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A RATIONALE FOR SOME DIRECTIONS OF THE DEVELOPMENT OF RESOURCE TERRITORIES: THE COMPLEX "MESO-LEVEL" PROBLEM[1]

The article presents an approach to the analysis and evaluation of integrated investment projects, which consist of infrastructure facilities and industrial clusters allocated to poorly developed areas rich in natural resources. This study shows the feasibility of a public-private partnership during the construction of infrastructure facilities in order to minimize the risks and maximize the benefits.

The conceptual framework of the resulting approach is associated with the ideas and principles of "impact investing" ("creation of shared values") and inclusive economic development. These are increasingly used worldwide, especially to accelerate the socio-economic development of backward countries and territories. The article presents an international experience and explains the relevance of best practices in Russia.

The authors identified methodological problems associated with the application of traditional methods to the evaluation of economic effects of project investing under the conditions of high uncertainty. The authors explain why it is necessary to use models and methods (real options analysis and fuzzy cognitive models) that allow researchers to directly take into account the uncertainty and project risks. The novelty of the article is the methodological tools for evaluating the socio-economic efficiency of complex projects combining the development of infrastructure and minerals.

The proposed approach was used to provide a rationale for a road construction project in the Berezovsky district of the Khanty-Mansi Autonomous Okrug. The authors showed opportunities to generate a set of institutional, organizational, and financial conditions under which the implementation of the project will be attractive to both investors and government and will bring socio-economic benefits to this territory.

The proposed approach and tools can be used for a socio-economic strategic decision-making process to justify infrastructure projects in resource-rich regions.

Keywords: region, mineral resource complex, infrastructure, cluster, impact investing, inclusive economic development, public-private partnership, financial and economic evaluation, real options analysis, fuzzy cognitive model

At present, the Russian economy is on the brink of a systemic crisis, whose main cause is that the development paradigm (adopted by the government in the 2000s) is no longer working. This paradigm de facto has two radically different priorities. One was the development of large-scale sources of minerals, implementation of the largest (mega-) projects, and active participation of the largest (and mostly state-controlled) companies in all promising areas of growth: from the oil-and-gas industry to nanotechnologies. The other priority was the development of small and medium-size businesses, with their ability of localization of activities and formation of multiplier effects.

On the other hand, today, almost all large deposits of minerals at the macroeconomic level that are capable of producing nationwide effects are already involved in the processes of economic development, whereas new sources, even if they will appear, will be smaller. Moreover, the implementation of megaprojects and activities of the largest companies are not very effective, according to the investigative files of the Audit Chamber of Russia.[2] At the same time, small business at the level of microeconomics, despite the ample supportive efforts of the government, is still too weak and unable to significantly influence the dynamics of the socio-economic development of separate regions and of this country as a whole.

As a consequence, the Russian economy is at the point where the opportunities for use of the biggest areas of growth are almost exhausted, whereas the cumulative effect of small and tiny points of growth is still insufficient and growing too slowly. The present model of development, which is

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[2] A suitable example is the investigation of ROSNANO. The results of this investigation show a dereliction of duties by this company in terms of the offical goals (assigned to ROSNANO) for the development of domestic nanoindustry. As of 2012, the losses accumulated by the ROSNANO Corporation constitute 24.3 billion rubles. Aside from the Russian Government and Federal Assembly, the investigation materials were sent to the Attorney General's Office, the Investigative Committee, Ministry of the Interior, and FSB of the Russian Federation (http://www.ach.gov.ru/activities/control/350/).

characterized by a peculiar combination of "megalomania" and "miniaturization," is lacking the middle layer (meso-level): sources of raw materials (resource territories), projects, and companies that by themselves can raise billions and tens of billions of rubles in investments. Undoubtedly, the activation of a large number of growth points at the meso-level, which have been overlooked by the government, can give a potent impetus to the development of the Russian economy: on the whole, this is probably even bigger stimulus than that provided by the biggest areas of growth.

This middle layer of projects is characterized not only by a smaller scale (as compared to megaprojects) and distinct main parameters of production and investments but also by certain localness: being far from the established centers of business activity. Another trait of the provinciality is that implementation of such projects is unattractive to federal-decision makers. Attempts to solve the problems of the meso-level projects by the procedures and approaches to economic justification that are characteristic of megaprojects do not yield positive results. A vivid example of teetering on the border of mega- and meso-levels is the project "Ural Industrial—Ural Polar." A substantial number of meso-level projects (their potential number is in the dozens) in combination with the necessity to take into account the local conditions and circumstances—all of this together requires designing the specific procedures and approaches to the economic justification of such projects.

The opinion of the present authors is that the meso-level nature of projects is quite complicated and demanding in terms of design and application of the modern approaches: theoretical-conceptual, organizational-economic, methodological, and evaluative-analytical.

The problem of resource territories: what is needed for sustained growth?

Many regions of Russia, especially those of the resource type, are characterized by rather strong internal territorial fragmentariness in the social-economic development, insufficient integration of various parts of their economy, and unattractiveness of the conditions for investments and implementation of new projects [1]. Among the most important factors that restrain the social-economic development of resource-rich regions, and of Russia as a whole, are the following:

— underdeveloped infrastructure of the territories, which leads to low competitiveness of many new projects;

— depletion of the most attractive fields of minerals having unique characteristics and parameters for the development, which allows high financial and economic efficiency both for the investors and for the government;

— the absence of effective and well-tested approaches to implementation and financing of projects in underdeveloped territories that pose high economic and technical risks.

To this list, we also need to add the absence of a clearly formulated effective industrial policy both at the federal and regional levels [2].

At present, in Russia, there are attempts to find a way out of this situation by formulating special conditions for economic activities on new yet underdeveloped territories (for instance, those in the status of territories of advance development). Nevertheless, this approach is not universal and is usually suitable in cases when there are explicit opportunities for realization of projects that yield rapid economic results. A much more complicated situation arises when there are attempts to implement projects that a) are dependent on the state of the infrastructure, b) involve interregional flows of effects and results, and c) have a large number of participants.

