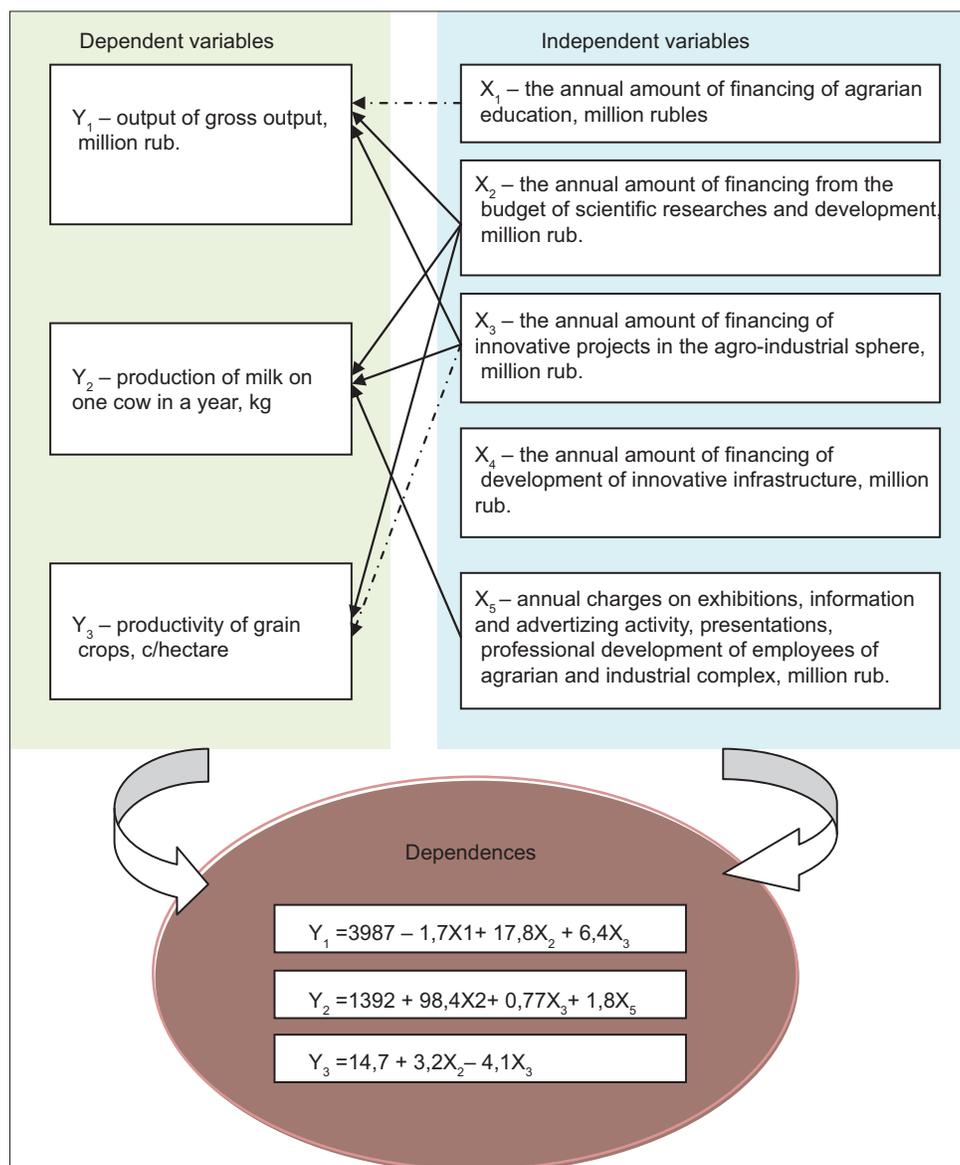
The established dependences for gross output of the agrarian sphere, efficiency of dairy cattle breeding, productivity of grain crops are defined during the multistep correlation and regression analysis.

After elimination of a multicollinearity statistical importance of the remained factors was checked on tabular value of criterion

of student. Results of iterations and the received statistical characteristics are presented in Appendices Table A1-A3. During the analysis the factor reflecting financing of development of innovative infrastructure was expelled from structure of independent variables.

Along with it, other factors, except the annual amounts of financing of scientific researches and research and production development at research institutes and higher education institutions of the region as not having pure statistically essential communications with the studied dependent indicators in modern economic conditions also didn't enter each of the received models. The exception of model of part of members with insignificant communications doesn't mean elimination of influence of the corresponding factors in system of the economic relations at all. It only illustrates change of forms of communication towards simplification. Influence of other independent factors is recognized as the statistically essential.

