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**NEW DEVELOPMENTS IN TEACHING ACADEMIC COURSE IN
RUSSIAN NATIONAL SYSTEM OF INNOVATIONS**

V. M. Vlasova (a), N. A. Ivanova (b)*, L. S. Vorobyova (c)

*Corresponding author

(a) St-Petersburg State University of Aerospace Instrumentation, St-Petersburg, Russia, ivanovanat207301@mail.ru

(b) St-Petersburg State University of Aerospace Instrumentation, ul. B. Morskaya, d. 67, St-Petersburg, Russia,
ivanovanat207301@mail.ru

(c) St-Petersburg State University of Aerospace Instrumentation, St-Petersburg, Russia, kafedra81@gmail.com

Abstract

The paper studies suggestions to improve training offered to postgraduates within the course in ‘National System of Innovations in Russia’. Authors suggest a system of training promoting proactive inclusion of each postgraduate in discussion of problematic issues, organized distribution and assignment of tasks and functions within the course, followed by writing and discussion of synopses and reviews by postgraduates with further publication in the form of online chapters. The type of NSI determines forms of its development, with development of NSIR following the lines similar to those of bigger national economy and being regarded integral of the national economy. NSI promotes proliferation of concept of Russia as a single and united nation, establishing similar standards of living in any of its parts or territories based on development of regional systems of innovations. NSI contributes to preservation of various resources and NSI promotes increased levels of technological development in various industries and sectors of the Russian economy based on the effect of multiplication.

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1. Introduction

The system of full-time postgraduate training in the field of business administration and economics of innovative and knowledge-intensive project consists of three academic semesters, each completed with a set of examinations and respective internships; the fourth academic semester includes industry-oriented internship for verification in the working environment of the skills acquired by postgraduates, and pre-graduate internship intended for completing the master thesis. The fourth semester is followed by the state examination and presentation of the qualification paper (master thesis). The Federal Standard of Higher Education offers a number of activities within professional training, of which most relevant for the course being discussed appear to be: research work, analytical, investment and entrepreneurial activities. This choice is conditioned by the qualification-related requirements according to which graduates are to possess knowledge and skills in methods and results of research work, in analysis of scientific research applicability and efficiency, in evaluation of the feasibility and financial outcomes of innovative projects proposed and in organizing the process of diffusing innovations. The academic course in '*National System of Innovations in Russia*' (NSIR) is offered in the third academic semester of postgraduate program. The methodological basis for this discipline is formed by the knowledge and skills acquired in general theory of cognition, problems relevant for the current state of science, technology and business, in applications of mathematical methods and models in innovation-based economy, in administering technological innovations. The course in NSIR is composed of workshops organized so as to follow the principle of induction in relation to content, forms, individual elements, various methods of evaluating the efficiency of NSIR in general, and, more specifically, knowledge-intensive and innovative programs and projects.

2. Problem Statement

Formally, the workshops are organized as seminars with postgraduates speaking on the topics suggested for research and presentation, with one topic assigned for each postgraduate. Such methodological approach allows postgraduates to develop relevant indicators of understanding the economic content of NSIR, stages in its development and directions followed in its development comparing Russia with the EU, the USA, Australia, Japan and other national economies, of its infrastructure and components. Improved techniques in teaching the discipline may produce both more profound theoretical knowledge of the subject and a more practical approaches taken in relation to cognitive and organizational functions in real development of NSIR.

3. Research Questions

Research questions. More specifically, suggested changes in teaching and organizing training in NSIR can be described as:

1. Each workshop is to be prepared as a complex set combining research-related and practical elements, which allow making connections between the traditional approach taken to the issue discussed, its historical background, current state with possible prospects and its problematic and debatable

character. These materials are uploaded into the professor's account in the university online system and include publications, links, presentations etc. allowing for the time the attendees require to study these. Each workshop is to be concluded with a brief review related to the next workshop in the curriculum.

