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MEANS OF STIMULATING REGIONAL INNOVATION PROCESSES

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Abstract: *The article highlights the relevance of finding ways to support regional innovation processes. Measures to support regional innovation processes have been clarified, which also provides for determining the economic basis for funding support activities. As an economic basis for the financial support of the studied processes, part of their side result in the form of a multiplier tax effect is substantiated. The method of determining the value of the latter has been clarified. This method is based on the use of an event tree, which should be systematically refined. The method allows determining the share of investments in regional innovation processes, which are transformed into tax revenues and probabilities of corresponding events. Attention is drawn to the admissibility of objective error in such calculations. Its partial neutralization is possible through systematic work on collecting, analyzing and processing statistical information on regional innovation processes. Provision of financial support to regional innovation processes on an irrevocable basis for project promoters is justified. The methodological provisions of determining the threshold of expediency of financing of regional innovation funds are substantiated.*

Keywords: *regional innovation processes; regional innovation fund; threshold of expediency of financing of the fund, a by-product of regional innovation processes, event tree, multiplier tax effect*

INTRODUCTION

The issue of improving support for regional innovation processes is painful, relevant and overdue. There is no contradiction in the importance of innovation processes in the regions to intensify their development. It is important to clarify the features of appropriate support.

It is desirable that the support of innovative processes have a stimulating effect on the intensity and usefulness of these processes for the economic development of

the regions and the national economy. Typically, such an impact is associated with either an increase in financial support or a reduction in taxes. Therefore, the issues under study are relevant, and proposals in one direction or the other must be carefully evaluated and justified.

The analysis of the latest research and publications in the field of evaluation of regional innovation processes and their infrastructural support [1-7] allows determining the existence of deep developments in the topic.

These and other studies have identified many shortcomings in supporting regional innovation processes; the influencing factors are specified. We will try to deepen the direction and clarify the economic basis of financial support for regional innovation processes, organizational measures of using such bases, methodical approaches for determining the quantitative parameters of organizational and financial support for such processes.

The purpose of the work is to clarify measures to support regional innovation processes, which provides for determining the economic basis of financial support for such processes and the features of its provision.

MATERIALS AND METHODS

The idea of using an event tree is at the heart of our research. This involves the formation of an interconnected logical sequence of events, the first of which is the investment of regional innovation processes, and the final - the tax revenues to the state and local budgets due to the implementation of these processes. The ultimate goal of such modeling is to quantify the tax multiplier effect. It should be borne in mind that it will take effect even when a specific regional innovation project is already completed. In addition, it works even if the project is not completed due to failure.

To build such an event tree, it is necessary to analyze the set of regional innovation projects and try to model further logical events related to the tax multiplier effect. It is important to identify all project participants who directly or indirectly benefit from their implementation and are involved in funding. Such relations should be expressed in the language of economic and mathematical models that take into account nonlinear stochastic relations.

At its core, the proposed event tree is an average logical interconnection of events. Therefore, in quantifying the share of investments that are transformed into tax revenues, it is necessary to use regional statistics on the dynamics of investments

and the volume of taxes, income and savings of households, income and profits of entrepreneurs. In general, this method is an abstract simulation using regional statistics and expert estimates.

RESULTS

In most countries, tax cuts are an effective measure of economic support for important regional processes. However, when considering the support of regional innovation processes from the point of view of the regional economy, it should be noted that it is almost impossible to optimize taxes at the regional level, since it is a national level and very complex. At this level, financial support for the necessary processes is possible, but it is important to clarify the economic background, standards and quantitative parameters in order for the relevant support to be effective for both main parties of these relations: the state and the organizers of innovative projects.

As an economic basis of financial support for regional innovation processes by the state, we propose to consider a side result from the implementation of innovative projects. In addition, a direct economic result can also be an economic basis for supporting regional innovation processes. A direct result from the implementation of innovative processes in terms of state regulation of the regional economy and the national economy as a whole, we see an increase in tax revenues to the state and local budgets, which are directly related to the course of such processes. The corresponding result can be clearly and accurately determined without any doubt as to its origin.

For example, over the course of 3 years, an innovative project A was implemented in a particular region and 100 people worked on it. The project organizer compiled a report and transferred income tax on the income of citizens of 1 mln. UAH, and value added tax - 500 thousand UAH. Therefore, the tax revenues from this project have been listed in the local and state budgets, which makes it possible to organize financial support for innovation processes both at the national and regional levels. Let us clarify that regional innovation processes proceed through the implementation of relevant projects.

We are considering the side result from the implementation of innovative projects as an increase in tax revenues to the state and local budgets, which are inherently related to innovation processes (projects), but not directly but indirectly. To quantify its value accurately is problematic, and any result of calculations is

characterized by relativity and error. By its economic nature, such a side effect is a multiplier effect by the intensification of business activity in the region. It is possible exceeding the direct result in value.

An important fact is that both the side and the direct result the state receives even in case of failure of innovative projects for their organizers. The main organizer of such projects is the business sector. In addition, the high-tech self-employed population in this respect has the characteristics of the business and household sectors. In the development of regional innovation processes, this sector, in particular in the regions of Ukraine, is becoming increasingly important.

