

FOR PROGNOSIS OF INNOVATIVE DEVELOPMENT OF ENTERPRISES

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1. INTRODUCTION

It is generally acknowledged that the chance of maintenance of economical sovereignty in the 21st century is owned only by the countries, which are accumulating innovative and industrial capital based on utilization of the final leading scientific and technological achievements in forced rates today. Following given principles of innovative development proves development of western states.

During the last years the development of innovative economy in the countries of transitive economy have been spoken and written much about. Unstoppable rhetoric regarding the fact that the country of post communist domain is necessary to transfer to the innovative model of economical development, may be considered to be the necessary precondition to their sovereignty. Truly, main fault of the economy with directive plan was that the ideologists of market – capitalist reforms in the first place noted low innovative level of economical systems of every field, which took place under the conditions of „command–administration dictate“. According to them, refusing the state regulation of economy (including ignoring innovative and industrial policy), its liberalization and moving to the “market rails” shall work up innovative activities of economical subjects.

The principle task of modern social and economical development of our country is its moving to the innovative trajectory, as well as maximal using of principally new factors of economical growth characteristic to the postindustrial informational era. This task is extremely important for modern Georgia, where the necessity of moving to the innovation activities are in the first place of the industrial subjects scientific – technical processing at the enterprise level and investment and other conditions. This gives the opportunity for the national economy. Based on the science – intensive it becomes possible to overcome great and traditionally increasing backwardness (in the different fields of economy, compared with the high – developed countries of the world).

The necessity of solving the mentioned problems conditions to create prognosis of development of scientific – technical and innovative sphere, to foresee the main methodological principles of its elaboration. Big importance is paid attention to foresee the factors of creating prognosis.

To consider prognosis of versions of macroeconomic

development and in general, creating stages of prognosis of scientific - technical sphere and constructing structural models, also constructing a scheme of scientific researches and result of prognosis is the main problem of my scientific work. While studying the above mentioned topics I have studied foreign and Georgian researches – L. Chikava, A. Abralava, E. Baratashvili, I. Shumpeter, V. Anshin, E. Bruce and other 's monographs.

2. MAIN PART

2.1. THE PRINCIPLES OF FORECASTS FOR DEVELOPMENT OF SCIENTIFIC-TECHNICAL AND INNOVATIVE DOMAIN

Under the conditions of the deficit of investment resources, active utilization of scientific-technical and innovative potential in the issue of development of native industry represents the important factor. It is known that the factor of technical progress determines the growth of production under the conditions of workforce and capacities (funds).

One of the relatively distributed instruments for scientific-technical and innovative development is so-called industrial functions. When modelling this process they call technical progress based on the instrument of industrial function “Neutral”, if this fails to change relation with following indicators during particular period:

- Production volume cost of workforce and capital – if replacing workforce with capital does not give rise to the increase of production. In such case, according to Hicks, technical progress is neutral. This means, that the technique reached limited productivity and increasing of these factors conditions extensive growth of the volume of production;
- Capitalization and interest norm – if interest norm and capitalization of unchanged nature, technical progress, according to Harold, is neutral. This means that capital productivity has become limited, i.e. reached the level of the interest norm and growth of these factors will give rise to the extensive growth of labour indicators;
- Labour productiveness and the level of salary – if the relation between them remains unchanged, the technical progress, according to Solow, will be neutral. This means that the productiveness of labour became limited; the growth of technical progress will give rise to the extensive growth of capital volume.

When learning influence of technical progress upon the production in the role of autonomic factor (without foreseeing changes of other factors of production), in case of unchanged level of labour and capital is determined as the growth of production.

According to Solow, particular technical progress is included in the capital, the growth of which is called investment into new technique (i.e. this is science-consuming investments, giving rise to the change of productiveness of capital).

The importance of Solow’s method of approach exists in the fact that technical progress in this period is determined with the level of technique established during the last period. Herewith, capital investments will not be foreseen with net volume, but by foreseeing their quality indicators reflected in the rate of technical progress.

