

**CDSSES 2020****IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin****DEVELOPMENT OF A REGIONAL FORESIGHT RESEARCH METHODOLOGY**

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**Abstract**

In modern conditions, regional innovation policy should be focused on finding adequate responses to global challenges. It is necessary to study the dynamics of changes in existing markets and understand what technologies will demand the digital economy. Foresight methods are proposed for forecasting and selecting promising technologies taking into account the potential of the territory. According to the authors, foresight is an analytical tool that identifies technological breakthroughs and opportunities for innovative development of the territory. In this regard, the study's purpose is to develop a methodology for conducting regional foresight studies aimed at identifying priorities for innovative development of the territory. The proposed approach allows us to identify the entrepreneurial potential according to the European concept of "smart specialization" used in this study. It is necessary to ensure a constructive dialogue between the government, business, civil society, science and education. The method is based on the author's matrix of priorities for the development of territories. The study's result will be a typical scheme for conducting a regional foresight describing the application of methods at each stage to select priorities for the development of the territory. This method will strengthen the existing theoretical and methodological aspects of the formation of regional innovation policy. The focus is shifted to the individuality of the territory and its competitive advantages in forming an innovative development strategy based on the principles of "smart specialization".

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## 1. Introduction

The formation of a strategy for innovative development of the territory is a mandatory procedure that determines the trajectory of movement in the external environment. Today, it is common to talk about the uncertainty of the external environment for developing systems at various levels: from supranational and national to regional and subject. Scientists and practitioners consider the concept of uncertainty as a large-scale category. Therefore, a comprehensive description of the uncertainty in technology's active development and the growing interdependence of economies and political instability are required.

In our view, understanding the external environment's characteristics is a top priority in determining the future for territory at any level. It is necessary to catch changes in time, try to influence them and adapt to them. It is important not to lose control of the present, to be able to anticipate possible future options and not to be afraid of uncertainty.

Highlighting the regional level as the object of research, we will focus in this article on the problems of developing and implementing a strategy for innovative development of the regions of the Russian Federation based on the principles of the concept of smart specialization. To provide such a strategic process with high-quality information about possible scenarios and images of the future, it is necessary to conduct a foresight study that takes into account the features and characteristics of the regional external environment in (Kutsenko et al., 2018).

In this work, the foresight study serves as the basis for selecting innovative development priorities in the region. On its basis, the entrepreneurial search process is formed with the involvement of representatives of all groups of the "four-link spiral of innovation" model and with the discussion of strategic alternatives by all participants of the foresight sessions in (Carayannis & Grigoroudis, 2016).

## 2. Problem Statement

Modern researchers study the problems of organizing and conducting foresight as follows: they highlight the main stages and methods, and offer general research tools (Ejdys et al., 2019). The basic methodology of any foresight includes the following aspects: characterization of the present; determining the image of the future; planning actions to achieve the future; maintaining a dialogue between the participants of the foresight. Foresight's main goal is not to predict the future, but to make "uncertainty" a reference point for long-term planning in (Gibson et al., 2018).

Currently, the scientific literature does not sufficiently develop regional foresight algorithms that take into account the interests of four groups of stakeholders: the state, business, civil society, science and education. Therefore, the relevance of this research topic can be justified by the need to develop a methodology for conducting regional foresight that meets the principles of the concept of "smart specialization" in (Khairova, 2017). It is "smart specialization" that is the main tool for forming the strategy of innovative development of regions. The foresight role in our case is not so much to identify global challenges, but to find answers – actions and policy tools that allow us to most effectively solve the problems of innovative development of regions.

Many scientists note that the core of the "four – link spiral of innovation" model should be consumers of innovations-the civil community as participants in the innovation process. In our opinion, this issue can be studied through the prism of a dual model: on the one hand, a citizen is considered as a labor professional (a representative of one of the government, business, science and education), and on the other hand as a resident of the region (a representative of the civil society). This means that their needs and interests can stimulate demand for innovation in the region in (Dezhina & Ponomarev, 2016). Therefore, it is necessary to strengthen the civil component of the dual model by using the "four-link spiral of innovation" in the strategic process and involving citizens in the process of entrepreneurial search.