The development of natural resources in new areas is typically associated with the necessity to create infrastructure systems (especially transportation-related) that ensure access to these resources. In this case, these projects by themselves (e.g., development of mineral deposits) are quite efficient for end users of natural resources if we do not count expenditures on the infrastructure. Nonetheless, complex multicomponent investment projects that represent a combination of pioneering infrastructure projects and subsequent projects on development of natural-resource deposits, at this point, do not meet the requirements of the potential investors in relation to the level of profitability.

From the standpoint of the formulation of the problem, it is important that infrastructural limitations exist in many regions that possess promising (for development) natural resources. Creation of a reliable transportation infrastructure 1) forms the basis for conversion of the natural-resource potential into real economic growth, and 2) increases the standard of living of the population at the expense of the internal factors of development (in contrast to subsidies from higher-level budgets).

Investments into construction of infrastructure objects are usually characterized by the long duration of recoupment, low profitability, and high risks. An investor willing to fund extraction of natural resources is not always capable of building a road to the resource deposits. The private sector expects the government to create a normal investment climate on a territory that is undeveloped or underdeveloped in the economic and infrastructural sense (including for performance of the declared social obligations). On the other hand, the government, especially at the regional level, does not have sufficient financial resources. Nevertheless, it is the government that faces the task of finding a way to overcome the existing infrastructural limitations.

An important part of the problem at hand is how to create organizational-economic schemes of interaction that would ensure successful implementation of the development of natural resources and of the economic territories, taking into account interests of the government, private sector, and population. The organizational-economic questions are not limited to the definition of principles of interaction of project participants, distribution of financial obligations, and the ensuing risks. The most important property of such schemes is their tight link to the procedures and approaches to regulation of the natural resources and environmental management [3].

As a solution to the problems related to the division of financial responsibility and the ensuing risks, public-private partnership (3P) has gained widespread use and can take many forms, including government contracts for private enterprises, renting of governmental and municipal assets, and creation of joint ventures [4]. Nonetheless, under the modern conditions for the construction of an infrastructure object during the launch of new projects in the mineral resource complex, the most attractive form of 3P is a concession. The concession approach allows implementation of infrastructural projects at the expense of private funds and replacement of governmental expenditures. From the standpoint of the government, the advantages of concessions are the balanced model of financing and distribution of risks among the participants, increased quality of services, and a reduction in expenses, including reductions due to the use of innovative technologies [5].

Implementation of pioneering projects is associated with big risks, and a 3P in turn inevitably implies the existence of risks and the necessity of their minimization and fair distribution. In other words, 3P serves as a form of joint mitigation of risks: with participation of the government and private sector. Without the risks—that systemically threaten the effectiveness of investment projects in certain types of economic activity—3Ps would be unnecessary. The necessity to consider the risk component—in a broader sense: the uncertainty factors—imposes special requirements on many areas of project activities, including the methods of economic evaluation and approaches to management.

The modern process of improvement of project activity proceeds in various directions, which share loyalty to the ideology according to which uncertainty not so much poses a threat but rather offers an opportunity for nontrivial benefits. Changing of the attitude toward the uncertainty often forces people to look at projects through a different lens; normally, these projects would appear to be ineffective according to the deterministic point of view. "Tolerance of uncertainty" [6] may be especially important during the implementation of complicated investment projects that have a pioneering infrastructural component.

The conceptual basis for a solution to the problem of socio-economic development of resource-based territories (primarily at the meso-level) should be defined in accordance with the above-mentioned explanation of this problem.

Basic concepts: inclusive development and impact investing

In the theoretical-conceptual realm of the above topic, in our opinion, the strategies of inclusive development and impact investing deserve some attention.

"Inclusive growth" [7] has global, national, and regional aspects. In relation to separate countries, in the general case, it is assumed that the growth should affect the biggest parts of the population, not only the richest and most active in the economic sense; i.e., growth should become inclusive. Territorially speaking, this concept implies a weakening of the differentiation by the level of socio-economic development.

In Russia, there are too many depressive areas, and inside almost every region (the subject of Federation) there are depressive territories. In addition, virtually every depressive territory has its own potential "meso-level" points of growth. Their activation should promote not only advancement of the national economy but also weakening of the above differentiation, leveling of the socio-economic

development, i.e., should make economic growth inclusive (not only territories but big parts of the population will be involved in the processes of development).

The concept of impact investing or creation of shared values means that "shared values are not the same as social responsibility, charity, or even sustained development; they are a new path to economic success. Their place is at the core of the strategy." The ideology of shared values is based on egotistical (pragmatic) not altruistic principles because "egotism, not charity, creates economic value, while serving the interests of society." Nowadays, the private sector should serve the interests of society, but "this service should be based on a deep understanding of the mechanisms of competition and creation of value, not on charity" [8].

All countries and regions encounter incessant social and ecological problems that require economically effective solutions. To satisfy the growing needs for education, health care, and energy; to combat poverty; and to ensure solutions to the problems of socially vulnerable segments of the population, a comprehensive approach is needed. Data from across the globe show that our era requires new approaches to the justification of investments. On the other hand, the practice of investing for the purpose of not only financial but social results is not new. Both developed and developing countries are actively experimenting in this field. It should be noted that attempts to realize ideas—related to profiting from investing aimed at the creation of social and ecological benefits—are not abandoned even during economic crises. Approaches to the solution of a problem change, as do proportions of contributions (roles) of the stakeholders: the government, public institutions, and private enterprise. Isolated and uncoordinated innovations that are based on the principle of impact investing in some sectors of the economy, in some countries, and in world regions are gradually replaced by new globally oriented industrial activities [9].

Lately, impact investing has been receiving growing attention; in particular, politicians and mass media showed great interest, whereas the scientific community is striving to develop a general theory and to find schemes of implementation. Most attention is given to the evaluation of financial and other risks and with social and ecological effects; these areas are very important both for investors and for intermediaries.

For example, in the IIPC (The Impact Investing Policy Collaborative) report, there is a study on German experience with social impact investing in the education sector, aimed at the resolution of certain most pressing problems, in particular, lessening of the inequality of opportunities for education, lowering of long-term unemployment, and overcoming relative poverty [10].

