

## RESEARCH PORTAL "REGIONS' INNOVATIVE DEVELOPMENT"

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**Abstract:** *This paper presents a project, aimed to create an information analytic system to solve the problem of organizing collective work of researchers, supporting their efficient cooperation on one of the topical problems in the sphere of economy – the problem of region's innovative development. The project supposes a creation of a portal that provides possibilities of publication, search, analysis and cataloging data on stated subject matter, as well as information exchange. In the system there should be presented not only publications, received from different sources, but also work results of the researchers, participating in the project, particularly, suggested models of innovative development of enterprises, economic sectors, regions, quantitative and qualitative assessment of their innovational development level in conditions of, on the one part, integration and on the other – intensification of competition. Special attention in the project is paid to the usage of up-to-date information technologies in conducting researches. The software of the portal includes means of information search in different sources, analytic processing of the information in accordance to developed methods. Access to the portal will be provided for users of different categories (scientists, lecturers, students, specialists in public authorities). The first stage is a creation of a research prototype of the system. Initial filling is expected to be executed on the base of data, issued by project participants (particularly, method of complex assessment of region's innovative development, which is based on the economic and mathematical methods and models; model of knowledge domain, built on the base of ontology and used for searching and analyzing papers and data; etc.).*

**Keywords:** *Innovations; Models of innovative development; Ontology; Intellectual search; Data analytic processing; Web-technologies.*

**ACM Classification Keywords:** *H. Information Systems. H.3 Information storage and retrieval: H.3.5 Online Information Services – Web-based services; H.3.6 Library Automation – Large text archives.*

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### Introduction

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Slow paces of development of the innovation activity in the Russian economy and connected with this failures in introduction of innovation arrangements are mostly caused by the drawbacks of the system of analyzing innovation processes both in the whole sectors of the economy and within the bounds of particular economic subjects.

Significant aspect of competitiveness management in any economic system is safe and highly-qualified tools of evaluating main indicators of system development and achieved results, possibility of comparing them with other subjects, as well as possibility of a constant control of dynamics and directions of changes in key indicators of development. Special urgency and complexity is attached to the evaluation of innovation competitiveness level.

In such conditions the vital task is integration in common information space of available models and methods, their systematization, highlighting the main indicators of innovative development, as well as determination of integral indicator that characterizes the level of innovations.

One of the tasks that demand solution to achieve a goal is a creation of a set of instruments and tools for conducting researches on regions' innovative development, approbation of workable models and methods. The complexity of the task is determined by the necessity of research integration in the sphere of innovative

development theory and usage of up-to-date information technologies. This will provide the possibility of new research approaches to investigation.

The project of creating the research portal "Regions' innovative development" is aimed to develop and test the prototype of the information analytic system of collecting and processing data on regions' innovation activities to support efficient managerial decision-making. Data for analysis are gained from heterogeneous unstructured or semistructured resources, particularly, Internet-resources, as well as on-line data bases. The system should provide integration, matching, aggregation and maintenance of previously uncoordinated data. In the workable system there should be different forms of data and research results visualization that will meet users' needs.

The research system is a set of instruments for economic analysis of innovation activities of particular departments, organizations, integrations, economic branches, regions. The portal should provide the possibility of collective work of researchers, the possibility of testing available models and methods of evaluating innovative development and innovational activity.

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### Researches on Innovational Activity

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Investigation of domestic and foreign methods of evaluating innovation potential and innovation competitiveness has shown a significant divergence in approaches, as well as essential drawbacks of statistic account base [1-4].

First of all, it should be noted that there is an absence of methodological approach and a method of innovation competitiveness evaluation of economic systems in the Russian theory and practice. A level of innovations in business is considered through a level of enterprises' innovation activity, which, by turn, is determined by an indicator of innovation-active enterprises percentage. And here innovation-active enterprises are organizations that carry out development and introduction of new or improved products, technological processes and other kinds of innovation activity. Depending on a percentage of innovation-active enterprises in a certain economic branch (sector) Russian researchers speak about a level of innovation activity of a branch or of a whole region.

For a quantitative and qualitative assessment in domestic investigations on innovations researchers use such methods as: percentage of innovative products in an aggregate output; dimension of research and development costs; percentage of technological innovations costs in dimension of aggregate output; a number of introduced technologies; a number of created up-to-date technologies; percentage of innovation-active enterprises and others. However, all these indicators are examined independently and their interconnection and correlation are evaluated only through qualitative categories.