2. Assignments offered for workshops are to develop a problem-oriented approach and thus often comprise regulations relevant for the topic discussed, review and primary analysis of statistical data available on the topic with possible application of relevant software packages and mathematical models.
3. Summarizing the materials offered in preparation for discussion, both indicated by professor and obtained by postgraduates individually in the course of preparation, aims to produce an interactive approach to NSIR in general and its individual elements in particular.
4. Evaluation of the place and role of the problem chosen by postgraduates for master thesis within the scope of NSIR.
5. Degree to which postgraduates' papers reflect the trends and discrepancies in the field of NSIR.
6. Emphasis made on most relevant issues of NSIR in course of pre-graduate internship.
7. All postgraduates participate in collection and analysis of materials and publications for each workshop organized. Thus, discussion in each of the workshops implies active involvement of every postgraduate presenting their findings in relevant materials including publications in foreign languages. Hence, discussion of each topic requires establishment of a task force to produce a case comprising all opinions on the issue and statistical data for identification of its characteristic features. This type of organization also implies one or several graduates to be made responsible for writing a synopsis while indicating materials cited as received from a given participant of the task force.

To write a synopsis to be produced in the examination each postgraduate is assigned a problem to be studied within NSIR. Description will include the problem's economic content, forms and types it can reveal itself in, national-specific features, prospects of development, possible risks and discrepancies. Following writing and presentation, all synopses are collected in e-chapters edited by professors. These allow adding, revising and improving the database of the course.

4. Purpose of the Study

More active interaction of professors and postgraduates within the studies in NSIR allows transition from a highly formalized approach in teaching the subject to annually revised and replenished statistical data, analytics and publications relevant for the problem area. They improve developing a personal approach to the problems discussed while allowing acquisition of skills in presentation of research work findings in the form of synopses, abstracts and papers.

5. Research Methods

The present study employs comparison-based approach based on the attendance and academic records of postgraduates in previous years; it also relies on the numbers of inquiries by postgraduates and data retrieval in studying theoretical reviews, relevant legislation and regulations, mathematical models.

Possible problem statements suggested for postgraduates for studies within the course may refer to a number of areas: types of national systems of innovations (NSI); methodological approaches and concepts of NSI; structure of NSIR; characteristics of public sector in NSIR; characteristics of private sector in NSIR; analysis of cluster-based approach and its impact on emergence and development of NSIR; infrastructure of NSIR; review of preconditions already existing in various industries of the Russian economy; funding sources and measures of state support to NSIR; methods of evaluating innovative programs efficiency (Russian Venture Company, 2021).

Working on the topics under the first title postgraduates learn definitions related to the economic content of economics of innovations and its types and variations, emerging in different national economies, e.g. the EU. The center of discussion, in this case, is demonstration and analysis of how historical developments in individual national economies produce a structure designed for developing and diffusing innovations at the national level. This area of studies implies topics related to determining the place and role of the Russian economy in a wider context of global economic development; of the type of innovation system in Russia and the respective stages in its development; of classifications applicable to innovation systems and economies (Mikhelashvili, 2019). Currently, a few definitions of innovation system are in operation: it is regarded a combination of institutes to generate, diffuse and commercialize innovations; or a part of a nation's economic system promoting development of innovation-generating processes. Synopses under this theme will dwell on the general features and individual characteristics of various types of NSI (market-based, inter-corporate, social-democratic, integrated European etc. systems). NSI of each type has historically developed in stages of chain marketing (also 'classical', 'hierarchical', 'market chain-based') type, command type (terms 'classical', 'non-market', 'unchained hierarchical' systems are also used) and mixed type (also termed 'post-classical', 'market' and 'chained hierarchical' types). Based on descriptions and analysis of types and stages in NSIs, on preconditions and limitations related, the current state of NSIR and the stage in its development can be identified. Another problem requiring attention is the study of emerging regional systems of innovations and their interrelation and interdependence within NSIR (Vasin & Mindeli, 2016).

The second area suggested for research is a logical extension of the first one, as analysis and justification of methods to examine and determine the conceptual frames of NSI development require understanding of the phenomenon of NSI itself and of the types existing in different economies and economic systems. The purpose of study, in this case, is to identify the conceptual frame underlying NSI development based on the analysis performed. More specifically, research aims at developing general understanding of the basics and different approaches used in different types and structures of NSI. In any national economy, the methodological foundation for NSI is obtained as an outcome of a system of acquisition and diffusion of knowledge, which is also a principal subsystem of NSI. Suggestions for research in NSI are to rely on identification and characteristics of the stage in NSI development (resource-

intensive, investment-intensive, innovation-generating stages) and are to employ object-centered or functional methods of study. NSI concepts are related most immediately to public policies. Almost 20 years ago NSIs of the European countries were integrated into a single EU innovation hyper-system, with its preconditions, processes and measures taken to be examined carefully and applied in development of a single NSIR comprising individual systems of regions within the Russian Federation (Lapin, 2018).