**Figure 1:** Interrelation assessment model between parameters of regional agrarian and industrial complex and stimulation of development of an innovative and educational cluster



### 3.3. Results of a Quantitative Assessment and their Interpretation

The calculated coefficients of multiple correlation testify that communication between the factors which included in the model is estimated as close link. Judging by value of coefficient of determination, the hesitation of independent factors explains a variation of volumes of gross output of regional agrarian and industrial complex in 58.7% of cases, efficiency of dairy cattle breeding – in 52.3% of cases, and productivity grain – in 62.3% of cases.

Coefficients of private determination showed that the leading role in interpretation of a variation of the dependent factors used by us belongs to the annual amount of financing from the budget of scientific researches and development in research establishments and higher education institutions and to the annual amount of financing of innovative projects in the agro-industrial sphere of edge. Their change can explain a variation of production of gross output of agrarian and industrial complex for 33.6%, a hesitation of efficiency of dairy cattle breeding – for 29.4% and productivity grain – for 16.1%.

Comparison of coefficients of elasticity showed that on force of influence of independent factors on the first place on influence on production of gross output of the agro-industrial sphere and productivity of grain crops is came out amount of financing from the budget of scientific researches and development in research establishments and higher education institutions of edge. The annual amount of financing of innovative projects in the agro-industrial sphere of edge has the strongest impact on production of dairy cattle breeding.

In general results of the conducted research don't contradict data of similar works in this area (Trukhachev et al., 2014; Gerasimov et al., 2014; Frolova, 2014).

### 3.4. Technique of Practical Use of Economical and Statistical Models at Regulation of Innovative and Educational Activity

The received economical and statistical models provide objective quantitative base for justification of a choice of the priority directions of financing of modernization and development of an innovative and educational cluster. We will carry out the comparative analysis of the received dependences on identical independent factors. For this purpose we will construct a matrix of coefficients of regression of  $b_i$  (Table 1).

Results of the analysis of correlation and regression model form the basis for allocation of the priority directions of financing of

**Table 1: A matrix of differentiation of priorities of financing of innovative and educational activity in Stavropol region**

Dependent factors	Independent factors				
	$X_1$	Priority group		$X_4$	$X_5$
		$X_2$	$X_3$		
$Y_1$	-1.7	17.8	6.4	-	-
$Y_2$	-	98.4	0.77	-	1.8
$Y_3$	-	3.2	-	-	-4.1

an innovative and educational cluster: Other things being equal and constant conditions change of each of  $X_i$  factors on unit of the corresponding dimension in the absence of influence of the others leads to change of a dependent factor at a size  $b_i$  of this dimension. That is, the independent factors having a positive sign are connected with statistically reasonable growth of an independent factor, but having a negative sign – with reduction. For justification of priorities of management it is possible to allocate two groups of independent factors. The first group includes factors which positive influence on productive indicators of activity of regional agrarian and industrial complex is shown systematically or in most cases. The second group includes factors which influence has multidirectional character, isn't shown in general or shown negatively. Thus, factors of the first group –  $X_2$  and  $X_3$ , and the second –  $X_1$ ,  $X_4$  and  $X_5$ .