In this regard, we would like to emphasize the need to focus regional innovation policy primarily on solving social problems. And only then can we move on to achieving economic goals using the potential of new technologies. Technology should solve the social problems of society. Therefore, foresight research can also be used as a tool for developing the dual model.

### **3. Research Questions**

Within the framework of this study, it is necessary to study the existing experience of regional foresight in Russian practice. Identify the features and identify the problems of using foresight as a technology for creating an "image of the future" for the region. On the other hand, it is useful to study the methodological techniques of foresight and critically approach the description of the methods of conducting foresight research. Based on existing experience and basic abstracts, it is necessary to propose a methodology for conducting a regional foresight, taking into account the principles of the concept of "smart specialization" for Russian conditions.

### **4. Purpose of the Study**

The authors are interested in modern methodological approaches and current principles of planning and forecasting for the purpose of forming a strategy for innovative development of the region in (Abisheva et al., 2014). The popular concept of "smart specialization", studied by the authors, distinguishes foresight as a modern communication and research technology that allows you to combine the interests of different groups of stakeholders (Tronina et al., 2019). In this regard, the purpose of this study is to study the practical and methodological experience of conducting foresight in Russian regions, as well as to develop a methodology for conducting regional foresight research in accordance with the requirements of the concept of "smart specialization".

### **5. Research Methods**

To achieve this goal, in the course of preparing this article, we used modern methodological tools that allow us to study the problems of innovative development of the territory, scientific works of domestic and foreign scientists on research issues. General scientific and special methods of scientific search were used in the research process: system analysis, comparison, description, generalization, systematization.

## 6. Findings

Russian practice has accumulated some experience in implementing regional foresight projects. In our opinion, the following examples of regional foresight are of scientific interest: "Foresight of the Republic of Sakha (Yakutia)-2050", "Priorities of innovative development of the Republic of Bashkortostan", "Strategy of the Samara region", "Foresight of Yekaterinburg", "Foresight-study of human capital development of the Krasnoyarsk territory until 2030", "Regional foresight of the Irkutsk region", "Strategy of the Republic of Tatarstan" (Makarov, 2020).