The third set of topics suggested bridge studies in NSI in various national economies and economic systems to a discussion of NSIR existence and the type it can be classified as; and, hence, the principles and approaches to be applied to its study and the prospects in its development based on identification of its conceptual framework. Workshops related to these topics include discussions of variations in types, conceptual frames, structural elements of NSIs in general and of NSIR in particular. Structurally, NSIR consists of public and private sectors with infrastructure including transportation, communications, information and digital technologies, financial system with its services, stock market and various intermediaries. Problem areas requiring attention, in this case, are incentives for increased investments in innovations and innovative industries, increased levels of interrelation between research, education and manufacturing in terms of innovations, functions of NSIR, areas of innovative technologies application, orientation of knowledge-intensive industries at global/domestic market etc. (Matriznov, 2018).

Suggested topical areas four and five imply studies in economic content and the forms of NSIR public and private sectors. The purpose of such studies is to develop conceptual understanding of NSIR as a combination of public and private sectors, requiring specific organization, structure and interaction between them. The public sector of the system of innovations in Russia comprises federal and local agencies and bodies related to scientific and innovative activities, developing and imposing standards and regulations, providing for financial support of innovative programs and projects with means of the federal budget, federal research centers, educational establishments at various levels, research facilities, innovation incubators and technological parks. The private sector of NSI in Russia is characterized by various foundations and organizations for privately-funded research, venture funds, small knowledge-intensive businesses, engineering companies, consulting agencies, expert organizations, private educational establishments, research facilities, innovation incubators, technological parks and centers for innovation development and promotion. Each of the elements listed requires knowledge and understanding of its specific goals, tasks, functions, reporting, of its interrelation with other elements in the system, and associated advantages and disadvantages. Since various models and structures of NSIs have already been developed in national economies worldwide, they can be analyzed in terms of their viability and correspondence to other elements of NSI in Russia, e.g. various models of technological parks in the USA, the EU and Japan. Analysis is also required to identify which elements (innovation-based technological centers, business incubators, co-working facilities, small knowledge-intensive businesses, venture funds) can be deemed most feasible and effective in terms of promoting cooperation and joint ventures between the public and private sectors in Russian NSI (Gribov & Kamchatnikov, 2018).

Problematic areas in terms of innovation systems can be defined as:

- comparison and interrelation of the two sectors in terms of such parameters as discoveries, inventions, patents, projects, operational efficiency;

- directions and trends in development of public and private sectors of NSIR and their short-term and long-term prospects;
- influences rendered by each of the two sectors of NSIR on innovation generation and diffusion in the national economy.

The sixth set of topics implies research problems associated with cluster structure of economy in NSIR. These topics are centered on refinement of conceptual frames of cluster-based approach to economic organization; further study aims to describe and compare various forms of cluster organization to identify the most suitable and effective ones to be applied in NSIR. The principle of major relevance, in this case, is a highly interrelated and interdependent character of NSIR, with all its individual elements combined into a single structure. A cluster existing within the NSIR is simultaneously regarded a hub linking multiple elements and a point of controversy and discrepancies inducing changes in both the cluster itself and in the wider economic system. The problems suggested for research may include specific features of clusters in Russia, their life-cycles, advantages and disadvantages of cluster-based approach for development of NSIR, specific features of industrial clusters, structures of clusters in the Russian Federation, classifications and types of clusters (regional clusters, intra-industry and inter-industry clusters, mega-clusters, micro-clusters etc.), innovation clusters and technological platforms (Azoyev et al., 2012).

The set of problems suggested for research within the seventh theme are concerned with analysis of NSIR infrastructure with its components, their historical development and comparison with components of other NSIs. Postgraduates are offered a chance to develop concepts related to principles and essence of various elements within NSIR. NSI infrastructure includes libraries, physical and online book-stores, scientific publishers and publishing houses, organizations producing synopses and bibliographic materials, various data bases. The topical issues to be addressed, in this case, are related to monitoring and supervision of NSIR activity in general while monitoring and supervising individual regional system of innovation within it, which implies development of specific indicators to be relied on in such studies (Kasumov & Guseynova, 2013).