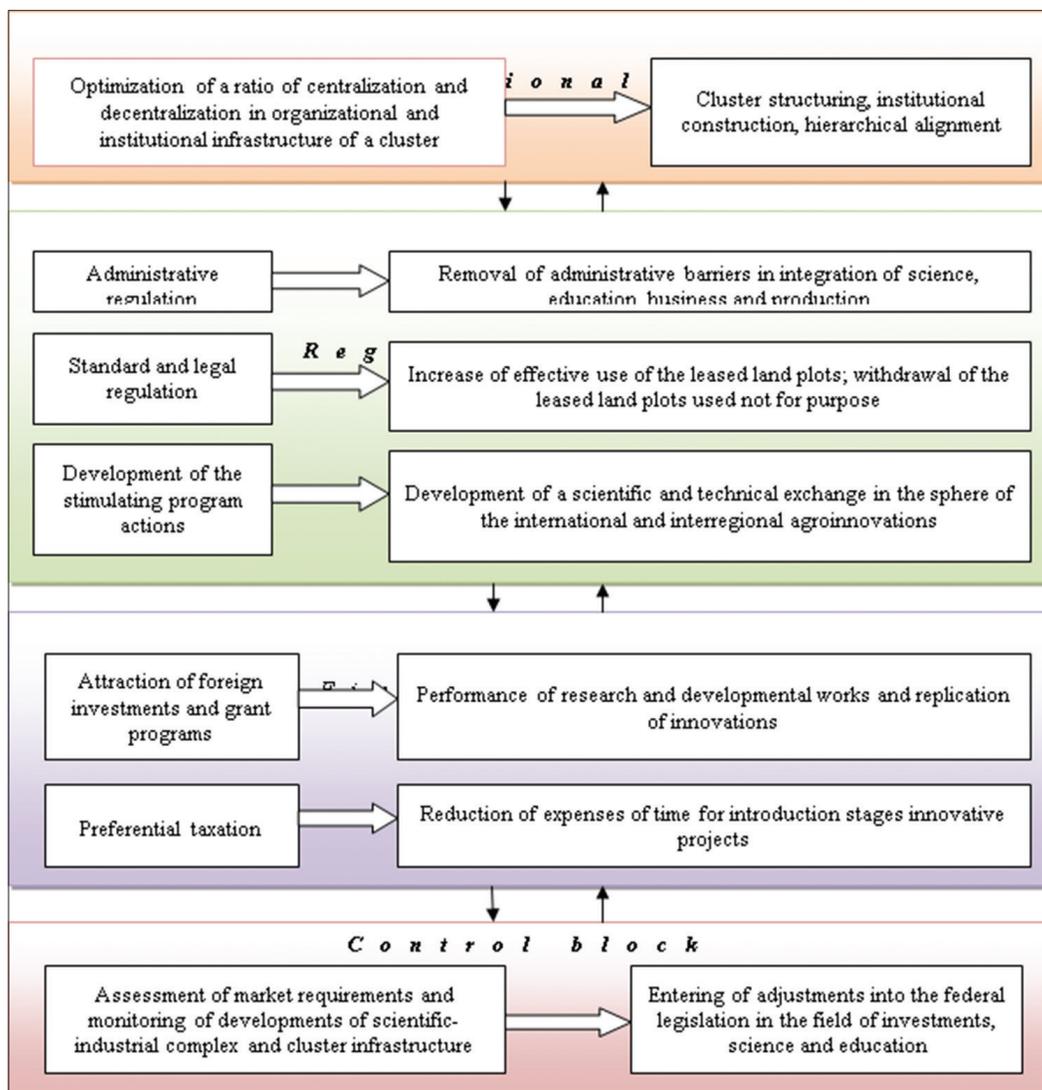
It is obvious that financing of the directions reflecting factors of the first group, obviously and is positively connected with fluctuation of dependent factors which characterize productivity of production of regional agrarian and industrial complex in the main agricultural branches. This circumstance can be considered as the objective criterion defining preference of their financing from budgets of various levels. It, first of all, belongs to financing of scientific researches and development in research establishments and higher education institutions of edge as the fluctuations of the amount of financing is positively connected with a variation of all dependent productive factors: In output of gross output of regional agrarian and industrial complex in established prices, an annual yield of milk of milk on one cow and productivity of grain crops.

Change of an independent factor of  $X_3$  reflecting financing of innovative projects in Stavropol region is connected with a variation of two dependent factors of  $Y_1$  and  $Y_2$  which are indirectly characterizing regional efficiency of activity of an innovative and educational cluster. This factor has to become object of paramount attention in the course of state regulation of activity of a cluster.

### 3.5. Development of Model of Functioning of an Innovative and Educational Cluster

System approach in research allows to prove the directions and to develop program actions for development of education, to define zones of the correcting influences in the mechanism of effective functioning of an innovative and educational cluster of the region (Capello, 2006). We will allocate two types of the correcting influences of the subject of management on scientific, educational and the innovative integrated structures of a cluster – positive and negative. In the first case the operating influences are urged to promote strengthening of positive effects, leading output parameters of system to some planned level, and in the second – to counteraction to negative changes of output parameters. Specific content of each type of influence depends on a stage of life cycle of cluster structure, the contents and a sphere of application of the realized innovative projects, and also on market condition. The tools of development of an innovative and educational cluster of agrarian and industrial complex of the region were differentiated by us on the basis of a functional indication (Figure 2).

