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Networking for sustainable Foresight: A Russian study

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ABSTRACT

A key element of any government's Science, Technology and Innovation policy is stable analytical infrastructure to support strategic decision making. Experience from many countries shows that substantial policy decision making requires collecting and analysing a broad range of information to develop proactive and future-oriented policies. Accordingly, infrastructure providing this information as well as evidence for policy-making must possess the capabilities for collecting, assessing, and processing information. However, information in this context is highly specific and subject related information, which is frequently embodied within expert knowledge holders. Therefore, information management in this light imposes special challenges on infrastructure.

The present study discusses some methodological approaches and practical studies to set up a network of STI Foresight network in Russia, integrated into the national Foresight and planning system. We outline the principles for goal setting, network architecture, creating a network of experts, selecting key information products, and methodological support. Russia's STI Foresight network, built on principles presented here, has been fully operational since 2011 and provides expertise on a large scale for a variety of governmental and industry organizations.

1. Introduction

Today, sustainable economic development is largely determined by how quickly countries react to the changing environment: to counter threats, and utilize opportunities. Depending on the economic system, both developed and developing countries are creating their own early warning mechanisms to foresee emerging trends and challenges which can significantly affect their competitiveness (Gokhberg and Sokolov, 2013). In countries with a dominant public sector (e.g. China or Russia), such systems are initiated by the government (top-down approach); in countries where the private sector plays a major role (e.g. the US), large corporations have for decades been setting up their own centres to monitor and analyse information regarding emerging global trends (bottom-up approach). A combination of these two approaches sets up a fully-fledged infrastructure for a long-term strategic vision and provides a flexible instrument for dealing with challenges.

Certain global challenges have become more urgent now due to a combination of faster R&D commercialization, radical changes in consumer behaviour, and evolving key global value chains. These issues dictate the need to compile an adequate portfolio of relevant measures, comprising science, technology, and innovation (STI) policies and private sector initiatives (Gokhberg et al., 2016).

The mass development of technologies and the emergence of entirely new technological fields and product groups at the juncture of thematic fields such as bioinformatics technologies, photonics, and additive technologies, require new STI policy instruments. They also necessitate the establishment of comprehensive operational processes alongside the formation of a national technology forecasting system, which would provide expert analytical support for government bodies, large sectorial companies, and academia. Developing expert infrastructure on the basis of a Foresight network will help to establish horizontal connections between scientific centres, higher education institutions, and companies operating in the real sector of the economy. These centres will also help create consortiums capable of carrying out large-scale projects in breakthrough thematic areas of R&D on the basis of these connections.

A major challenge in this ongoing desire to change the STI landscape is the widespread use of Foresight methods which give a more complete and comprehensive picture of the future development of an industry, product, or technological group (Miles, 2010; Miles et al., 2008; Rohrbeck and Schwarz, 2013; Meissner et al., 2013).

Essentially, Foresight, as a comprehensive instrument to look into the future, entails forecasting and implementing new methodical and organizational procedures to select and involve science, technology and business experts (Meissner and Sokolov, 2013). As part of this set of procedures, different areas of work are taken into account, for which various experts are called upon to conceptualize, structure, and classify priority fields, participate in surveys, validate results, and develop foresight and analytical materials (Afanasyev et al., 2014).

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Furthermore, a balanced number of experts from different thematic groups need to be involved to ensure a mature STI policy is developed.

The comprehensive involvement of different thematic groups of experts at different stages of the Foresight network's activity will allow new science, technology and product developments to be analysed from different perspectives. In addition, all stages of expert analytical support for decision making in government and science, technology and innovation policy for all major industries will be covered comprehensively.

To establish a balanced STI Foresight network i.e. a network geared towards solving the problems of different government and commercial organizations, we need to take stock of three critically important aspects:

1. The most important aspect is the organization of a range of interrelated processes to support organizational, methodological, and technological functioning of the forecasting system;
2. The completeness of the content coverage and accounting for the specialization of all priority development areas in STI are extremely important to form a consistent picture of the current state of the STI landscape;
3. Establishing connections between different STI forecasting fields to diffuse and reproduce methodical practices, results from monitoring of STI development in priority areas, and the overall information technology architecture of the STI forecasting system.

