

Alignment of goals for decision support in innovation ecosystems

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Achieving the sustainable development goals requires proper actions that are results of sophisticated decisions based on research on complex socio-ecological processes at various levels: local, regional and international. Sustainable development depends, on the one hand, on the state of individual subsystems of socioecological system: economic, ecological, social; and on the other hand, from effective decisions at different governance levels of that ensure the adjustment of the relationship between these subsystems and the rational use of resources.

The economic development of a certain region depends on the use of high technologies and innovations in production processes, which is related to the maturity of the innovative ecosystems in the region. Participants of the innovative ecosystems work on new ideas and technologies, contributing to the transformation of knowledge into socio-economic value. An innovation ecosystem goes beyond the boundaries of a single organization and requires a certain level of synergistic interaction of participants, which becomes most effective when it is "orchestrated" or coordinated through informal and formal associations formed on the basis of trust, shared resources, value chains, shared vision of common values. At the same time, regional innovation ecosystems must have sufficient industrial and scientific and educational potential, as well as consistency with the policy of regional decision-making bodies.

Innovation ecosystems that developing on the basis of clusters, as a rule, involve a joint financial commitment, additional to current costs, from both the regional industry and the regional government, as well as the use of resources of scientific and educational organizations. Accordingly, the task of optimal distribution of these additional resources for the effective development of the whole innovation ecosystem arises. In addition, the participants of the innovation ecosystem have their individual and group goals, which must be reconciled among themselves and in accordance not only with projects and ecosystem goals, but also with sustainable development goals .

When stimulating the processes of innovative activity at the local and regional level through the activation of innovative potential in individual and collective projects, initiatives or startups, it is necessary to simultaneously solve the problem of adapting the structure of production factors of the territorial complex to the challenges of sustainable development.

Strategical planning both at the local and regional level requires optimal solutions for the distribution of limited resources between regional programs and projects, taking into account both environmental constraints and social and economic priorities.

Innovative ecosystems require complex targeted interactions of actors in some socio-ecological system which represent 4 helixes of the Quadruple Helix model of innovation: science/education, industry, government, public.

When the ecological dimension of innovation is added to the innovation ecosystem as the fifth helix of the natural environment, through socio-ecological interactions, then this quintuple helix expands the goals of the innovation ecosystem to the sustainable development goals of the region to which the innovation ecosystem belongs.

During the formal description of the set goals, it is necessary to achieve a certain balance between the goals of the participants and consumers of innovative products and services taking into account additional environmental criteria.

This task is solved by using multi-objective optimization methods to take into account the largest possible set of objective functions of actors with a common strategy. Let`s consider the strategy as a long-term plan, which is accompanied by constant analysis and monitoring during the implementation process, and is aimed at achieving a certain main goal. Decision support tools should be used to provide an opportunity to allocate available limited resources between projects, which allows to achieve the highest degree of fulfilment of the goals of participants and decision-makers.

Therefore, we are talking about a common strategic goal - the development of an innovation ecosystems in regional sustainable development strategy. Decomposition takes place to the level of specific projects that can be influenced by decision-makers. Coordination of priorities with the goals of other participants of innovation ecosystem can be done by ranking priorities. This will make it possible, on the one hand, to structure interactions, and on the other hand, to identify additional resources for achieving goals where there are many other interested participants of the ecosystem. Determining the distribution of available limited resources between projects makes it possible to achieve the highest degree of fulfilment of the set strategic goal at a given time, taking into account the current influence of factors and the limited amount of resources and financing of projects. So, the use of multi-criteria optimization methods should be based on taking into account both the internal goals of the participants of the innovative ecosystem and the sustainable development goals.