Difficulties with a solution of social and ecological problems by traditional methods (by means of grants, charitable contributions, and donations, while capital markets are focused on financial profitability and economic growth) in Canada, stimulated the search for new models of investing aimed at the creation of positive effects outside financial gain. In 2012, in particular, a special fund was set up (The RBC Generator Fund) that is intended for investing into nonprofit institutions for acceleration of positive social change [11].

An interesting example is African countries, which are known for low incomes; multibillion-dollar investments are flowing into these economies in the hope that these investments will serve as a catalyst in the reduction of poverty. Many investment projects—this is their key characteristic—are designed for creation and development of small and medium-size businesses of the inclusive type. Existing enterprises are being transformed, pioneering enterprises are being created (with the help of business incubators), and access to venture funds is being ensured for funding of inclusive businesses. The research shows that impact investing that is aimed at inclusiveness of development holds great promise for resolution of the problems related to economic backwardness [12].

The above example is also interesting from two perspectives: first, it demonstrates organic closeness of impact investing and inclusiveness, the possibility of convergence of the said principles during socio-economic development; second, (and as a consequence of point one) this example is useful for analysis and selection of growth pathways for underdeveloped, depressive territories in almost any nation, and in Russia within the borders of almost any subject of Federation.

The goals of impact investing (creation of shared values) and of ensuring inclusiveness of economic development are especially relevant to depressive territories, whose problems are linked to today's lack of interest in the existing potential for development (including natural-resource-related). In many cases, this potential does not arouse interest for reasons of institutional character (because of the

dominance in the economic policies of the approach directed at implementation of megaprojects) and because the infrastructure is not developed.

Combination of business and government interests: organizational-economic parameters

The duality of the principles of impact investing and inclusiveness of economic development forms the basis of the modern ideology of 3P, which in turn leads to further development of organizational approaches and to the search for adequate solutions in the structuring of rights and responsibilities both on the part of the government and private business.

Distribution of competencies and responsibilities in the system of governmental management is naturally linked to the level of interest among various echelons of power in the implementation of projects:

— federation: the level of large projects (mega-level);

— region (the subject of Federation, its part, or a combination of closely located parts of different subjects of Federation): the level of peripheral projects (meso-level);

— municipality: the level of small business (micro-level).

Structuring of competencies in the private sector is determined by the complexity of projects, the degree of comprehensiveness, and by the need to solve problems related to the various types of activity, and accordingly, characterized by a distinct level of effectiveness in terms of investment. During economic development of new territories, the success of implementation of the projects in the mineral resource complex depends on auxiliary components and infrastructure.

Resolution of various economic problems frequently is impossible for a single company and, therefore, requires clustering. Clusters, i.e., "concentration (in one place) of firms, their intermediaries, suppliers, providers of services, including logistical ones," can strongly influence the results of projects ("productivity and innovation") [8]. The absence or underdevelopment of some components related to the project has a negative impact on its financial and public effectiveness. In particular, underdevelopment of the transport infrastructure, at the minimum, causes large expenses on logistics, and in the worst case, physically limits the access to promising objects of economic activity (for instance, to deposits of fossil natural resources).

At present, one of the most characteristic examples of impact investing in the clustering format is demonstrated by several largest global corporations — Coca-Cola, Nestle (drinks, food products), Wilmar Intl. (agribusiness), Yara (manufacture of mineral fertilizers) — in their activity on the African continent. In partnership with the governments of Mozambique, Nigeria, Uganda, Kenya, Tanzania, and some other countries with an undeveloped economy, in cooperation with specialized financial institutions and international organizations, so-called African Agricultural Growth Corridors are being formed. The result of the implementation of the whole series of national and international inclusive projects is the creation of hundreds of thousands of new jobs in the area of small agrarian business. At the same time, the formation of agricultural clusters is often based on construction and modernization of the transport infrastructure (roads and sea ports) [13].

Practical examples of the use of the impact investing concept reveal two important organizational characteristics: first, there is a strong relation between the size of benefits (corporate and public) and creation of clusters at the location of deployment of the project activity; second, the borders between commercial and nonprofit organizations are getting erased [8]. Complexities of the organization of such a collaboration in Russia are currently obvious. Interbudgetary relations are set up so that a municipal level (district) rarely gets an opportunity to seriously participate in funding of more-or-less large infrastructural projects on its territory, even if these projects are of great consequence for the region (subject of Federation). The most realistic source of public investments into infrastructural projects of the meso-level is the regional budget.

In the case, for example, of construction of automobile roads, from the practical standpoint, it is important to note that the roads in new development districts are usually without alternatives, and for this reason, cannot be used on a paid basis. Nevertheless, paid use of a road for transportation of special-purpose industrial cargos and toll-free use for other types of freight is one of the balanced solutions for all parties concerned: the population, business, and the region. In the case of toll-free use of the road, the ultimate payer for its construction is the budget of a subject of Federation. Even in the case of construction of a toll road, the region will bear certain expenditures associated, for instance,

with share-based participation in the funding of the investments and provision of guarantees to the concessionaire to raise external funding.

Therefore, during consideration of projects dealing with the construction of infrastructure in new development districts, a subject of Federation should have guarantees that its expenditures will not only have social significance but will also pay off due to new economic effects and tax revenues from economic activities in the zone of influence of the project-related infrastructure. In other words, the tax revenues collected by the region today and expended on construction of an infrastructural object should pay off in the future at the expense of the additional tax revenues from the industrial projects in the new development district. The problem is that construction of a pioneering infrastructural object by itself is not a guarantee of implementation of the industrial projects that can bring high income. Consequently, for the schemes of implementation of infrastructural projects, which stipulate funding from the regional budget, it is necessary to work out the guarantees in relation to the performance of industrial projects.

One of the approaches has to do with the formation of a consortium of companies that are interested in the construction of an infrastructural object. This consortium should include the main business entities that are planning on the implementation of the industrial projects in the new development district, large potential consumers of the products, and financial institutions. Put another way, there is a need for organizational-legal institutionalization of the cluster that is associated with the implementation of the whole set of projects. In this case, to protect the interests of the subject of Federation, it is possible to sign an agreement with the consortium, and this agreement should stipulate the legally binding conditions on the size of investments in the industrial projects as well as the proper execution of the works. This way, the group of companies (consortium) confirms in practice its abilities and intentions regarding the implementation of the industrial projects (development of the cluster as a whole) in the district in question.