Thereby, it is hard to speak about integrity and common methodology of evaluating innovation potential and innovation competitiveness of economic systems (including enterprises) in domestic science.

Investigation of similar foreign literature has shown that the majority of methods, which are put in practice in developed countries, is based on a set of similar indicators. For instance, within the bounds of the method of determining economic branches' and sectors' innovation competitiveness, which is common in the European Union (EU), instead of direct quantitative assessment of each innovation activity factor (method of State statistic committee) an integral indicator is calculated. This indicator is a general outcome of innovation activity. As a result, with the help of UE method we can analyze the level of innovation activity not only of a particular branch, for example, cable branch, and compare it with a level of development in similar branches in other countries, but also evaluate a position of a particular enterprise in the branch, determine the difference between the innovation levels of different enterprises; point out those factors that are essential for a growth of innovation competitiveness, as well as factors that hinder enterprises' development.

One of the project's tasks is to develop a method of a complex assessment of region's innovation potential that will use economic and mathematical and statistic methods and models based on up-to-date information

technologies and will help to determine a region's position among other subjects of innovation activity, mark out strong and weak points, compare advantages and disadvantages with main competitors (foreign and Russian), formulate main directions of innovative development.

Researches should go through the approbation on-line. It is necessary to provide the possibility of conducting analytic processing of received data, visualizing and comparing results, obtained from heterogeneous sources. Researchers should be able to have an access to the information, means of search and initial processing. The portal should provide these possibilities.

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### Information Analytic System in Innovational Activity Investigation

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One of the main results of the project is to create a research system, which is aimed to integrate workable models, previously uncoordinated data, received from different sources in different formats (operational system data, accessible commercial data and others) into one storage, data coordination and further possibility of analytic processing.

The system should include statistic indicators, reports on evaluating innovations with the help of different methods, publications of different kinds on the matter, etc. the system should be used for accumulation, integration and maintenance of innovative development information. The research system should serve users' complicated requests both on search of necessary information and selection and processing. Different ways of forming requests, which will be available and handy for a user who is a specialist in a particular sphere, should be also provided. For introduction of research results there should be presenting information means in different forms (tables, graphs, diagrams, cartographical presentation, three-dimensional representation, as well as visualizing of models of different kinds).

Information system is carried out as a research portal and the main tasks of it are:

1. Computer-aided search of data sources among Internet-resources, devoted to innovation activity of particular departments and whole organizations, integrations, economic branches and regions, based on users' requests considering specificity of knowledge domain and its models.
2. Intellectual analysis, classification and cataloging of papers, gained from different sources, provision with easy-to-use navigation means for work.
3. Data gaining from received sources with the following matching and placing in one data storage.
4. Analytic processing of data placed in the storage.
5. Introduction of an access to the data storage with the help of convenient Windows- and Web-interface with a developed system of data visualizing and a handy set of instruments for creating reports.
6. Introduction of "portfolio" of economic and mathematical models of innovation activity with possibilities of editing available models of portfolio, development of new models by users and experimentation with the help of new models.

Users can exploit the system for analysis of available data, experimentation and approbation of built models and offered methods. Managers, analytics and researchers could use the system to analyze archival and operational data. The possibility of interpretation the most significant information is vital as well. The final goal of system introduction is to ease the users' access to the necessary information with the view of using it in decision-making, as well as the possibility of users' interaction in the process of investigations.

## Realization of the Research Portal

Creation of such a system presupposes the necessity of using technologies that allow creating flexible, dynamically adaptable system with a high degree of feedback. This will allow carrying out its operational adjustment in changing conditions and according to specific needs of different users [5-6].

Different researches on the matter are conducted in the sphere of information technologies, results of these researches are widely introduced in proceeding of conferences of different levels. Researches are devoted both to theoretical questions of creating adaptable systems and technologies, instruments (adaptability is investigated quite broadly: from the possibility of user's interface adjustment to the possibility of whole restructuring, reengineering of a system). However, nowadays there are only few program products that meet listed requirements (particularly, MetaCASE). In Russia today there is an absence of industrial systems of such level.

Technologies of data storage, operational analytic processing and intellectual analysis, search and analysis of text and semistructured data sources, visual analysis should be used to develop the system [7-8]. Data analysis presupposes usage of economic and mathematical, statistic and econometric methods. It is planned to use statistic, ontological methods, as well as methods of recognition, structural and semantic text analysis for search and gaining data from text and semistructured data sources.

For carrying out the project experience of early conducted works is used, particularly projects of creating means of developing dynamically adjusted Web-oriented systems [9].

