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# FTA supporting effective priority setting in multi-lateral research programme cooperation: The case of EU–Russia S&T cooperation

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ABSTRACT

Common global societal challenges require common answers, also in programming research to help offer those answers. This paper addresses the issue of priority setting for research programming in a multi-layered and multilateral context, taking into account the interests of diverse stakeholder groups. It uses a structured FTA approach to offer guidance for the design of foresight exercises supporting such priority setting, drawing on the case of S&T cooperation between EU Member States, countries associated to the FP7, and Russia. A framework is proposed for thematic priority setting through the application of Future-oriented Technology Analysis (FTA) and for achieving clear policy impacts by including principles for impact optimisation. A combination of foresight methodologies such as expert workshops, a Delphi survey, roadmapping elements, and prioritisation techniques was applied to select relevant topics for a joint research call. The paper shows how foresight can be embedded in a multilateral S&T programme cooperation using a set of coordination dimensions and design principles. Strategies for achieving policy impact and for communicating foresight results are also outlined. Future research is proposed to further improve guidance to facilitate more global research programme cooperation in the future to jointly address global challenges.


## 1. Introduction

In a context of global challenges, not only the performance but also the programming of research needs to become more global to be effective in addressing those challenges. International cooperation in science and technology (S&T) at the programming stage between different world regions thus becomes increasingly important, but also poses complex challenges with respect to multi-level and multilateral policy coordination. A considerable research body exists with regard to multilevel transnational research programming within a specific world region (OECD, 2003; Kaiser and Prange, 2004; Reid et al., 2007; Könnölä et al., 2011, 2012), but little is known about what this means for cooperation between world regions (one of few examples is described by Gnamus, 2009). This paper addresses the issue of priority setting for research programming in such a multi-layered and multilateral context, taking into account the interests of diverse stakeholder groups. The framework proposed offers guidance for the design of foresight exercises supporting such priority setting, drawing on the case of selecting challenges and research areas for S&T cooperation between the EU, countries associated to the FP7, and Russia in an ERA-NET (European Research Area Network) context. The case builds on the activities of ERA.Net RUS, a project which received considerable policy attention in light of the EU–Russia Year of Science in 2014.[1]

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[1] See http://eu-russia-yearofscience.eu/en/index.php.

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## 2. S&T priority setting in transnational and international research programme collaboration

### 2.1. Current knowledge base

#### 2.1.1. Addressing grand challenges in different parts of the world

Today the research programming for addressing grand societal challenges becomes a more urgent issue in the national and international contexts (Boden et al., 2012; Hoareau McGrath et al., 2014). More states are concerned with problems of global warming, an ageing population, terrorist attacks, etc. A natural first step in addressing such challenges is their identification. Over the last century an increasing number of studies have been dedicated to this problem.[2] A decade ago the concept had a rebirth with the Bill & Melinda Gates Foundation defining a list of 14 grand challenges in global health,[3] followed by more specific health initiatives.[4] In recent years the US presented the idea of S&T application for addressing grand challenges for development (U.S. Agency for International Development, 2013) and a set of grand challenges in engineering[5] (prevention of nuclear terror, reverse-engineering of brain, etc.). Generally, over the last decade about 50 individual grand challenges were identified in Canada and the USA in global health, chronic non-communicable disease and engineering.

This list of grand challenges has substantial overlaps with the challenges identified by the EU. The main document in the EU on grand challenges is the Europe2020 strategy, focusing on smart, sustainable and inclusive growth and encompassing 7 flagship initiatives (EC, 2010). The societal challenges are made more concrete in the Horizon 2020 Programme (2014–20), the financial instrument implementing the Innovation Union Flagship Initiative. It is centred on excellent science, competitive industries and a better society, and includes 7 societal challenges.[6] Whereas Horizon 2020 mobilises EU funds, a pooling of national research resources from Member States takes place around 10 societal challenges in the frame of Joint Programming Initiatives.[7]

In the last years the concept of grand challenges has also become more urgent for Russia. A list containing around 140 challenges was established under the Russian S&T Foresight 2030. These challenges were divided into 4 main groups: economic, environmental, social and political, science and technology challenges (Gokhberg, 2013).