In the course of the processes under study, one sector, namely the state, has a one-sided advantage: tax revenue will be gained in each case, while entrepreneurs will only benefit if projects are successfully implemented. Conflict of interest between the economic sectors is possible by compensating the organizers of innovative projects for a part, if not a direct, at least a side result. If we consider the direct result as an unconditional payment to the state, which it must receive, obligatory to ensure the performance of state functions, then in the distribution of the by-result, discussions are possible.

For example, the state financially supports birth rates with the expectation that children will grow up, become taxpayers, and overcompensate for the state's costs. Similar to fertility support, regional innovation processes should be addressed. By sacrificing part of the results (part of the side result) that the state receives from them, in the future it is possible to count on the tax multiplier effect.

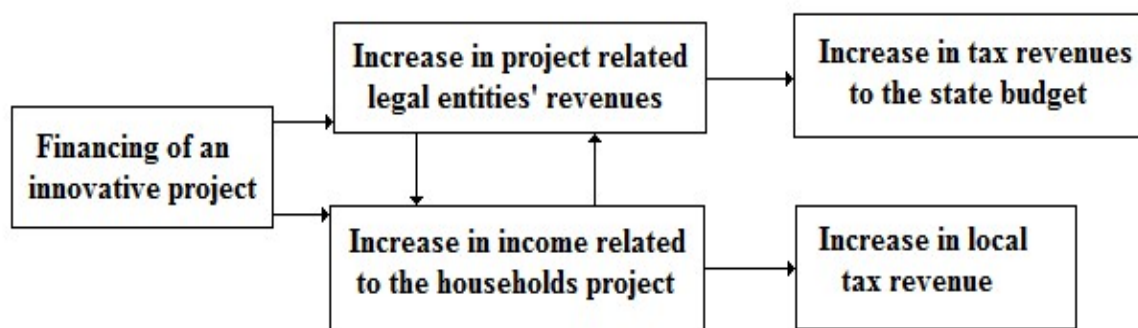


Figure 1: A simplified version of the event tree to determine the side effect of regional innovation processes

Source: created by author

Considering the methodological approaches of quantifying the value of a side result from the regional innovation processes, we emphasize the possibility of using

the event tree to determine the share of investment in such processes that are transformed into tax revenues. The appropriate approach should be systematic: first, a simplified event tree is formed (Fig. 1).

Based on the systematic collection, analysis, and processing of relevant material, the relevant event trees should be complicating in order to clarify the cause-and-effect relationship and increase the number of events (Fig.2).

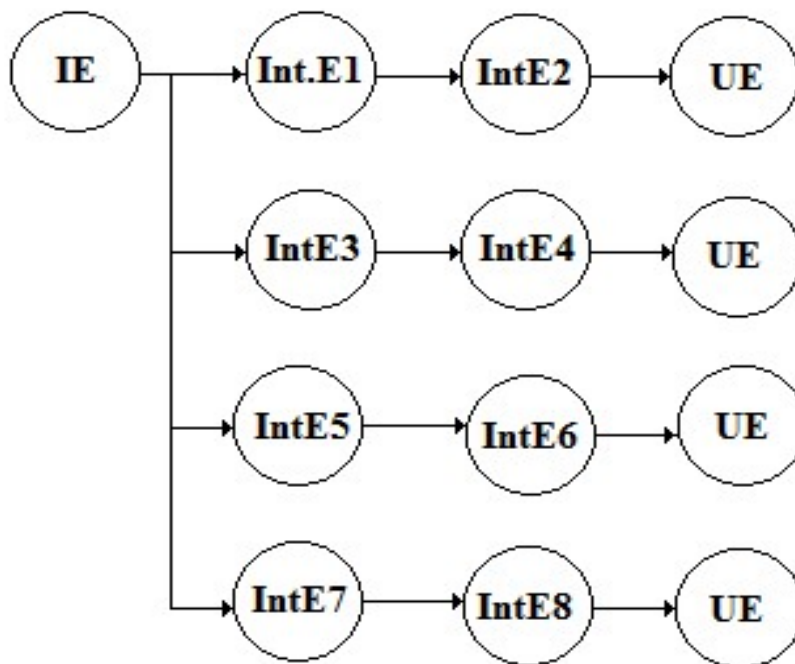


Figure 2: A complicated example of an event tree

where: IE - initial event - investment in innovative projects; Int.E1,...n - intermediate event; UE - ultimate event - tax revenue.

Source: created by author

Based on such event trees, it is possible to determine both the share of investment volumes that are transformed into the corresponding revenues to the state and local budgets, as well as the value of the probabilities of such events. The existence of an error in the calculations should be recognized as an objective phenomenon, but with the organization of systematic work on the collection, accumulation and processing of statistics on investment and innovation activities, the magnitude of such error will gradually decrease.