**Figure 2:** Model of development of an innovative and educational cluster of agrarian and industrial complex of the region



Blocks of the offered model are focused on performance of a certain functional administrative loading: Organizations, regulations, material stimulation and financial security, assessment and control. In each block processes, on the right – the results expected from their realization are presented at the left.

Independent direction is formed by ways of improvement of federal legislative regulatory base, and also science funding and the higher agrarian education from the federal budget.

The solution of the tasks presented to models has to create reliable basic prerequisites for further improvement of a regional innovative and educational cluster and providing a sustainable development of regional agrarian and industrial complex. The financial aspect of the touched issues is connected with need of the constructive organization of the budgetary process, mobilization of the income and optimization of expenses.

Develop management tools will also allow you to adjust programs to the functioning of the studied system of public administration institutions at the regional level.

### 3.6. Modernization Management Instrumentation Innovation and Education Cluster Through the Use of Multiplicative Mechanisms and the Algorithm of Realization of Practical Use of Network Graphs

The feasibility of measures for development of regional innovation and education cluster can be accelerated by generating synergy effects if systemically important areas of the channels and integrative model to produce regulatory impact to produce the expected result. For this purpose, we propose to increase the flexibility of the model by the use of additional multiplicative mechanisms-oriented system health innovation education cluster. Develop management tools will also allow you to adjust programs to the functioning of the studied system of public administration institutions at the regional level (Bobryshev and Kazakov, 2013).

The effect of the first mechanism aims at improving the efficiency of innovation, accelerate the adaptation of educational and research institutions of the region to the changing market conditions. With it, governments should reinforce positive results in innovation and education, or to restrain, to hinder and block unwanted, negative

reactions of the system, no matter what reasons, objective or subjective, they are caused. In the field of regional legislation, managerial and financial activities of the program of the first socio-economic multiplier mechanism are focused on meeting the complex events:

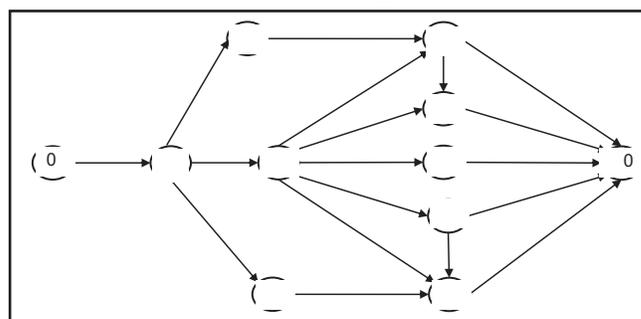
1. Reduction legislative and the regulations concerning support of the small and medium-sized agrarian and industrial complexes innovative enterprises in compliance with a modern level of development of economy and a condition of the competitive environment of the region;
2. Use of tools of business planning for justification of perspective innovations in agrarian structures of small and medium business taking into account results of market researches;
3. Development of strategy and tactics of implementation of scientific and educational and innovative activity in branches and spheres of regional agrarian and industrial complex;
4. Forecasting of need for qualified personnel for implementation of innovative projects in agrarian and industrial complex of the region;
5. Formation of venture fund for advance of achievements of scientific and technical progress in agro-industrial production of the region;
6. Development of a multichannel funding mechanism for innovative projects and control of target use of investment resources;
7. Development and distribution of practice of target preferential training of students by orders of the innovative enterprises of regional agrarian and industrial complex;
8. Additional financing of agrarian science and education in the region in the perspective directions of innovative development;
9. Use of positive international experience of insurance of investments in the sphere of scientific researches and developmental development.

Algorithmization of proposed measures that is reflected by us in the form of the network count (Figure 3) has to precede practical execution of the program of the correcting management.

The network count modeling operation of the multiplicative mechanism on improvement of an innovative and educational cluster in legislative, administrative and financial spheres of regional agrarian and industrial complex has three branches of the first level.

Numbering of events corresponds to quantity solved by the offered mechanism of the tasks given above. Events (0) and (10) correspond to the beginning and the termination of a cycle of actions; the branch (0-1) network counts is aimed at development of standard and legal base; (0-2) – on expansion of researches of the market; (0-3) – on elaboration of strategy and tactics of innovations in regional aspect. The key event forming purposes of the second level development of strategy of development of public and private partnership (an event 6) is urged to become for which scientific justification we suggest to define optimum shares of each of the parties of integration at a basis of calculations of net modern value of innovative projects (net present value).