We shall consider the condition that only labour resources reserves and the quality may not be main preventive factors of economic growth. We shall necessarily consider the aspects of technical progress related with the quality of investments and main capital. They are determined by intensive investments and intensive investment process.

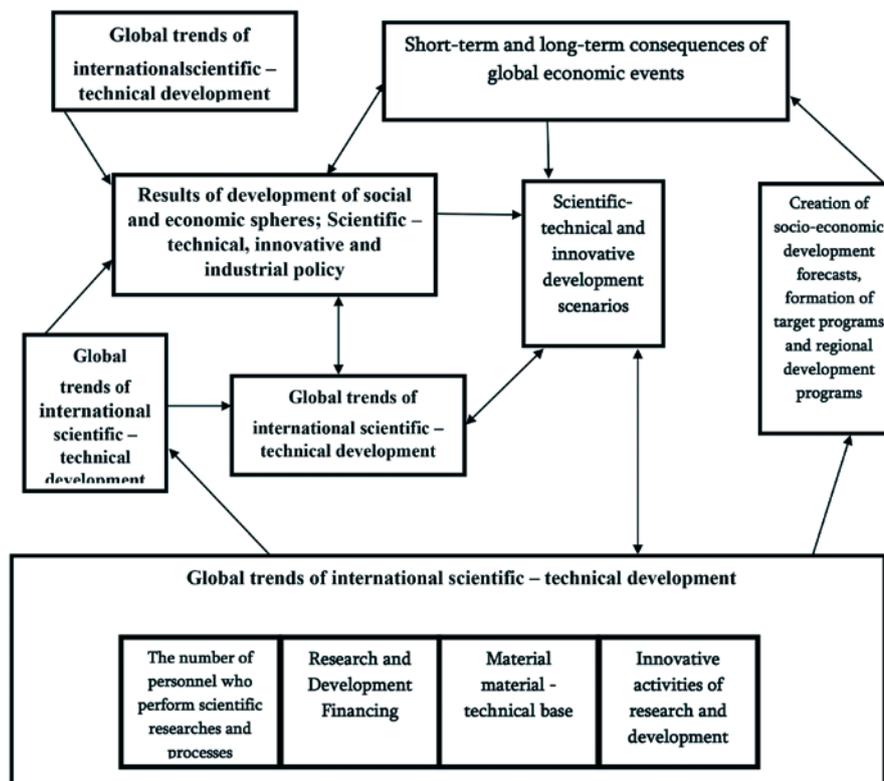
Within the framework of the reviewed system, in course of developing forecasts for development scientific-technical and innovative domain, we consider it purposeful to foresee the following main methodology principles:

- They will use the indicators, giving influence to the size of prognosis will be used for the primary information indicator;

- Reviewing alternative forms of social-economic, scientific-technical and innovative distinguished with the purposes, objectives and resource provisions during development of prognosis;
 - Applicable nature of the models of prognosis under the conditions of selection of data, foreseeing accidental and missed data giving no reflection of real trends;
 - Reviewing agreed and related characteristics of the indicators of scientific-technical and innovative domain, as activities of scientific, scientific-technical and innovative activities;
 - Adaptation and completeness of forecasting models (establishing self-correcting system of forecasting model, which will be able to provide immediate response on the changes of nature of dynamics of data);
 - Active role of the persons’ making decision in selection of the data, according to which prognosis is made and adopted system of forecasting models are formed (foreseeing various data in selection and variation of profitableness for the persons, making decision, in case of opportunities of foreseeing and variation of selected models of prognosis). Extended scheme of issuing prognosis of scientific-technical and innovative domain are reflected in the Fig. 2.1.

When selecting and realizing models and instruments of the models for calculation of prognosis for development of analyse field, peculiarities of the objectives to be solved will be foreseen, as well as the specificity of primary information and following groups of factors:

Fig1. SCHEME OF DEVELOPMENT OF SCIENTIFIC – TECHNICAL AND INNOVATIVE



1. Outcomes of foreign economic events. Here we mean the economic and political situation of the country, purposefulness of foreseeing various kinds of foreign-economic and other factors. Changes in global importance of the rates of economic development and changes of political conjuncture form the background, which will be foreseen in course of developing prognosis for development scientific-technical domain.