This brief review of approaches of different world regions in addressing grand challenges depicts that the problems humanity aims to solve are largely similar. That is why programme cooperation in S&T across borders is useful for addressing such challenges. And such cooperation is not only useful, it is essential, as challenges ahead cannot be solved by single agencies or through national planning approaches alone (Cagnin et al., 2012) and current governance systems are incapable of tackling current and future global interconnected challenges (Boden et al., 2010). This includes not only national systems, also existing governance systems and processes at both European and global levels appear to be no longer sufficient, calling for new models of governance. If S&T research is to contribute to addressing these challenges, new models for cooperation and for setting joint priorities will be required also in organising research programming.

#### 2.1.2. S&T programme cooperation in a multilevel multilateral context

A range of examples exist in collaboration on S&T programming, ranging from bilateral programmes between countries (such as the Swiss Bilateral Programmes with priority countries) and multilateral programmes between nations (such as the Open Research Areas Plus programme[8]), to joint programmes between world regions (such as joint programmes between the US and Russia[9]). Collaborative programmes between the EU and other countries and world regions are considered separately here, due to the largely decentralised nature of public research budgets within the EU. This entails that attempts for international research programming are either multilevel (taking into account European and national/regional level programmes) or are limited in scope by focusing only on one single level. A multilevel collaborative context makes the governance of joint programming more complex. In order to specify what governance in this context entails, Stamm et al. (2012) apply 5 dimensions when considering governance of international STI cooperation: priority setting, funding and spending, knowledge sharing and intellectual property, putting STI into practice, capacity building for research and innovation. In this paper we focus on the priority setting dimension, with a particular focus on a multilevel and multilateral governance context.

#### 2.1.3. Setting joint S&T priorities in research programming and the role of FTA

Several authors recognise the key importance of agenda-setting for science at the global level, taking into account longer-term perspectives and their inherent uncertainties. As argued by Keenan et al. (2012), foresight is an approach that can help addressing these concerns. Cagnin et al. (2012) argue that FTA can offer three types of benefits (informing, structuring and capacity-building benefits) in orienting innovation systems towards grand challenges. Boden et al. (2012) see three challenges for STI policy, when it comes to addressing

[2] The idea of grand challenges was proposed more than a century ago by the famous mathematician Dr. David Hilbert who presented 23 challenges in mathematical foundations, prime numbers, etc. (Weisstein, 2007).

[3] www.gatesfoundation.org.

[4] Examples are the identification of grand challenges for chronic non-communicable disease by the team of Dr. Abdallah Daar, and an initiative in mental health for verification of grand challenges (http://grandchallengesgmh.nimh.nih.gov).

[5] http://www.engineeringchallenges.org/cms/challenges.aspx.

[6] The 7 challenges are: 1. Health, demographic change and wellbeing; 2. European Bioeconomy Challenges (Food security, sustainable agriculture and forestry, marine and maritime and inland water research); 3. Secure, clean and efficient energy; 4. Smart, green and integrated transport; 5. Climate action, resource efficiency and raw materials; 6. Inclusive, innovative and reflective societies; 7. Secure societies.

[7] The 10 Joint Programming Initiatives are: Alzheimer and other Neurodegenerative Diseases; Agriculture, Food Security and Climate Change; A Healthy Diet for a Healthy Life; Cultural Heritage and Global Change: A New Challenge for Europe; Urban Europe — Global Urban Challenges, Joint European Solutions; Connecting Climate Knowledge for Europe; More Years, Better Lives — The Potential and Challenges of Demographic Change; Antimicrobial Resistance — The Microbial Challenge — An Emerging Threat to Human Health; Water Challenges for a Changing World; Healthy and Productive Seas and Oceans.

[8] International research programme between national funding agencies of France, Germany, the UK, the Netherlands and the US, with a focus on social sciences.

[9] E.g. the US–Russia Bilateral Collaborative Research Partnerships (CRP) on the Prevention and Treatment of HIV/AIDS and Co-morbidities.

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