IMPROVEMENT OF INSTITUTIONAL MECHANISMS OF UNCERTAINTY MANAGEMENT IN THE IMPLEMENTATION OF INNOVATION PROJECTS WITH STATE PARTICIPATION

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Abstract. The work was prepared on the basis of the results of studies carried out at the expense of budgetary funds for the state task of Financial University for 2017

The report examines the problems associated with the imperfection of the institutional mechanism for interaction of economic agents in the process of implementing socially significant innovative projects with state participation. These problems are caused by uncertainties arising in the process of planning, financing and monitoring the implementation of innovative projects and the imbalance of interests of business agents. The content of the independent responsible examination, allowing to balance the remuneration and responsibility of the expert communities, as well as the mechanism of its functioning, is considered.

Keywords: institutional mechanism, innovations, uncertainties, economic agents, responsible expertise.

The Russian Federation, is, in accordance with the Constitution of the Russian Federation [1, art. 7], is a social state, whose policy is directed, in particular, to the creation of conditions "... ensuring a decent life and free development of a person". This is manifested, in particular, in the fact that a significant part of social needs are realized within the framework of state initiatives related to the development of health care, education, sports, culture, leisure, social infrastructure, etc. The role of public authorities and management in their implementation includes:

• Definition of the goals and priorities,
• Analysis and selection of the alternatives,
• Financing, monitoring and regulation of the implementation process,
• Evaluation of the effectiveness, including rather remote consequences of implementing social innovations.

Any actual innovation, regardless of the institutional nature of the participants and the sources of funding, public or private, for their direct or indirect results, as well as the consequences, both near and far, contain significant uncertainties, sometimes leading to serious, sometimes catastrophic consequences. The collapse at 14-08-2018 of the Polcevera viaduct (the bridge of architect P Morandi, Genoa, Italy), built in 1967, which caused the death of about 30 and the wounding of dozens of people, was only one of the many high dramatic consequences of the phenomena.

As an uncertainty, we understand here the inadequacy of the a priori information about future results and consequences of the implementation of relevant innovative projects. With private financing, the coordination of interests and risk management has been solved rather effectively.

Quite a different situation we observe when the project is financing by the government sources. In these cases, the system is unbalanced in terms of interests. First, the investor - the state agency, unlike the venture investor, risks by not his own capital, but by the public one. Secondly, the decisions about the form, scope and other significant financing conditions are taken by government officials authorized for this, which, although limited by the rules of action,

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have a considerable degree of freedom in choosing alternatives. As a consequence, conflicts of interest may arise (and often arise), which may lead to inefficient use, waste of public capital, a decrease in the effectiveness of innovative investments, and attempts to corrupt civil servants involved in the distribution of state orders in this sphere. All the above-mentioned makes an evidence of a deep lack of perfection of institutional mechanisms of uncertainty management in the sphere of innovative projects financed on the basis of state orders, which is one of the urgent problems of our institutional development.

At least two significant circumstances determine the complexity of this problem. First, it is that the standard methods of risk management, based on the law of large numbers (LLN), are not completely adequate, due to the fact that A.Y. Khinchin and A.N. Kolmogorov conditions on independence and the identical distribution of a large number of random events for the uncertainties under consideration do not hold. Therefore, the search and application of methods based on the difference in the results of research activity in different scientific groups, schools in terms of depth, time of achievement, the degree of validity and accessibility for the scientific community is required. These differences increase the expert value of those scientific groups and schools that have further advanced in system modeling of processes related to the field of social innovation being developed. As the expert value of the group, we will understand the predictive value of its model of the expert innovation which concerns to the completeness of the criteria for achieving the goals and the accuracy of estimates by this model of Benefits, Costs, Opportunities and Risks in the sense of, for example, [1].

The second source of complexity of the problem under consideration is that the interaction of the subjects of the process is unbalanced in terms of interests, which can reduce the effectiveness of innovation. Consider the characteristics of the main agents in this process.

The initiator of the innovation:
• Level of awareness of the problem of innovation: the largest,
• Interests: financing of innovation, achievement of the declared effect, public recognition and its economic consequences,
• Attitudes towards benefits and opportunities: a tendency to overstate,
• Attitude to costs and risks: the tendency to understate,
• Responsibility for failure of the project or failure to achieve the expected results: mostly moral, except for cases of misuse of the project funds.

The state body which is planning and financing the innovations (the person or persons making the decision - a decision maker (DMP)):
• The level of awareness of the problem of innovation: derived from the initiator of innovation and, possibly, from the expert community,
• Interests: compliance, even formal, with existing directive documents, legislative and other normative acts, organizational and financial strengthening of the position of the state body in the management system, medium-term - achievement of the declared effect, public recognition and its economic consequences, long-term - is absent,
• Attitude towards benefits and opportunities: neutral or a tendency to overstate,
• Attitude to costs and risks: neutral or propensity to down,
• Responsibility for failure of the project or failure to achieve the expected results: predominantly moral, with the exception of cases of connivance or promotion of misuse of project funds

The society (groups - users of innovation and, at the same time, taxpayers who finance them):
• Level of awareness about the problem of innovation: derived from all direct participants in the project,
• Interests: the fastest and most effective implementation of all social results announced in the project with the rational use of the resources allocated to the project, the medium-term - achievement of the declared effect, long-term - is absent,
• Relation to benefits and opportunities: neutral or absent,
• Attitude to costs and risks: neutral or absent,

• Responsibility for failure of the project or failure to achieve the expected results: none.