DEVELOPMENT FORECASTS

2. Situation in the country. In course of short-term and middle-term forecasting of scientific-technical domain inside the country, it is purposeful to foresee two main aspects: the prognosis shall foresee as the scientific-technical domain itself, so gross internal demands and opportunities of the country economy; besides this, it will be based on the preliminary analysis of the formed dynamics of analyse indicators.

When concluding prognosis for development of scientific-technical and innovative domain, they will take into account and foresee following factors: necessity for concentration of resources on the scientific and educational preferable directions; the leading role of the formed technological structure and technological factors of national economy; condition of civil resources of technological development; condition and quality of labour potential, necessity for structural reorganization of scientific-research and experimental-construction works.

3. Versions for macroeconomic development. Forecasted calculations will be constructed in relation with scientific-technical domain based on the number of external parameters. For example, prognosis of funding scientific-technical domain is based on the prognosis of such macroeconomic indicators, as the amount of Gross Domestic Product, the volume of industrial production, level of inflation etc. Prognosis of employment in the field of science, on the one hand, may not foresee financial condition in the given domain and, on the other hand, they will foresee the data characterising perspectives of demographic situation of the country.

Prognosis for development of scientific-technical and innovative domain based on the traditional methods of extrapolation of formed trends, due to insufficient depth of retrospective of separate indicators, may be developed for inertive scenario of economic situation, with single condition. Instability of economic situation of the country and current structural changes do not direct allocation of the dynamics reflected during the period before 1991 with the existed forms of the state statistic settlement.

According to the separate indicators, due to the absence of representation data, they carry out simultaneous studies in the state statistical reports. Priority of this process is

the fact that the scope of the research is relatively often reflected in compliance with the purposes faced by the research. However, conducting these researches, ordinarily, in course of processing primary data, is related with particular difficulties, which considers limitations when publishing outcomes of researches.

In any case, the reasonable compromise is required and necessary between state statistic reporting (however incomplete, but timely and regularly entered) and the data of conducted researches.

2.2. THE STAGES AND THE STRUCTURAL MODELS OF CONCLUSION PROGNOSIS FOR DEVELOPMENT OF SCIENTIFIC-TECHNICAL DOMAIN

Conclusion of the development prognosis for scientific-technical field of the country requires particular logical consistency. They consider the following stages of forecasting development of scientific-technical domain in economic literature:

1. Forecasting the size of funding researches and processing;
2. Forecasting the size of expenditures incurred for researches and processing per one employee;
3. Forecasting the number of staff employed for performance of scientific researches and processing;
4. Forecasting average salary of the staff engaged in scientific researches and processing;
5. Forecasting indicators of material and technical framework of science;
6. Forecasting indicators of patent activity.

Find below brief description of all listed stages.

On the Stage One they carry out forecasting of the volume of gross domestic expenditures incurred on researches and processing. In the form of main sources of funding researches and processing, they distinguish following in the forecast models: budgetary resources, industrial sector resources, resources of the sector of higher education, resources of unprofitable private sector; resources of foreign resources.

The forecast of the value of indicators from budgetary resources will be calculated based on the dynamics of Gross Domestic Product and the indicator of expenditure part of state budget. When forecasting the size of financial resources entered from industrial sector, they use forecasted size of industrial production as primary parameter. Forecasting of the value of the resources entered from unprofitable private sector and that of higher education is carried out with evaluation of the indicator of Gross Domestic Product and the dynamics of the indicators of the volume of industrial production. The forecast of funding from foreign resources are calculated by foreseeing extrapolation of the dynamics of the foreign investments balanced in current period of the technologies for receiving experts' opinions.