Fig. 1 demonstrates the structure of the research system.

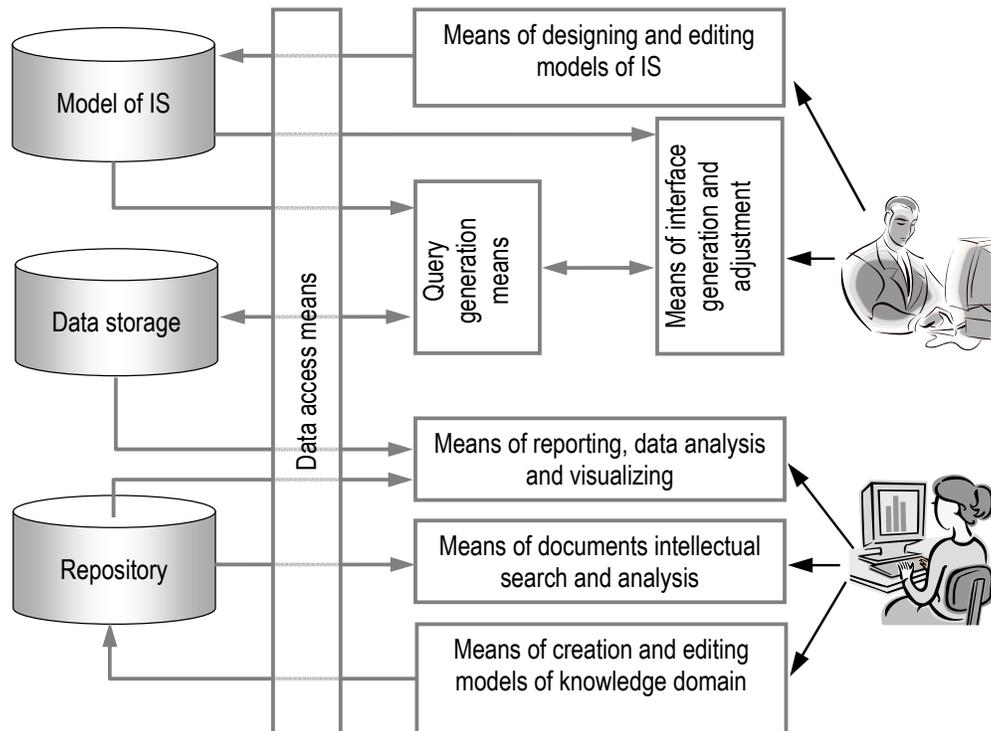


Fig. 1. The structure of the information analytic research system

System functioning is based on interpretation of multilevel models, metadata, describing the informational system (IS). Means of modeling, creating and editing IS models allow IS adjusting in changing conditions and in

accordance to users' needs. Metadata of different levels describe data structures, user's interface and main IS functions. Changes in models lead to changes in system functioning. Adjustment can be carried out dynamically in the process of system exploiting [5-6].

Means of documents intellectual search and cataloging are based on the usage of ontology [7]. Each user can create his or her own knowledge domain model and save it in the repository or use already designed models to search information responding user's needs. These means provide not only information search but also information cataloging in the storage, easy-to-use means of paper navigation, data gaining for analysis.

Data analysis complex is oriented towards the work with multimentional data [8]. Users have an opportunity of creating their own data analysis models and generating reports, based on models designed by users. Each user has an opportunity to develop his or her own report models or use already developed ones.

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## Conclusion

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Usage of research portal's opportunities will allow not only publication of innovation economics theory papers but also their approbation with the usage of accumulated information on-line. In addition to this, portal's means will provide users with a set of instruments for intellectual search and initial automation of information processing in accordance to users' requests. Offered means allow significant reduction of work content, automation of operations that demand time costs. Open architecture of the portal and technologies used for project implementation allow expansion of portal's opportunities, its functionality, adjustment of available means to meet the needs of users' that work in different knowledge spheres.

Models and methods of innovative development evaluation, which are developed in the process of project implementation, have their own science and practical importance and can be used on different levels of management.

The research portal, which provides on-line access to data on theory of innovative development of enterprises, economic branches, regions, approbation of evaluation models and methods offered by users, possibility of collective work, will provide activization of collaboration in this sphere.

Offered technological solutions allow system adaptation in changing conditions and in accordance to users' needs and these, by-turn, guarantee its vitality and possibility of development. These solutions also could be used to create information systems of different purpose in other knowledge domains.

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