**Figure 3:** Network model of the multiplicative mechanism of development of legislative, administrative and financial subsystems of an innovative and educational cluster of regional agrarian and industrial complex



This criterion reflects the difference between costs of the project and future net income expressed in monetary measurement. The dynamic method of an assessment allows to consider a factor of time and a high rate of inflation.

The importance of events 5 and 6 consists in ensuring the state participation in the transfer of an innovative and educational cluster of regional agrarian and industrial complex to qualitatively new level as full assistance and support of scientific and educational activity from authorities of regional and local levels is an indispensable condition of successful implementation of regional innovative policy. Besides, implementation of financial control of target use of investment resources, the organization of monitoring and carrying out a complex assessment of stages of implementation of innovative projects in regional agrarian and industrial complex is necessary.

In the course of performance of the first multiplicative mechanism special importance is gained by carrying out market researches in labor markets and innovations. We suggest to allocate the structural divisions operating as a part of government bodies of the power, such powers and functions as: Studying of dynamics of supply and demand in labor markets and innovations; selection, the analysis and systematization of information on scientific achievements in areas of agriculture and processing industry in the country and abroad for the purpose of their development and use in regional agrarian and industrial complex.

Specific actions in this direction can be expressed, for example, in that with frequency 2 times a year the analytical group of number of specialists of the Ministries of Agriculture and Economic Development of edge carried out market researches. By results of researches it is necessary to make and represent for the publication in the open press or on the site analytical notes. In interests of small and average business specialists of this group at the expense of the budgetary or private funds can sign contract contracts for development of standard business plans of introduction of innovations. By results of activity of group it is necessary to prove recommendations and offers on the scientific directions of thematic plans of work of research establishments and divisions.

For practical use the network model can be transformed to the network plan by means of definition of the most admissible time

in specific conditions for performance of program actions and calculation of a critical way. The optimum duration of a complex of actions which is object of control has to act as criterion of efficiency of implementation of the network plan. The practical assessment of such parameter of network model as duration of works for an event fulfillment, in many respects depends on the put-forward purpose, an initial condition of system, and also degree of concentration of material, financial and intellectual resources on its performance.

The second multiplicative mechanism offered by us is aimed at improvement of system of the higher and professional education. Its task consists in creation of conditions of effective use of innovative results of activity of educational institutions for strengthening of a trend of innovative development of agro-industrial complex of the region. Among actions for ensuring productivity of the offered mechanism, in our opinion, it is necessary to allocate:

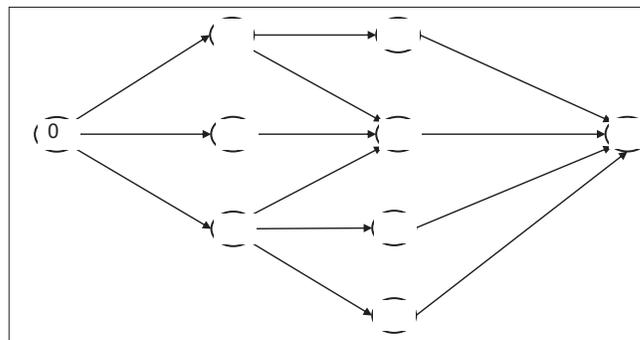
1. Creation of private educational structures as a part of large agroholdings;
2. Reorganization of educational institutions in autonomous establishments;
3. Distribution of technologies of interactive training in the establishments of the higher and secondary professional education preparing shots for work in various spheres of regional agro-industrial complex;
4. The organization of monitoring of system of theoretical and practical training on a competence-based basis and with involvement of highly qualified specialists for carrying out independent quality control of knowledge, skills;
5. Training of specialists by the orders of structures of agrarian and industrial complex focused on the level of quality of knowledge and practical skills necessary in the conditions of an intensification of scientific and technical progress;
6. Implementation of strategy of continuous retraining of personnel for regional agrarian and industrial complex for the purpose of timely development of new achievements of scientific and technical progress;
7. Introduction of practice of foreign training and retraining of scientific shots of regional agrarian and industrial complex in the perspective directions of development of innovative technologies in agriculture and processing industry of edge and attraction for participation in scientific and educational process of foreign scientists and highly qualified specialists.