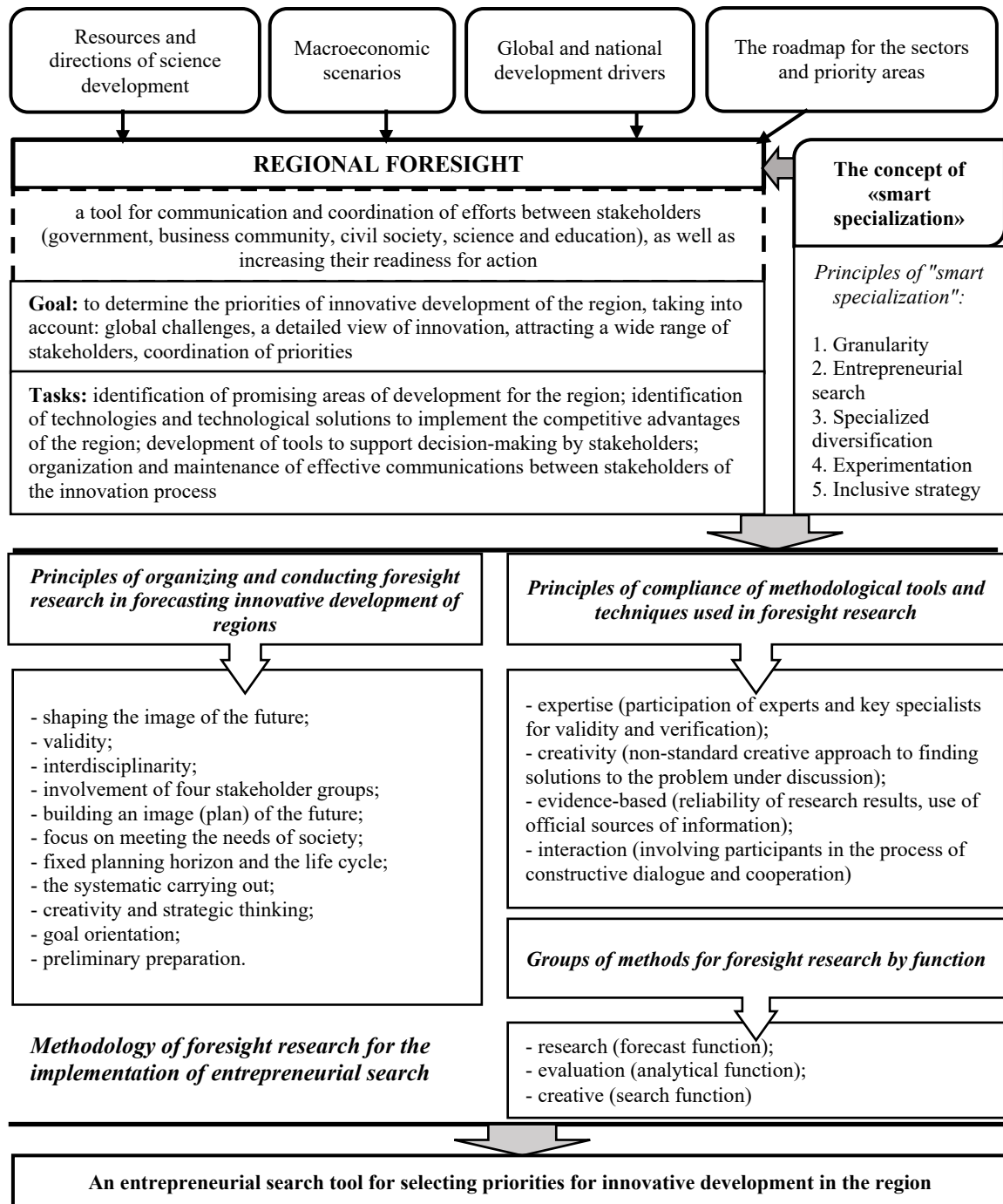
Analysis of open information about Russian foresight research at the regional level allows us to draw the following conclusions:

- many of the stated foresight studies are not such in their essence;
- weak implementation of the communication function of foresight as a result of the preferential orientation of decision-making by participants to narrow groups of influence;
- low level of innovative activity of organizations and innovative culture in the region;
- low level of development of network interaction potential between key participants of the region's innovation system;
- low level of social capital development in the region and insufficient opportunities to use it in developing an innovative development strategy in the format of a foresight session;
- in many cases, there is a weak elaboration of the tool for implementing the results of foresight as the development of practical measures to follow the selected strategic guidelines.

Taking into account the experience of conducting regional foresight in Russian practice, and based on the principles of the European concept of "smart specialization" studied in the study, the authors proposed an essential model of regional foresight research, taking into account the problem of implementing "entrepreneurial search" (figure 1).