Thus, consideration of the relation to the project of its actors shows the imbalance of this system, at least in its following parts:

• Direct interest in the effective implementation of innovation is available only to the passive participant of the system - the consumers of innovation, among active participants this interest is secondary, giving priority to financing for the initiator or compliance with the norms for the state agency (DMP),

• Both the state agency (DMP) and the initiator are not responsible for the non-success of the project and the economic incentives for its successful implementation.

These circumstances led us in [3] to the concept of an independent responsible examination (IRE), which was further developed in [4].

This concept can be realized through independent responsible expert communities (IREC), which is a scientific research institution combining the functions of a systemic scientific and technical expertise, self-insurance of its scientific reputation, insurance of risks arising from the experts' -conclusion of uncertainties and stimulation of the expert community, depending on the quality of the submitted expert opinion. The historical predecessor of IREC can be considered, of course, with some stretch, the custom, observed by designers and bridge builders, to become a bridge at its commissioning, which symbolized the complete trust of the creators to the quality of their creations.

Let's consider the basic positions and construct-elements of the mechanism of functioning of IREC. Uncertainty here acts as a measure of ignorance that is eliminated in the process of research; IRE, as one of the methods for managing uncertainties, along with others (acceptance, transfer, reduction), requires public costs, which are "a payment for diminishing the uncertainty". This fee, as well as the cost of the innovation project itself, which is a part of, acts as the net costs of society "for progress" and it forms the estimated cost of innovation. Since the value of the IRE is the accuracy of the peer review, which can only be evaluated only ex post, the effective IRE mechanism can

be if the payment of the IRE service would be carried out, at least in a significant part of it, first, after the implementation of the main objectives of the project, and, secondly, in direct dependence on the accuracy of the expert evaluation. The reserved part of the IRE payment before the completion of the project acts as a guarantee fund of the project, placed in highly liquid, low-risk financial instruments. Of course, this scheme works if the project is implemented. In those situations where the project is rejected (or the decision is moved to a later date to reduce uncertainty), a more complex scheme should be applied, which can be considered later.

Further, the concept of IRE, in accordance with the principle of responsibility, provides for making a guarantee deposit, preferably multiple of IREC remuneration. This deposit is made either at the request of the state agency - DMP, or at the initiative of the IREC itself, and it may be used in three ways. First, as a part of the project's guarantee fund (see above). Secondly, it uses for averaging the results of the IREs of individual IRECs in the decision-making process (the multiplicity factors are used as the weights, since they express the IREC's confidence as its forecast and the level of its responsibility for this quality). And finally, it can be used as a tool for encouraging IREC for the accuracy of the forecast (in accordance with the coefficients of the multiplicity of the winners).

The result of the IRE is the portfolio of responsible expert opinions (RECs) submitted by the participating experts of the IREC, and the government agency as an DMP should make a decision to implement or not the project, which bases on a collection of generalized BOCR indicators (see above), possibly equipped with a metric. While there is no retrospective of the implemented solutions that can be used to establish the quality rating of the IRECs, the only basis for the decision is the average expert evaluation of the project, weighted by the volume of guarantees provided to each IREC. In the future, the total quality rating of each IREC should be used as an additional weighing factor. This rating is in inverse relation to the normalized deviation of prognostic parameters of the projects from the actual for all the projects evaluated by the IREC. After determining the average expert evaluation

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of the project, the After determining the average expert evaluation of the project, the DMP makes a decision on its basis, whether to implement or postpone the implementation of the project in question.

After completion of the planned project implementation period, the actually achieved project parameters are compared with the estimates made earlier by each IREC, and the rating of the IREC is determined for this project. The main purpose of it is the distribution of the payment from this fund among the IRECs for the quality of their RECs.

Let's consider the sketch scheme of the functioning of the proposed mechanism with the following simplifying assumptions:
• The project is non-alternative, it is either realized or rejected (postponed for the future),
• There is a metric on the set of parameters that determine the value of the project, that allows us to u order un the unique way its estimates,
• Government agency - the DMP has no right to reject in its decision the generalized opinion of IRECs.

In this version of the mechanism, only assessments of the quality of expert opinions are possible for establish (correct) the IRECs ratings and for encourage them for the quality of these estimations. It is also possible to obtain accumulated assessments of the overall quality of the REOs of all the IRECs. However, the assessment of the quality of by the state body (DMP) in this model is not possible because it involves the role of simple implementation of generalized opinion of all IRECs involved in the process of examination For assess quality of DMP we need more complex models, the consideration of which is not the subject of this paper. Possible assessments of the quality (ratings) of REOs of individual IRECs for different ratios of generalized project estimates and the actual effect of this project are presented below (see Figure 1).