Regional structures, such as regional innovation funds, may be created to perform the functions of determining the relevant side result and its partial distribution. There has already been a similar fund in the history of Ukraine, but it

provided financial support for innovative projects on a returnable basis. This was the key reason for its failure: innovative projects are characterized by a higher risk of failure, so not all budgetary funds have been returned.

If we consider the side effect of regional innovation processes as the economic basis of their state financial support, there is no need to reimburse the state for the funds from the project organizers. Nonspecific individuals and regional innovation processes are supported. In this case, the financial support should be irreversible to the organizers, since in any case the state will receive the effect directly or indirectly from the fact that the processes under study are developing.

When creating a regional innovation fund, which will be determine the side effect of regional innovation processes and arrange for their financial support, an additional important indicator in the activity of such structures is the "threshold of expediency of financing" ($\Pi_{\text{д}}$), which depends on the volume of its overhead and the amount of direct financial support for regional innovation processes.

By economic nature, this indicator is close to the break-even point and shows the minimum permissible amounts of funding for these structures. Lower volumes of financing at such the existing overhead of a regional innovation fund makes the activity of this fund inappropriate.

$$\Pi_{\text{д}} = \frac{B_{\text{н}}}{1 - K_{\text{к}}}, \quad (1)$$

$\Pi_{\text{д}}$ - threshold of expediency of financing of regional innovation fund, monetary unit.

$B_{\text{н}}$ - annual overhead costs for the maintenance of the fund's apparatus, monetary unit / year;

$K_{\text{к}}$ - compensation factor. Shows the fraction of a side result from the implementation of regional innovation processes, which is compensated by the state for the project organizers. Its value should range from "0" to "1" and be set by the employees of the respective fund. The use of this coefficient should provide a rule: the cumulative side effect of the increase in tax revenues resulting from the implementation of regional innovation projects should exceed the amount of financing the activities of the proposed structure.

The net benefit of the state from the support of financing of regional innovation processes (ЧВД) is determined by the formula:

$$\text{ЧВ}_{\text{Д}} = (1 - K_{\text{к}}) \cdot \sum_{i=1}^n \Pi P_{\text{оф}} - B_{\text{н}}, \quad (2)$$

or

$$\text{ЧВ}_{\text{Д}} = \sum_{i=1}^n \Pi P_{\text{оф}} - \Phi 3 \Phi, \quad (3)$$

where $\sum_{i=1}^n \Pi P_{\text{оф}}$ - cumulative annual expected side result of implementation

of those regional innovation projects supported by the Fund, monetary unit;

n - the total number of projects supported by the Fund during the year.

$\Phi 3 \Phi$ - general financial support for the Fund's activities, monetary unit per year.

At the same time

$$\Phi 3 \Phi = B_{\text{н}} + \Phi \Pi, \quad (4)$$

where $\Phi \Pi$ – funds that go directly to support regional innovation processes, monetary unit.

$$\Phi \Pi = K_{\text{к}} \cdot \sum_{i=1}^n \Pi P_{\text{оф}}, \quad (5)$$

In order to financially support regional innovation processes, it is possible to partially finance them with the relevant fund already upon implementation. For receipt partial compensation, the organizers of regional innovation projects can submit to the Regional Innovation Fund Directorate applications and documents confirming the innovativeness of the project and allowing determining the side result. Based on the submitted documents, the Fund's management estimates the size of the by-result on the actual data (actual estimates) and in the case of a positive decision, its organizers may be compensated by a certain amount determined by the formula:

$$P_{\text{комп}_i} = \Pi P_{\text{ф}_i} \cdot K_{\text{к}}, \quad (6)$$

where $P_{\text{комп}_i}$ - amount of compensation for the i -th period of time, monetary unit

$\Pi P_{\text{ф}_i}$ - the estimated amount of a expected side result by a regional innovation project.

The proposed scheme is one possible. Others may provide interest repayments on bank loans or to be carried out in the form of down payments.

DISCUSSION AND CONCLUSION

The concept of organizational improvement of support for regional innovation processes has been clarified, which provides for determining the economic basis of their financial support and the features of its provision.

As an economic basis for financial support for regional innovation processes, part of their side result in the form of a multiplier tax effect is substantiated. The methodological basis for determining such an effect is the formation and systematic refinement of the event tree, which determines the share of investments that, because of regional innovation processes, is transformed into tax revenues, as well as the probability of corresponding events.

The organizational basis for improving support for regional innovation processes is the formation of structures (regional innovation funds) that systematically evaluate the side effect of such processes and provide financial support to the organizers of regional innovation projects on an irrevocable basis.

No need for a refund of financial support is identified as a key condition for the success of the structures created. The condition is based on the idea that the main purpose of supporting regional innovation is to support the processes rather than the individual. In return, the return from regional innovation processes is implemented in the form of direct and indirect results in any case, even in the case of failure of individual innovation projects. As the return from the processes is in any case, then there is no requirement for a mandatory return from the individuals. In turn, financial support for the processes themselves is not possible without economic stimulation of the persons - organizers of regional innovation projects.

The methodological approaches proposed to determine the feasibility of financing regional innovation funds allow for optimization of infrastructure support for regional innovation processes.

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