The network count of implementation of actions for creating favorable conditions of development of an educational subcluster of regional agrarian and industrial complex is presented in Figure 4.

Numbering of events in the network count coincides with numbering of the projected actions of the second offered animated mechanism. The first two events – (1) and (2) – open a wide field of activity of the private capital in the professional educational sphere.

It is necessary to emphasize that the event result will be, unlike the situation which developed now in the educational environment, to have address, specifically branch character of preparation and

**Figure 4:** Network model of the multiplicative mechanism of development of an educational subcluster of an innovative and educational cluster of regional agrarian and industrial complex



retraining of qualified specialists. It is necessary to carry to the same branch also an event (5) which, in our opinion, finishes formation of the basic, fundamental branch creating prerequisites of achievement of balance between the offer of shots in regional labor market and demand for it. Achievement of such balance will also serve as a platform for further synchronization of development of an innovative and educational cluster.

Other events – (3), (4), (6) and (7) realize the following opportunities opened by a basic target branch:

- Full-scale development of university and academic science in interrelation with production;
- Monitoring of quality of knowledge and achievement of their compliance to modern innovative agro economic policy;
- Continuous retraining of personnel, their training and training abroad.

## 4. DISCUSSION

The value of the offered multiplicative model of functioning of an innovative and educational cluster of the region is that ensuring operation of multiplicative mechanisms doesn't demand neither additional capital investments, nor carrying out structural transformations of the institutional and personnel plan. Function on expeditious coordination of mechanisms and control of results of program actions should assign to regional executive authorities. At use of the multiplicative mechanisms developed by us in practice it is necessary to consider results of monitoring of parameters of a state and indicators of a level of development of territorial scientific-industrial complex that will promote increase of flexibility and adaptability of model tools.

Thus, importance of the listed factors and ensuring their positive dynamics for receiving the high end results in a scientific and innovative complex of the region doesn't raise doubts. Effective activity of a regional innovative and educational cluster and achievement of the corporate purposes of the establishments entering it, requires carrying out complex monitoring of the markets of agricultural raw materials and food, innovations and work and in-depth market researches of problems of their development. The studied parameters of objects of monitoring will serve in quality of indicators of establishment of optimum borders of functioning of an innovative and educational cluster of the region.

The market researches which are carried out now by structures of the educational block of a cluster in the priority directions of innovative development more have local character and are directed on the solution of problems of ensuring own survival in the competitive scientific and educational environment. Objective assessment of the situation from positions of regional productivity will allow to develop the balanced personnel policy and policy of rational use of the budgetary and other investment resources.

## 5. CONCLUSION

Conducting complex research of questions of modernization of an education system, we proceeded from a hypothesis that is the cornerstone of creation of the effective scheme of increase of regional competitiveness use of advantages of locomotive branch in the course of formation of innovative clusters which kernel are research establishments and high school science.

In model of an innovative and educational cluster of regional agrarian and industrial complex and for its stimulation effective use of the multiplicative mechanisms which are carrying out a number of the practical actions ordered on sequence is offered. Activity of the first mechanism is aimed at carrying out transformations in legislative, administrative and financial spheres of a cluster, adaptation to changes of social and economic conditions of the research environment, animation of positive effects in education. Purpose of the second mechanism consists in control or blocking of undesirable, negative manifestations of reactions of an education system irrespective of the fact which the reasons, objective or subjective they are caused.

The developed network models of implementation of the program of development of an innovative and educational cluster are capable if necessary to transformation in network plans of regional government of agrarian and industrial complex and definition of the horizons of forecasting with specification of temporary characteristics of performance of stages. The modernized economic-mathematical model will allow to optimize on condition of practical realization of the second multiplicative mechanism share of means in financing of innovative projects in regional agrarian and industrial complex at development of public and private partnership.