During funding of a pioneering infrastructural project, the government budget will face the greatest risk during the first years of the implementation. Afterwards, with the controlled completion of industrial projects within the framework of the development of the cluster, the risk will diminish because there is a greater probability of implementation of the said projects, which are capable of generating tax revenues at the stage of functioning.

Methodological tools for economic justification of projects of the meso-level

Project-related investing during economic development of new resource territories requires designing of adequate procedures of economic evaluation and analytical tools. The methodological component should have well-pronounced comprehensiveness and should be aimed at the resolution of the problems associated with the analysis of uncertainty and risks, i.e., it is necessary to form a multilevel set of economic-mathematical models of various types. As for a complicated investment project of the cluster type, which includes creation of pioneering infrastructure and economic development of resource objects, the following tasks should be accomplished:

— financial and economic evaluation of a project as a whole and of its distinct components (infrastructural and industrial);

— evaluation of the regional budgetary effectiveness of the combined project (taking into account budgetary expenses on the implementation of the infrastructural component);

— evaluation of socio-economic effectiveness for the territory of deployment of the project.

The financial and economic evaluation of the projects in question should be based on the models of discounted cash flows (DCF) and on real options analysis (ROA). Application of the ROA method eliminates a number of drawbacks of the traditional DCF methods of project analysis that are related to their determinacy [14] and to the impossibility of adequate analysis of specifics of the concession mechanism of 3P [15, 16].

A generalizing evaluation that takes into account a multitude of scenarios of events in the future should be built by means of a decision tree and evaluation of the probabilistic present value of the project, with consideration of the alternatives. The decision tree and the probabilistic cost of the project are tools for evaluation of investment projects under the conditions of uncertainty.

The biggest challenge is an evaluation of the influence of the combined project on the socio-economic development of the district of deployment; this influence is related to the uncertainty of two kinds. First, implementation of large-scale projects has a revolutionary influence on the economy of the

territory (district); this situation obviates various extrapolations. Second, it is virtually impossible to quantitatively predict the consequences of the implementation on the basis of statistically measurable indicators. In such cases, the goal of evaluation and prediction is usually accomplished by means of the tools of systems analysis that is aimed at studies of weakly structured problems and allows researchers to analyze systems and their internal and external interactions.

Thus, for evaluation of socio-economic effects of a combined project, we propose a twofold approach.

1. Evaluation of budgetary effectiveness is conducted by means of the DCF model for calculation of present cash flows of the government (revenues and expenses). The cash flows of the government are computed on a multiversion basis: the maximal and minimal version are identified (in accordance with the expected scenarios of the conditions of the project's implementation); as a result, one determines the area of possible solutions. In addition, one evaluates the risks of the government's participation in the investment project under study (depending on the type of participation and specifics of the possible default situations).

2. The influence of the project on the socio-economic development of the municipal district is assessed by means of the fuzzy cognitive model based on a fuzzy cognitive map [17, 18]. The use of this type of models is probably the result of, first, the "revolutionary" transformational influence of the project on the district's economy, and second, limitations of the existing (at the district level) statistical information. In this combination, the above-mentioned circumstances make it difficult to construct traditional mathematical models: econometric or balance (interindustry) models. The fuzzy cognitive model takes into consideration interactions among the elements (factors) of the socio-economic system and determines the possible increment of key indicators of the territory's development (caused by construction activity and subsequent functioning of the infrastructural object). Our interpretation of the method of cognitive modeling and the technology of its application are discussed in detail elsewhere [19].

The main elements and interactions of the proposed tools for financial and economic evaluation and for socio-economic evaluation of complex projects in new development districts are presented in Fig. 1.

The proposed approach was applied to analysis and evaluation of a project on creation of transport infrastructure (building of an automobile road) in the Berezovsky municipal district of the Khanty-Mansi Autonomous Okrug (region)—Ugra (KhMAO)—in terms of its social progress and development of the mineral-natural-resource potential.

The Berezovsky district is one of the most problematic in KhMAO in the sense of socio-economic development. Historically, for a number of reasons, the district has been falling behind and became hopeless, with a diminishing population, high unemployment, and a low standard of living. Besides, the Berezovsky district (total area ~90000 km^2, greater than the Chelyabinsk region or almost the size of Portugal) has no year-round transportation routes: no railroads and no automobile roads. Today, there is growing realization that depressive districts do not so much require government subsidies and "artificial lifting" to the average level, but rather need the creation of internal conditions conducive to economic (inclusive) growth and to the general welfare. Such a condition for the Berezovsky district is, above all, the creation of reliable transport infrastructure, which will enable conversion of the existing natural-resource potential into real economic growth.

Analysis of a complex project on construction of an automobile road and development of natural resources in the Berezovsky district of KhMAO[3]

The first big step in this direction can be the construction of the automobile road "Saranpaul–River port" in the basin of the Ob river; this road will traverse in the latitudinal direction virtually the whole territory of the Berezovsky district and will connect the resource-rich pre-Ural zone with the existing large-capacity transportation routes. The highway opens up the path to natural riches of the expansive area of the pre-Ural part of KhMAO; these rich resources cannot be developed at present because of the absence of the necessary infrastructure. For the Berezovsky district, the road under consideration can be called a "lifeline route" without exaggeration. The expected (multiplicative) socio-economic

[3] The authors express their gratitude to N. V. Tabakov and A. V. Kopaygora for support and interest in this work.