The eighth set of research problems reflects the potential and prospects in development of NSIR, based on technological reserves already accumulated in various industries of national economy (Frolov & Ganichev, 2014). Technological reserve here refers to a combination of innovations in science, engineering and technologies which are yet inoperational, but are to be made operational within a visible time horizon based on the existing manufacturing capacities and perceived as possessing prospective market potential.

Topics to be discussed by undergraduates within the theme are:

- justification of an industry to be classified as high-tech and knowledge-intensive. Currently such industries comprise aviation, shipbuilding, propulsion engineering, rocket and space-shipbuilding, radio-engineering, nuclear energy sector, information and communication technologies (digital economy);
- defining the industry-specific notions of ‘technological reserve’ and ‘scientific research reserve’;

- interrelation of the level of scientific research and technology development with developmental scenarios elaborated for clusters, industries, territories, inter-industry complexes;
- identification of industries with most significant and relevant technological reserves;
- provisions for inter-industry innovations and for innovations to be regarded as promoting the emergence of new industries;
- clarification of the impact rendered by technological reserves on national projects.

The ninth set of research problems is centered on the analysis of available and prospective sources of funding activities and programs within NSIR. Detailed description is to be given to public funding due to its share in support of innovations. Funds and financial sources identified perform the function of funding source for innovation and investment projects; they provide incentives for innovation-related activities, nation-wide innovative projects and processes, for making project business plans promoting increased rates of innovative development. Synopses and abstracts prepared by postgraduates can include studies related to the principles and forms of public and private funding, and of inter-sectoral joint projects and ventures. Typically, federal funds are allocated to support establishment of communications for innovation-related activities, professional training and education, programs for improvement of professional qualifications. Federal funding is channeled through state-owned research granting foundations, subsidies can also be granted to individual activities related to innovations, inventions and patents. Problem areas include special features and developments in funding large-scale projects, namely, projects with major social implications; delegation of functions in public-private joint ventures and projects; role of venture funding in development of NSIR and other innovation-related activities; role played by the banking sector in NSIR; evaluation and justification of basic financial instruments to be used in each instance, e.g. equity capital, preferred shares, convertible debentures, warrants etc. (Kondratyeva, 2017). Materials collected and analyzed within the tenth set of topical problems comprise publications and analytics on methods for evaluating innovation projects feasibility and efficiency. Problems to be discussed include review and examination of conditions requiring evaluation of innovation activity efficiency; areas for application of qualitative, or targeted, and quantitative, or funds-intensive, approaches to evaluating efficiency of innovation and investment projects and programs; principles underlying project efficiency evaluation; detailed description of stages in selecting innovation-related activities; analysis and evaluation of risks associated with innovative activities; types of expertise used in evaluating the feasibility of innovation; development of financial models to be used in evaluation procedures.

6. Findings

The outcomes of analytical work performed in the course of studies and attendance of workshops during the semester by postgraduates are preparation and presentation of synopses and literature reviews related to existing classifications, types and forms, main trends in development of NSIR; the role of the venture capital in funding innovations; specific structure and principles of operation in state-run research institutes and centers; establishment and development of research and manufacturing clusters; NSIR infrastructure; NSIR monitoring and regulation; advantages and disadvantages of small innovation-based businesses; region-specific forms and developments in NSIR; innovative technologies in forestry; development of cooperation between the public and private sectors in innovation-oriented activities. All

synopses and abstracts prepared are discussed with professors and fellow postgraduates in course of workshops with findings presented in the examination completing the course. The course is followed with collecting synopses presented in e-chapters to be uploaded onto the department section of the university site.

7. Conclusion

The above discussion allows for the following conclusions to be drawn by postgraduates upon the course completion:

- the type of NSI determines forms of its development, with development of NSIR following the lines similar to those of bigger national economy and being regarded integral of the national economy;
- NSI promotes proliferation of concept of Russia as a single and united nation, establishing similar standards of living in any of its parts or territories based on development of regional systems of innovations;
- NSI contributes to preservation of various resources;
- NSI promotes increased levels of technological development in various industries and sectors of the Russian economy based on the effect of multiplication.

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