Within the framework of this model of the mechanism, there are two significant differences when, in accordance with a positive generalized estimate, the project is realized, but with a fundamentally different practical result: the actual effect is positive (1) and negative (2).

In case 1, the mechanism provides for part of the collected guarantee fund to be used to pay for the expertise and promotion of IRECs that gave the most accurate predictive estimates, the other part of the guarantee fund can be used both to cover unforeseen project costs, and to form a cumulative guarantee fund, to compensate for the uncertainties of other, erroneously implemented projects.

In case 2, in spite of the erroneous implementation of the project due to the unavailability of the generalized expert evaluation, part of the guarantee fund should also be used to pay for the expertise and promotion of the IREC, which provided accurate (in this case, negative) forecasts. The rest of it should be used to compensate losses from the implementation of the flawed project, with the possibility of attracting for these purposes also the funds of the cumulative guarantee fund.

In both cases, the IRECs ratings for this project are added to the cumulative ratings of each IREC, and new cumulative assessments should be used in arranging forex examinations of future projects to determine the weight of the relevance of the IRECs and the norms of their insurance coverage.

It seems that the proposed sketchy model, with all its conventionality and incompleteness, contains the potential for the formation of a full-fledged mechanism for interaction of economic agents in the planning and implementation of innovative social projects, and possibly a wider profile with public participation.

For transforming the sketch model into a workable version, it is necessary to solve at least the following tasks:
• to formulate for each class of innovations a fairly representative list of uncertainties, possibilities and risks that are significant for this class, as well as the time period within which they can manifest themselves,
• to find the way of forming a metric in the space of the quality characteristics of the projects under consideration,
• to generalize the model for the case of alternative projects of similar purpose, which presupposes selection for the implementation of a better alternative.

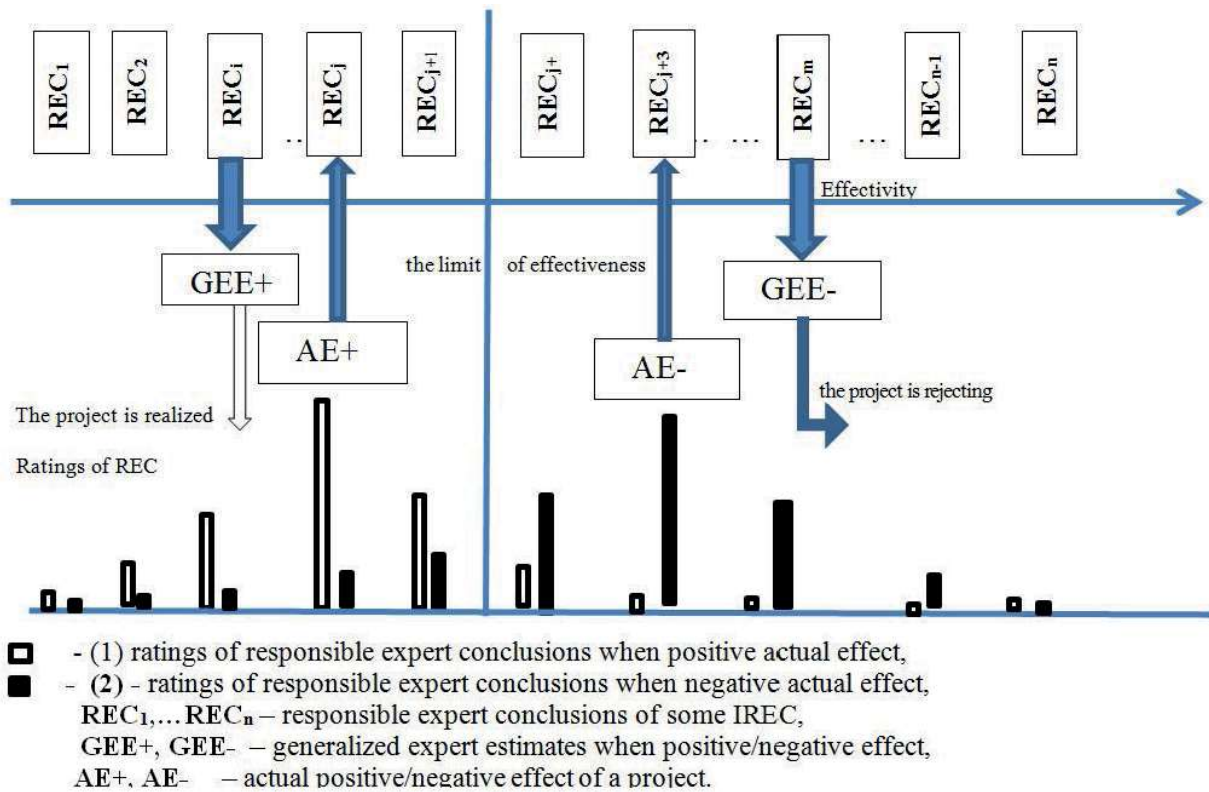These tasks will be the subject of further consideration.

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Fig. 1 Individual and generalized expert assessments related to the actual effect as the basis for ratings of examinations

Source: design of the author

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