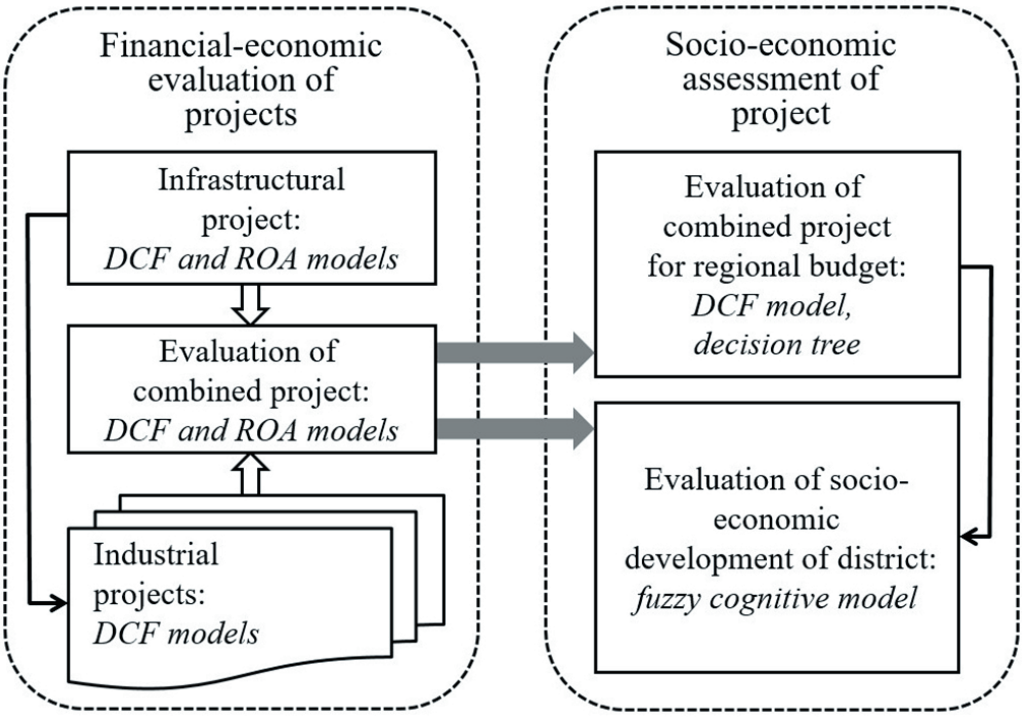


Fig. 1. *The tools for evaluation of complex projects in new development districts*

benefits of this automobile road go beyond the borders of this district because the existing resources can be effectively used for the needs of the whole region.

On the scale of the Berezovsky district, construction of the automobile road represents a very large investment project. Furthermore, the combined project, which includes the development of natural resources of this territory, is a complex one from the organizational-economic and financial-organizational points of view. This project is also interesting because it served as an example for derivation and elaboration of the following:

— the model of implementation of development projects for economically underdeveloped territories (also having integrational significance within the framework of the interaction of the European and Asian parts of Russia);

— the scheme of management, funding, and regulation of complex projects of the cluster type with a developing and expanding structure (which has to do with the process of research on and replenishment of the resource base for implementation of distinct subprojects);

— the procedure for creation of new manufacturing processes that are tightly linked to one another and serve the internal market (not only within the economy of the analyzed subject of Federation).

This project may become proving ground for the formulation of an approach to the economic advancement of underdeveloped territories on the basis of implementation of infrastructural projects with participation of the government and business. Undoubtedly, such projects represent the future of economic development of the whole Russian economy and its resource territories.

Economic evaluation of the combined project from the standpoint of KhMAO. Evaluation of the budgetary effectiveness of the project was performed by means of the DCF model. The positive cash flow for KhMAO (revenues) from realization of the project consists of several components and includes:

— tax revenues from the mineral resource complex and the related manufacturing processes, which will be created thanks to the emergence of the highway;

— tax revenues from the development of other branches of the district's economy (including income tax revenues from the population);

— coupon income from bonds of the company–concessionaire (in the case of government funding of the project via purchase of bonds).

The negative cash flow (budget expenses) associated with the project's implementation includes:

— investments into implementation of the project (direct and in the form of the purchase of bonds of the company–concessionaire);

— expenses on the use of the highway (in the case of share-based participation);

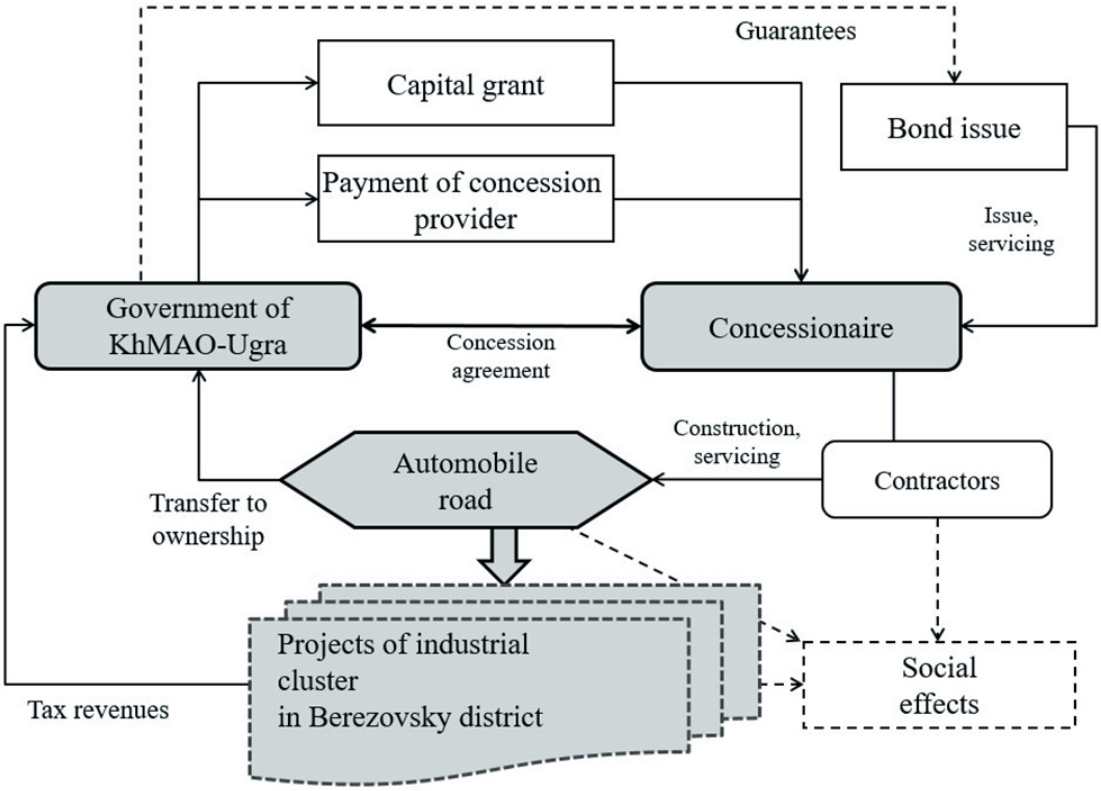


Fig. 2. *3P with government cofunding of capital investments in the form of a concession agreement*

— payment of coupons on bonds in the case of default of the company–concessionaire.