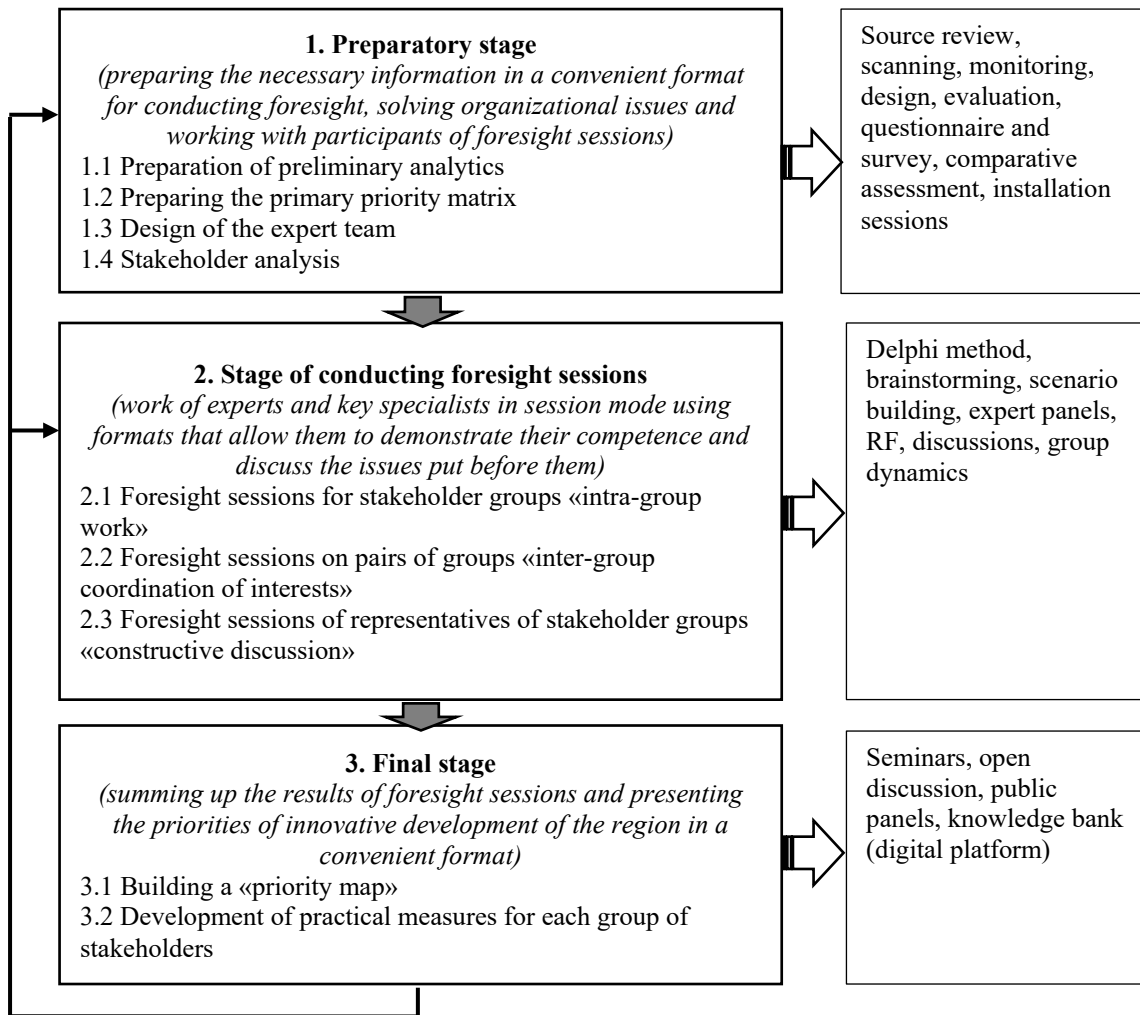
The specificity of the "entrepreneurial search" technology is the need to involve representatives of four groups of stakeholders in the research process. The purpose of this interaction is to identify the region's main advantages and opportunities; formation of a unified view of the directions of regional innovative development in (Bosch & Vonortas, 2019). The model reflects the author's understanding of the essence and methodology of regional foresight research that meets the requirements of the concept of "smart specialization".

As the results of the Russian experience analysis confirm, a good arsenal of tools and research methods is used for conducting regional foresight. The goals of foresight determine everything. Based on the basic structure of foresight, the authors developed a method for conducting regional foresight research that meets the previously presented model's requirements. The method involves the allocation of three main stages, each of which is detailed on a set of measures with its own set of methodological techniques (figure 2).