The indicator of expenditures on scientific researches and processing is of generalized nature. Due to this, its forecasted evaluations are used in the form of input data, in course of forecasting other remaining data of scientific-technical and innovative domain.

On the Second Stage, they forecast the resources received from different sources of funding per one employee. The dynamics of the given indicator in each sectors of science are being formed differently. Due to these models for their prognosis, as well as for forecasting gross value of expenditures, are individually processed for separate sectors by the scientists. In the form of input data in these models, at the initial stage, they take forecast of the gross volume of internal expenditures together with the main macroeconomic indicators.

On the Third Stage they provide prognosis of the amount of the staff employed in the field of scientific researches and processing.

Input information for this stage is the prognosis of gross volume of expenditures incurred on the scientific researches and processing made earlier, per each person employed in each sector of science and scientific field, forecasting the value of expenditures. In the form of additional primary information they use the prognosis of the number of population and employment.

The prognosis of gross amount of a staff is calculated as the sum of the amount of those employed in the separate sectors.

On the Fourth Stage, they provide forecasting of the value of average salary of the workers of separate sectors of science, based on the prognosis of staff amount and internal expenditures.

Given prognosis is adjusted by foreseeing forecasting evaluation of the expected level of inflation.

On the Fifth Stage, they develop prognosis of the indicators of material-technical framework of scientific researches and processing. These prognosis are made based on the grounds of the prognosis of domestic expenditures, namely, they foresee the share of expenditures incurred on the devises in current and capital expenditures.

On the Sixth Stage they carry out development of the forecast of productivity of scientific researches and processing, based on the indicators of patent activities, such as applications of native and foreign persons, forecast of the expenditures incurred on the scientific researches and processing and the forecast of number of those employed in this field.

Thus, the system for management of innovative activity¹ foresees carrying out special calculations, related with the scientific-technical prognosis. The scientific-technical prognosis represents probable complex evaluation of the

content, directions and volumes of future development of the science and technique in this domain.

The forecast reduces the number of variable processing when forming the plan, rising the quality of justification of the plan, rising its final purposes, determining terms and conditions for performing the plan, identifies possible methods for development of the object. Hence, this, in the first place serves for justification of the planned decisions.

Innovative activities include the following:

- Performing scientific-research, experimental-construction and technological works, oriented towards the formation of new or improved production realized in economic turnover, and new and improved technological process;
- Carrying out marketing researches and organization of the sale market of innovative products;
- Carrying out technological new equipment and preparation of production;
- Carrying out testing of new processes, products and items, implementing certification and standardization;
- Primary period of manufacturing of new and improved products, using new or improved technology until expiration of the regulatory term of innovative project;
- Establishment and development of innovative infrastructure;
- Training of the staff required for innovative activities;
- Protection, transferring and obtaining rights on the objects of intellectual property and confidential scientific-technical and technological information;
- Funding of innovative activities in the innovative programs and projects, including implementation of investments;
- Other works necessary for implementation of innovative activities and not preventing legislation of the country.

Governments of all developed countries develop and approve innovative programs based on the preferences of innovative policy, as well as the programs for supporting innovative activities and development of innovative infrastructure. Besides this, they have developed legislation on innovative activities, which include activities (forms) of state support of innovative activity.

When forming and establishing state innovative programs and targeted programs, they provide competition selection of the innovative projects included in them and the projects for development of innovative infrastructure.

State assistance of innovative activities is carried out in the following main directions:

- a) Funding of scientific-research, experimental-construction and technological works related with innovative activities;
- b) Funding activities providing innovative programs

¹ **Abzalava A., Gvajaja L., Qutateladze R.**, Innovative Management. City of Tbilisi, Technical University of Georgia. 2009, pg. 140.