The completed evaluations showed that there is a real opportunity to form a set of institutional and organizational-financial conditions, which would make implementation of the highway project attractive (in the financial and economic sense) both for investors and for the government (not to mention the socio-economic benefits for KhMAO and the Berezovsky district). The above opportunity is related to the use of 3P mechanisms which allow for minimization and fair distribution of risks, whereas the benefits are maximized.

During construction of the object in question, it seems most rational to use the investing mechanism involving government's cofunding of capital investments in the form of a concession agreement with payment of the concession provider. Such an agreement stipulates that the concession provider will assume a part of the expenses on implementation of the project at the investment stage, the use of private investments, as well as repayment of investing-related and use-related expenses of the private partner via payment of the concession provider (Fig. 2).

Calculations were performed that included several versions of the concession agreement, where the share of the regional government in the funding of the highway was 30 %, 50 %, or 70 %. The results showed that from the point of view of the regional government, the concession version with the capital grant on the order of 30 % of the investments into construction of the highway is the most efficient (Fig. 3).

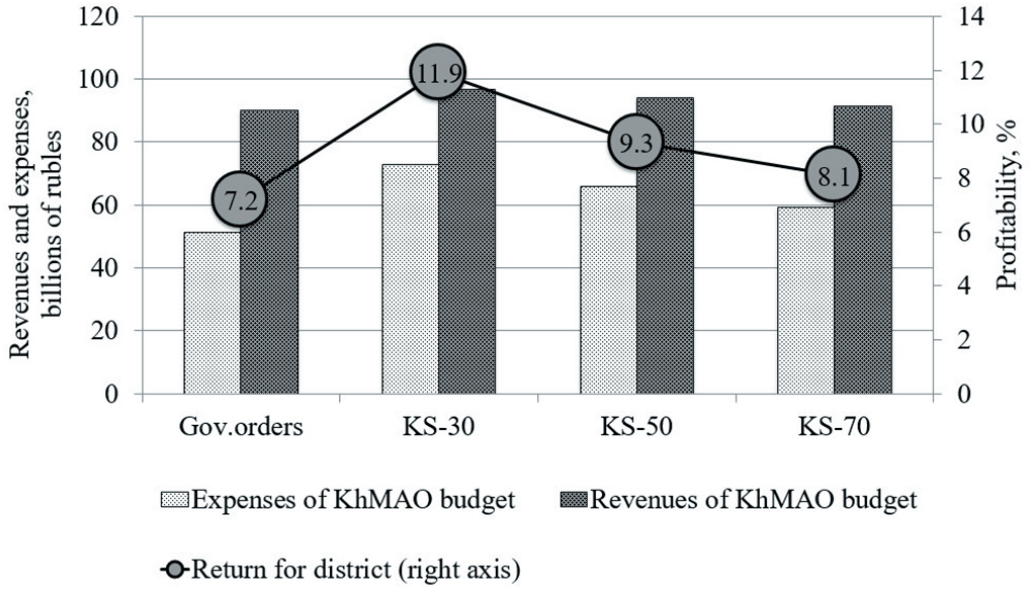
Evaluation of socio-economic effects for the Berezovsky district. This district level evaluation was performed by means of the fuzzy cognitive model, where researchers build a system of direct, reverse, positive, and negative interactions (differing in intensity) among the factors being modeled. Numerical values of the mutual-influence coefficients were determined, taking the following into account:

— the expected target effects of the highway construction, related first of all to the active development of the mineral resource complex;

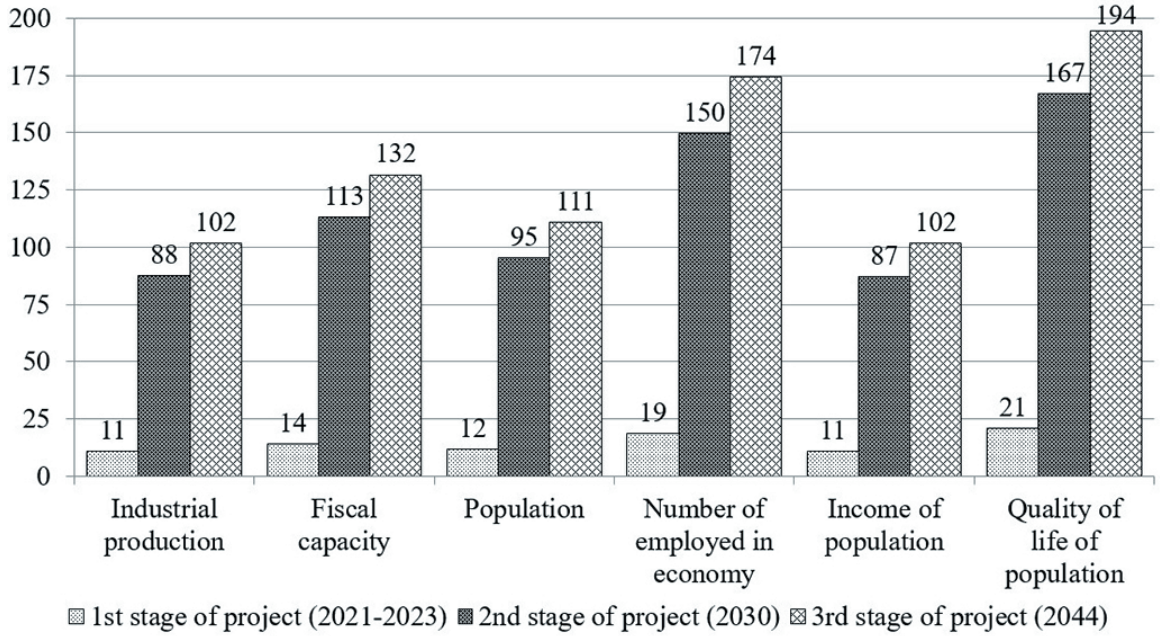
— overall status, structure, and the established trends of socio-economic development of the Berezovsky district;

— typical estimates (verified by means of statistical observations and by quantitative and qualitative research) of the strength of interactions among the elements of the territorial socio-economic system.