**Figure 1.** The regional foresight research model

**1. Preparatory stage.** The overall goal of this stage is to provide information and methodological support for foresight. The more carefully thought out the process of organizing foresight sessions and the mechanism for involving participants in the discussion of problems, the more effectively the next stage will be implemented.



**Figure 2.** Methodological scheme for conducting a regional foresight study

1.1. Preparation of preliminary analytics. The foresight team prepares preliminary analytics based on the search and analysis of scientific texts, statistical materials, program and conceptual documents. Based on empirical research, a cross-section of the current situation is described. The macro-environment research technology can also be applied, including sequential and cyclical use of the following methods:

- scanning (identification of indicators, signals, trends and patterns of current, potential and new changes (problems) in various areas);
- monitoring (tracking detected changes over time, observing trends and sequence of events, as well as the dynamics of changes in order to determine the nature of their evolution);
- design (determining the trajectory of a possible development of events with a way to respond, resulting in the delineation of the «image of the future»);
- assessment (assessment of current and future changes in terms of importance and significance for the region in its strategic and innovative development).

1.2. Preparing the primary priority matrix. The foresight team creates a matrix of priorities for future discussion by experts at foresight sessions. This matrix reflects the region's innovation and structural profile, taking into account its resource and performance components of innovation potential.

For this purpose, the region's industry specialization, socio-economic and scientific-technological conditions, as well as the geo-demographic state are described in (Kutsenko & Eferin, 2019). Matrix cells describe the levels and possibilities of using key technologies in various fields of activity. The matrix is a tool for discussing potential and real "windows of opportunity" for the region in the format of innovation development priorities (Tronina et al., 2020).

1.3. Designing the composition of experts. The composition of expert groups is being formed. For this purpose, the most competent participants are selected – representatives of each of the four groups: government, business, civil society, science and education. You can first create a "competence" model of a potential foresight expert and use it as a selection criterion. To work with experts, you can use such methods as a questionnaire, interview, or survey.

1.4. Analysis of stakeholders. Stakeholders are not just a focus group of foresight, but they act as players in foresight sessions, representing the interests of their entire subject position: government, business, civil society, science and education. It is necessary to think over the procedure for pre-training each participant to form their competencies for effective participation in foresight sessions. After that, the applicants are analyzed and working groups are formed. The following methods can be used to work with stakeholders: a survey, a competency questionnaire, an interview, and a comparative assessment. To train stakeholders, you can use installation sessions, trainings, analytical guides, and role-playing games.

Based on the results of the preparatory stage, an "information and analytical" package of documents for all categories of participants is determined, an algorithm for conducting foresight sessions is developed, focus groups and expert groups are formed, and moderators of foresight sessions are appointed.

**2. Stage of conducting foresight sessions.** This is the essence of foresight as a social technology in the format of communications, which allows participants to agree on the "image of the future" of the region and determine the trajectory of movement to it. At this stage, experts and key specialists work directly on the subject groups of stakeholders: government, business, civil society, science and education. According to the authors, the work of groups should be divided into three types of foresight sessions: intra-group, inter-group, and general. The primary priority matrix compiled by the analytical team is the main tool for this work. The goal of the stage is to discuss and draw up a reasonable version of the final priority matrix, determine the overall trajectory of the region and the direction of further actions for each group of stakeholders.

2.1. Foresight sessions for stakeholder groups "intra-group work". The purpose of the session is to discuss the proposed primary matrix of priorities within each subject group. As a result of this work, four subject matrices will be compiled.

2.2. Foresight sessions on pairs of groups "intergroup coordination of interests". The task of the session is to coordinate interests in pairs in the format of a priority matrix between subject groups. Each focus group should "communicate" in turn with all the others. The result of this work will be a list of agreed priorities and a list of "stress points" to be discussed in the next step.

2.3. Foresight sessions of representatives of stakeholder groups "constructive discussion". The task of the session is to coordinate the interests of all stakeholder groups in the discussion mode and prepare

the final version of the priority matrix. The work is conducted with experts and key participants-representatives of each subject group.