The Foresight methodology, traditionally seen as a key tool for shaping the future (Miles, 2010; Miles et al., 2008; Elias et al., 2015), helps us formulate queries for a network of industrial Foresight centres. Such a network can serve as infrastructure that assists decision making in the STI sphere. Therefore, the central research questions this article addresses are:

1. How to create an adequate architecture for a network of industrial Foresight centres, keeping in mind that they each have specific goals and objectives, and how to integrate this network into the framework of a wider national STI Foresight and planning system?
2. As a pioneering country in the field of national-level planning of STI development, which of Russia's experiences are generalizable and can be transferred to nations wishing to approach global challenges systematically in search of relevant 'global answers'?

This paper describes a network of industry centres for STI forecasting (hereafter, Foresight centres). It extends existing knowledge on Foresight by discussing new organizational and methodological approaches to create comprehensive expert and analytical infrastructure for STI policy support on the national level.

The activities carried out by Foresight centres, in close coordination with other infrastructural STI policy instruments, and these centres' integration into a network of industry leaders in technology will provide independent expert assessments about the quality of strategic documents under development. Hence, the Foresight centres will also help form the necessary conditions for large-scale implementation of STI forecasting results towards strategic industry planning practice. The considerable experience of conducting national foresight studies was used in establishing Russian National Foresight network (Chulok, 2009; Poznyak and Shashnov, 2011; Shashnov and Sokolova, 2013; Sokolov and Chulok, 2012; Sokolov, 2009).

For each of the stages in establishing the network, this paper presents methodical approaches to organize processes for the activities during the pilot operation of the network.

2. Established Foresight networks – an overview of best world's practice

Establishing national Foresight networks and providing adequate methodological and organizational support to them is a major, complex objective that involves several stages. We identified more than 25 Foresight networks all over the world and selected a few that were mature and relevant to our research question. Examples of existing national Foresight networks we studied include the National Foresight Network of Finland (The Finnish National Foresight Network, 2015) and Foresight Canada (The Canadian Foresight Network, 2015). On the international level, the Joint Institute for Innovation Policy (The Joint Institute for Innovation Policy, 2015) is functioning quite efficiently, while the United Nations Industrial Development Organization (UNIDO)-sponsored Eurasian Virtual Centre on Technology Foresight (United Nations Industrial Organization, 2015) is currently being set up. The selection was done by assessing each Foresight network against the following criteria:

- Sustainability of relationships between the network participants;
- Links with various Foresight activities including implementation of Foresight studies, disseminating results, exchanging with other research studies, involving experts, etc.

Following this assessment, we analysed in depth four networks.

Finland has a developed and multifaceted national Foresight network (The Finnish National Foresight Network, 2015). It was established in 2006 by the Sitra Foundation; since 2015, the foundation coordinates the Foresight network jointly with the Prime Minister's Office. The National Foresight Network's goal is to provide adequate information about new challenges facing Finland and about related opportunities to all stakeholders – to discuss and analyse them, and incorporate them in decision making on various governance levels. The network is also supposed to hold Foresight fora, issue reviews and 'atlases of the future', and organize training events (The Finnish Prime Minister's Office, 2014).

The Foresight network receives practical support from the Government Foresight Group which promotes the application of the results in strategic decision making in the STI sphere. The network comprises representatives of government ministries and other agencies, regional councils, universities, private companies, and research centres. It is an open network, in which participants can set up other specialized 'targeted networks' to meet their own requirements.

Close cooperation between members of various organizations when implementing Foresight programmes is supposed to significantly increase their efficiency and promote application of their results, thanks to better opportunities to plan their applications early on.

Information support of the network is provided via the official website. In addition, the network maintains a specialized information channel – the so-called 'Foresight Fridays' which are held monthly and include presentations, courses, and various Foresight-related network activities. These events are open to everybody interested in Foresight studies.

An example of a national Foresight network built around an independent organization is Foresight Canada (The Canadian Foresight Network, 2015). Its objective is to promote high-level professional Foresight studies. The network provides opportunities for interaction and information exchanges between participants – Foresight practitioners employed in various sectors of the economy. It also conducts monitoring of Foresight studies and other activities of various organizations and individual researchers in relevant areas. Members of the network implement Foresight projects, provide consulting, education, and training services, and organize various workshops.

Participants of the Public Sector Foresight Network pursue similar objectives: they discuss current and future Foresight projects, and share relevant best practices and results (Institute for Alternative Futures, 2015). However, membership is limited to those who apply Foresight methodology for government agencies.

The Joint Institute for Innovation Policy that has operated since 2008 is an example of an efficient international network (The Joint Institute for Innovation Policy, 2015). The institute provides intellectual support to decision making concerning the implementation of STI policies. It is a closed network established by four leading research and technological organizations: TNO (the Netherlands), VTT (Finland), Joanneum Research

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