Realization of the fuzzy cognitive model represents a recurrent computational procedure, where the number of iterations should ensure convergence of the calculations, i.e., obtaining the stable values



Notes: KS-30, KS-50, and KS-70 are versions of the concession agreement, where the share of the district in the funding of the automobile road is respectively 30 %, 50 %, and 70 %.
Revenues and expenses of the KhMAO budget are in billions of rubles.
Fig. 3. *Participation of the KhMAO budget in implementation of a complex project*



Note: in the prognosis of the increase in the indicator of industrial production, we did not take into account the mineral resource complex, whose dynamics cannot be expressed numerically because of the severalfold growth relative to the present level.
Fig. 4. *The predictable increase in indicators of the socio-economic system of the Berezovsky district as a result of implementation of the project, %*

that characterize changes in values of the model's factors. Such a change is interpreted as a percentage increment relative to the value of an indicator in the initial state of the system.

The initial factor—creating the impetus for the socio-economic development of the Berezovsky district—is the highway project "Saranpaul—River port of Ob." It is assumed that the presence of the highway allows for initiation of the development of mineral/natural resources in the Saranpaul area and in other parts of the Berezovsky district that are adjacent to the highway.

The process of implementation of the project in the direct manner is accompanied with a sharp increase in investments and construction activities. The development of the mineral resource complex has a very similar influence on the factors "investments" and "construction activities." After that, with decreasing intensity, mutual influences among the above-mentioned and other factors become

realized including the indicators that characterize fiscal capacity and budget expenses, development of the social realm, employment, and the standard of living of the populace. The final factors are the population's quality of life, safe living, and the ecological situation. As a restrictive factor in this model, we used the ecological situation, whose deterioration may projects and the flow of investments into the territory.

The results of this calculation revealed that realization of the project gives a potent impetus to the socio-economic development of the Berezovsky district and exerts a substantial multiplicative action. The predicted increase in the indicators of industrial production, fiscal capacity, population size and employment, the standard and quality of living is 2.2 — to 2.7-fold, under the influence of the project (Fig. 4). The stimulatory action of the project can be increased by ~25 % via enhancement of the regional economy, with effects on the processing industry, agriculture, tourism, and services.

Our financial/economic and socio-economic analysis showed that implementation of the project is worthwhile, most of all, for the interests of KhMAO and the Berezovsky district, which are the main beneficiaries of the budgetary-financial and socio-economic improvements. At the same time, the realization of the proposed project can have big consequences for the economy of the Ural federal region. Within the borders of Pre-Polar Ural, despite the scarce geologic data, rich deposits and signs of virtually all groups of hard fossil resources have been discovered: quartz, coal, ferrous and nonferrous metals, rare and noble metals, and diamonds. Improvement of transport accessibility of this area should promote the acceleration of geologic reconnaissance, completion of research on the known deposits of natural resources and discovery of new deposits in order to establish and develop mining/extractive industries in this region and to enhance the overall resource security of this country. Construction of the highway in the Berezovsky district of KhMAO should give a strong impetus to the large interregional project "Ural Industrial — Ural Polar." Due to the above-mentioned circumstances, construction of this automobile road should receive support at least at the level of the federal region.

Main conclusions

Our study on the problems of economic advancement of new development territories and on implementation of meso-level resource projects showed the validity of the use of concepts of impact investing and inclusive growth as the basic principles. This conceptual construct forms the modern scientific-theoretical and practical basis for the interactions between the government and private business (including the 3P format), where the ultimate goal is general welfare and accretion of socio-economic values.

It should be noted that the immediate motives of the project-related activities are far from being altruistic. The government and business have to show mutual pragmatic attitude toward the formation of conditions for implementation of investment projects, and this situation will allow to attain satisfactory indicators of effectiveness. From the practical standpoint, the problem mostly has to do with how well both parties — private investors and the government (represented by regional authorities) — are prepared for constructive resolution of problems, for the search and unbiased selection of concrete types of collaboration, and for delineation of the boundaries of own responsibilities and the desired benefits. Another important aspect is related to the competence of the decisions being made: how meticulously they will be analyzed, how precisely they will be verified, and how timely they will be — without jumping ahead and lagging behind.

It is believed that pragmatism is characteristic of business; therefore, we would like to point out the necessity of a symmetrical attitude on the part of the government. Government support of projects is not equivalent to charity. Participation in the implementation of complex projects gives the government substantial financial gains in the form of revenues for the regional and federal budget. Furthermore, in each concrete case, the size of benefits for the government directly depends upon the scale of the development of the whole cluster (not only the infrastructural component); this observation predetermines the necessity of stimulation and control over the completion of the corresponding plans.

During financial and economic analysis of projects and during evaluation of project-related multiplicative effects, it is necessary to create and use adequate methodological tools. Priority should be given to the models and methods that allow researchers to directly take into account the uncertainty factor and to assess project risks and their balancing (including determination of parameters of concession agreements).

The rationale for the ideas proposed here and for the proposed solutions was confirmed during analysis of a concrete infrastructural project (construction of the highway Saranpaul–Port of Ob river), which forms the basis for the creation of a large industrial cluster in the Berezovsky municipal district of KhMAO. The current socio-economic situation in this depressive but potentially affluent district is typical of Russia because many other territories of this country are in a similar position. The results of our study proved that resolution of the problem of backward territories is not an increase in the financial aid from above, but activation of internal points of growth according to the principles of impact investing and implementation of projects that promote inclusive development. To overcome the difficulties, the territories in most cases need the government assistance that is based on pragmatic consideration of the interests, likely shortcomings, and benefits (rather than subsidies from higher-level budgets).