Experts work in each foresight session, making a preliminary selection of priority areas and key technologies, as well as participating in the synthesis of results. The following methods are suitable for this stage: Delphi, brainstorming, scenario building, expert panels, RF (rapid foresight), discussions, and group dynamics. The mode of foresight sessions allows all participants to demonstrate their competence and adequately discuss the issues of innovative development. This approach will ensure the effectiveness of the "entrepreneurial search" mechanism as an important aspect of the concept of "smart specialization".

**3. Final stage.** This stage "puts an end" to the foresight research and provides a conclusion for all participants. The foresight team together with experts summarizes the results and draws up the results in a convenient and understandable format.

3.1. Building a "priority map". The purpose of this document is to describe in detail the selected priorities for innovative development of the region. This is necessary for further actions when developing a strategy for innovative development of the region based on the concept of "smart specialization". For example, a priority map may contain the following sections: priority formulation, goal, tasks, work format, meaningful results, and deadlines. The "priority map" can be considered a starting point for strategic actions in the region. The prepared priority map should be placed on the information portal for public review and discussion.

3.2. Development of practical measures for each group of stakeholders. At this step, a set of measures is developed with directions for each subject group of stakeholders and planning further actions and meetings. This information must also be published on the information portal in a shared access format.

At this stage, you can use the following methods and techniques: seminars, open discussion, public panels, knowledge bank (digital platform) in (Raunio et al., 2018).

Since the results of each stage can be ambiguous and require time to adjust, feedback is needed. Foresight research can be cyclical and involve a return to a particular step. Moreover, according to the concept of "smart specialization", the result of foresight can be revised depending on changes in the external environment and internal regional transformations. The technology for implementing feedback should be considered at the preparatory stage. Feedback, in our opinion, is convenient to carry out through a digital platform as an information portal of the region.

Thus, the authors propose a method for conducting regional foresight research for the purposes of innovative strategic planning, which differs from the existing ones in the following aspects:

- the principles of the European concept of "smart specialization" are taken into account;
- the preparatory analytical stage has been worked out in detail (this will allow forming a working matrix of priorities that takes into account the current state of the regional economy and global trends);
- it takes into account the involvement of representatives of four spheres as stakeholders (government, business community, civil society, science and education) in order to identify priorities "from the bottom up";



- provides "competency" selection of foresight participants, the ability to conduct qualitative and quantitative assessment;
- orientation in the selection of regional priorities primarily on solving social issues with the active involvement of civil society;
- drawing up a map of regional priorities as the final document of the foresight study;
- focus on multi-sided and effective interaction of foresight participants during its implementation and in the future;
- application of modern digital technologies and platform solutions for organizing and conducting foresight.

## 7. Conclusion

The considered aspects of conducting a regional foresight study as one of the most relevant modern approaches to strategic planning and shaping the image of the region's future emphasize its importance in solving the problem of choosing priorities for innovative development of the territory in (Kuzmenko, 2017). Based on the study of existing examples of implementation of foresight projects in Russian practice, the advantages and disadvantages of foresight are identified, and the ambiguity of understanding the essence of this research tool is proved. The authors note the complexity of organizing and evaluating stakeholders' interaction in the innovation process in the region to create a constructive dialogue in the format of foresight sessions. An attempt is made to prescribe the order of using various methods of foresight research using a methodical algorithm.

The paper focuses on the difficult-to - study element of the "four-link spiral of innovation" model-civil society. Its duality and role in the innovation process as a consumer of innovations are shown.

Nevertheless, the question of creating an algorithm and describing the mechanism for selecting experts for each of the stakeholder groups to participate in foresight sessions remains open. This problem can be considered one of the directions of further research by the authors.

We need a special foresight environment as a "communication platform" that allows us to "pick up" the initiative "from below" and ensure competent interaction between participants in the innovation process. The issues of creating and maintaining such a foresight environment should also be studied in the next study.

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