and innovative activities of the projects, as well as the infrastructure, subjects and works of innovative activities;

c) Funding patenting of inventions and industrial samples abroad, which are included in the export products or domestic products intended for exporting;

d) Investment of resources into the creation and development of the subjects of infrastructure of innovative activities;

e) Placement of state order for procuring products established by using innovative activities;

f) Issuing subsidies on carrying out separate innovative products and activities for their implementation;

g) Guaranty of the state for performance of the liabilities of the foreign creditors, the subjects of innovative activities with the investors and the subjects of infrastructure of innovative activities;

h) Tariff and non-tariff regulation of competitiveness of high-technology production produced by the entrepreneurs of the countries in connection with the analogues, which are subsidized with the products of foreign entrepreneurs and they are carried out by the state;

i) Offering benefits to the subjects of innovative activities and the infrastructure of innovative activities, in relation with the taxes, fees, contributions to the central and local budgets or non-budgetary funds, in compliance with the legislation of the country;

j) Issuing right for using state property, including the objects of intellectual property.

State assistance of the innovative activities is carried out only in the period of these activities. State assistance of the innovative project in some countries is carried out during the regulatory term of redemption; however, they have determined different periods from the moment of commencing production.

The subjects of the infrastructure of innovative activity, created on the commercial basis, may receive state assistance in compliance with the applicable legislation of the country.

State agencies are eligible to transfer the area or property owned by the state to the small innovative enterprises carrying out innovative activities under lease agreement, by foreseeing respective benefits.

Funding of innovative activities is carried out:

- At the expense of the subjects of innovative activities;
- At the expense of the resources attracted from the outside by the subject of innovative activity;
- At the expense of the central budget, local budgets;
- At the expense of the resources of state non-budgetary funds and other state organizations participating in the innovative process;
- At the expense of the resources of foreign investors,

international financial organizations and funds.

State funding of the innovative activities is carried out:

- By the agencies of executive government of the country, within the framework of the norms established by the Government;
- By the subjects of the agencies of executive government within the framework of their authorities;
- By the state organizations, providing state assistance for the subjects of innovative activity.

In course of realization of state innovative policy, they carry out activities for supporting small and middle innovative entrepreneurs. These activities and the resources incurred for their implementation are allocated for funding the programs for assistance of innovative activity and those for assistance of small entrepreneurs. Budgetary crediting of innovative projects is performed in compliance with the prescribed rule.

3. BRIEF CONCLUSIONS

Forecasting - is a previous stage of work. Expert assessment and modeling methods are comparatively spread from prediction methods.

Forecasting Innovations – This is a complicated process with a large share of risk. This is explained with the necessity of considering the factors, such as the consultant’s actions, the difficulty of calculating own expenses, store up the products and change in the price of products, if the equipment is more difficult and expensive, the problem of taking into account the possibility of continuing its life cycle, is more actual.

Ensuring innovations are divided into the following species: Informative, Technical, financial and hazardous, Information Security is a difficult and contradictory process, as far as, on the one hand, there is a necessity for complete information about the present directions conditions of science and technology, on the other hand, it is necessary not to leak information about its own processing – Technical ensuring of innovations implies the appropriate base, in order to fulfill the tasks for construction, store up experimental samples and for arrangement technology. Financial ensuring of innovations – is one of the hardest problem in the modern stage of economics (especially for transitional economies countries), as fast as, there is no effective system of state support for innovations. The situation has sharply deteriorated for scientific personnel.

On the stage of forecasting innovations it is necessary and essential to take into account ecological and social factors. Ignoring these factors can significantly reduce the efficiency of innovation.

Small business is generally effective in innovative activity, as far as, small scale production, flexibility of technical processes and the high qualification of workers and creative environment makes it possible that innovations can be promptly developed in manufacture.

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SUMMARY

The article highlights the main methodology about the elaborating prognosis resulting from actually of prognosis on the development of scientific –technical and innovative sphere. About their principles; it shows models of prognosis of innovative development, peculiarities of tasks that should be solved while choosing and fulfilling instruments, also specifies

of original information and kinds of factors. The article has studied versions of macro economical development of prognosis, main stages of compiling prognosis and structural models. The work has examined and presented conclusions about main directions to support a state in innovative business, about completing the mechanism in innovative funding.