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References

1. Kryukov, V. A., Sevastyanova, A. Ye., Shmat, V. V. (2006). Problemy vybora napravleniy diversifikatsii ekonomiki neftegazovoy territorii [Choice of the directions of economic diversification for the oil and gas territory]. *Prostranstvennaya ekonomika [Spatial economy], 2,* 33–44.

2. Tatarkin, A. I. & Romanova, O. A. (2014). Promyshlennaya politika: genezis, regionalnyye osobennosti i zakonodatelnoye obespechenie [Industrial policy: genesis, regional features and legislative support]. *Ekonomika regiona [Economy of region], 2,* 9–20.

3. Kryukov, V. A., Silkin, V. Yu., Tokarev, A. N. & Shmat, V. V. (2011). Mineralno-syryevoy kompleks Rossii. Realizatsiya preimushchestv i vozmozhnostey razvitiya [Mineral and raw complex of Russia. Realization of advantages and opportunities for development]. *Mineralnyye resursy Rossii. Ekonomika i upravlenie [Mineral resources of Russia. Series: economics and management], 5,* 3–13.

4. Varnavskiy, V. G. (2005). *Partnerstvo gosudarstva i chastnogo sektora. Formy, proekty, riski [Partnership of the state and private sector. Forms, projects, risks].* Moscow: Nauka Publ., 315.

5. Matveev, D. B. (2007). *Gosudarstvenno-chastnoye partnerstvo. Zarubezhnyy i rossiyskiy opyt [Public-private partnership. Foreign and Russian experience].* St. Petersburg: Nauka Publ., 171.

6. Zinchenko, V. P. (2007). Tolerantnost k neopredelennosti. Novost ili psikhologicheskaya traditsiya? [Tolerance to uncertainty. News or psychological tradition?]. *Voprosy psikhologii [Psychology questions], 6,* 3–20.

7. Hoekman, B. (2012). Trade Policy for Inclusive Growth. *Policy Dialogue. Redefining the Role of the Government in Tomorrow's International Trade.* Geneva: UNCTAD, Retrieved from: http://unctad.org/meetings/en/SessionalDocuments/ditc_dir_2012d1a_Hoekman.pdf (date of access: 11.05.2015).

8. Porter, M. & Kramer, M. (2011). Creating Shared Value. *Harvard Business Review, 1.* Reprint R1101C, 17. Retrieved from: http://www.hks.harvard.edu/m-rcbg/fellows/N_Lovegrove_Study_Group/Session_1/Michael_Porter_Creating_Shared_Value.pdf (date of access: 11.05.2015).

9. *Impact Investing Policy in 2014. A Snapshot of Global Activity.* (2014). IIPC, 100. Retrieved from: http://globalpolicy.iipcollaborative.org/wp-content/uploads/sites/5/2014/12/2014-IIPC_Full-v6.pdf (date of access: 11.05.2015).

10. Höchstädter, A. K. & Scheck, B. (2014). *Mapping the Social Impact Investing Market in Germany. An Overview of Opportunities in the Education Space.* IIPC, 52. Retrieved from: http://gle.iipcollaborative.org/mapping-social-impact-investing-market-germany-overview-opportunities-education-space/ (date of access: 30.06.2015).

11. Harji, K., Reynolds, J., Best, H. & Jeyaloganathan, M. (2014). *Impact Investing in Canada.* RBC Foundation, 17. Retrieved from: http://www.rbc.com/community-sustainability/_assets-custom/pdf/2014-Impact-Investing-in-Canada.pdf (date of access: 30.06.2015).

12. Ngoasong, M., Korda, A. & Paton, R. (2014). Impact Investing and Inclusive Business Development in Africa. A research agenda. *IKD Working Paper, 2014.* UK: Open University Business School, 23. Retrieved from: http://www.open.ac.uk/ikd/documents/working-papers/ikd-working-paper-76.pdf (date of access: 30.06.2015).

13. *The Roles and Opportunities for the Private Sector in Africa's Agro-Food Industry.* (2012). UNDP African Facility for Inclusive Markets. UN: United Nations Development Program, 100. Retrieved from: http://www.undp.org/.content/dam/undp/library/corporate/Partnerships/Private%20Sector/Market%20Study.pdf (date of access: 30.06.2015).

14. Laughton, D. G. (1998). The Potential for Use of Modern Asset Pricing Methods for Upstream Petroleum Project Evaluation. Introductory Remarks. *The Energy Journal, 19(1),* 1–11.

15. Shmat, V. V. (2015). O metodakh ekonomicheskoy otsenki regionalnykh energeticheskikh proektov GChP s uchetom faktorov neopredelennosti i riska [On the methods of economic assessment of the regional PPP energy projects taking into account factors of uncertainty and risk]. *Energeticheskaya politika [The energy policy], 3,* 47–58.

16. Gamba, A. & Sick, G. (2010). Some important issues involving real options. An overview. *Multinational Finance Journal, 14(1/2),* 73–123.

17. Kosko, B. (1986). Fuzzy cognitive maps. *International Journal of Man-Machine Studies, 24,* 65–75. Retrieved from: http://sipi.usc.edu/~kosko/FCM.pdf (date of access: 30.06.2015).

18. Silov, V. B. (1995). *Prinyatie strategicheskikh resheniy v nechetkoy obstanovke [Adoption of strategic decisions in the indistinct situation].* Moscow: INPRO — RES Publ., 228.

19. Belan, A. K. & Shmat, V. V. (2015). Analiz vliyaniya resursnykh i neresursnykh faktorov na rost ekonomiki Tomskoy oblasti s primeneniem kognitivnogo podkhoda [The analysis of influence of resource and non-resource factors on economic growth of the Tomsk region with application of cognitive approach]. *Vestnik NGU [Messenger of NSU], 15(1),* 78–93. (Series: Social and economic sciences).

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