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## APPENDIXES

**Table A1: Results of the multistep regression analysis of influence of innovative and educational activity on results of production in agrarian and industrial complex of Stavropol region**

Indicators	Designations	Iterations		
		1	2	3
Regression constants				
(a) Free member	$a$	7012	4638	3987
(b) Regression coefficients at factors:				
Financing of agrarian education	$b_1$	0.89	-4.5	-1.7
Financing of innovative projects to the agrosphere	$b_2$	-0.87	63.4	17.8
Financing of development of the innovative infrastructures	$b_3$	3.2	4.6	6.4
Financing of the research development	$b_4$	8.1	-	-
Costs of exhibitions, information and advertising activity, presentations, increase qualifications	$b_5$	0.56	-1.7	-
Settlement criteria of importance ( $t_{\text{табл}}=2.09$ )				
Financing of agrarian education	$t_1$	1.44	1.87	2.14
Financing of innovative projects in the agrosphere	$t_2$	1.54	5.32	3.44
Financing of development of innovative infrastructure	$t_3$	1.89	1.96	11.92
Financing of research development	$t_4$	0.98	-	-
Costs of exhibitions, information and advertising activity, presentations, increase qualifications	$t_5$	1.16	1.56	-
Coefficient of multiple correlation, %	R	14.7	72.1	50.6
Coefficient of determination, %	D	11.1	68.3	58.7

$t_{\text{табл}}=2.09$  (now and hereinafter) defined at number of degrees of freedom 20 and a significance value 0.05; results of calculations are rounded

**Table A2: Results of the multistep regression analysis of influence of innovative and educational activity on productivity of grain crops in agrarian and industrial complex of Stavropol region**

Indicators	Designations	Iterations			
		1	2	3	4
Regression constants					
(a) Free member	$a$	168.9	35.7	89.1	14.7
(b) Regression coefficients at factors:					
Financing of agrarian education	$b_1$	13.4	16.8	8.9	-
Financing of innovative projects to the agrosphere	$b_2$	46.5	38.2	44.3	32.1
Financing of development of the innovative infrastructures	$b_3$	-3.4	-1.3	-0.8	-
Financing of the research development	$b_4$	-16.9	-4.3	-	-
Costs of exhibitions, information and advertising activity, presentations, increase qualifications	$b_5$	2.4	1.9	2.4	-4.1
Settlement criteria of importance ( $t_{\text{табл}}=2.09$ )					
Financing of agrarian education	$t_1$	3.15	11.64	0.58	-
Financing of innovative projects in the agrosphere	$t_2$	2.08	3.16	3.01	2.59
Financing of development of innovative infrastructure	$t_3$	6.01	1.98	2.12	-
Financing of research development	$t_4$	1.24	1.92	-	-
Costs of exhibitions, information and advertising activity, presentations, increase qualifications	$t_5$	0.05	2.6	2.2	2.3
Coefficient of multiple correlation, %	R	17.4	24.6	39.9	60.4
Coefficient of determination, %	D	14.4	44.3	40.3	62.3

$t_{\text{табл}}=2.09$  (now and hereinafter) defined at number of degrees of freedom 20 and a significance value 0.05; results of calculations are rounded

**Table A3: Results of the multistep regression analysis of influence of innovative and educational activity on efficiency of dairy cattle breeding in agrarian and industrial complex of Stavropol region**

Indicators	Designations	Iterations		
		1	2	3
Regression constants				
(a) Free member	<i>a</i>	3098	987	1392
(b) Regression coefficients at factors:				
Financing of agrarian education	<i>b</i> <sub>1</sub>	-37.5	39.7	-
Financing of innovative projects to the agrosphere	<i>b</i> <sub>2</sub>	12.3	184.5	98.4
Financing of development of the innovative infrastructures	<i>b</i> <sub>3</sub>	1.39	2.99	0.77
Financing of the research development	<i>b</i> <sub>4</sub>	-0.98	-	-
Costs of exhibitions, information and advertising activity, presentations, increase qualifications	<i>b</i> <sub>5</sub>	-0.76	0.78	1.8
Settlement criteria of importance ( <i>t</i> <sub>табл</sub> =2.09)				
Financing of agrarian education	<i>t</i> <sub>1</sub>	5.01	1.42	-
Financing of innovative projects in the agrosphere	<i>t</i> <sub>2</sub>	3.15	2.87	3.16
Financing of development of innovative infrastructure	<i>t</i> <sub>3</sub>	2.08	2.09	2.33
Financing of research development	<i>t</i> <sub>4</sub>	0.99	-	-
Costs of exhibitions, information and advertizing activity, presentations, increase qualifications	<i>t</i> <sub>5</sub>	1.67	4.32	2.10
Coefficient of multiple correlation, %	R	12.5	22.4	63.1
Coefficient of determination, %	D	7.8	34.2	52.3

*t*<sub>табл</sub>=2.09 (now and hereinafter) defined at number of degrees of freedom 20 and a significance value 0.05; results of calculations are rounded