ASIRPA Real-Time: a method to steer research towards desired societal transformations

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1 Introduction

Current policy discourse supports the idea that there is a need for research to address major Societal Challenges. The European H2020 research framework program was built on this premise, with 45% of the budget dedicated to Grand Challenges. In Horizon Europe, five Missions will be implemented in 2021 to solve challenges such as fighting cancer, adapting to climate change, protecting our oceans, living in greener cities and ensuring soil health and food. This trend is also visible at the level of member states. For instance, the Netherlands have set a mission for reducing national greenhouse gas emissions by 49% by 2030 and by 95% by 2050, France has implemented a multi-year research program with the mission of contributing to a 'pesticide-free agriculture by 2050'. These Mission-Oriented Policies (Robinson and Mazzucato, 2019) or Transformative Policies (Schot and Steinmueller, 2018) are implemented to develop solutions and to foster deep transformations of the current socio-technical systems towards desired directions.

However, the extent to which these policy interventions can contribute towards societally desired systemic change poses a difficult analytical and evaluative challenge. R&I programs have to make choices and understand whether they are achieving their aims. Do they generate desirable impacts that lead to the desired transformations? Do they have the appropriate strategic intelligence to analyze in real-time if their contributions are "off-" or "on-track"?

There is a lack of an appropriate analytical framework and corresponding tools that would help R&I programs orientate and steer activities in real-time so as to maximize their contribution to desired transformations. The aim of this paper is to fill this gap and to propose a framework and associated tools for real-time assessment of the contribution of transformative R&I to expected societal impacts. The framework and the toolset is labelled ASIRPA$^{\text{Real Time}}$

2 Toward a heuristic framework and tools for real-time impact assessment

Our starting point is ASIRPA$^{\text{ex-post}}$, a methodological approach (Joly et al., 2015) based on standardized case studies to qualify and quantify the ex-post societal impacts of the research results generated by scientists in the French National Research Institute for Agriculture, Food and Environment (INRAE). The standardization of case studies combines standardized narrative description with three analytical tools: chronology, impact pathways and vector of impacts. The analysis is based on a theory of impact inspired by innovation studies (Garud, Tuertscher and Van De

Ven, 2013) and actor network theory (Callon, 2001). A first objective of the ASIRPA methodology (Joly et al. 2015) is related to learning. To understand the mechanisms that generate impact, each case describes the actor network that is mobilized, the contribution of each actor, the diversity of the impacts produced and the critical points. Standardization of a sufficient number of case studies allows systematic codification of each case study variables, and the building of a typology of impact pathways (Matt et al., 2017) which highlights generic lessons.

Building on this foundation, and making a future-oriented turn, the objective of ASIRPA$^{\text{Real Time}}$ is to help project and program managers to steer R&I towards desired transformations (or specific missions). Usually the main goal is well identified (a chemical pesticide free agriculture) but the ways to achieve it are unknown (many R&I avenues may hold merit and novel solutions may emerge during the process of the research itself).

2.1 The main principles of ASIRPA$^{\text{Real Time}}$

Based on the literature review and lessons from ASIRPA$^{\text{ex-post}}$, the ASIRPA$^{\text{real-time}}$ approach is built around one main tool: the (anticipated) impact pathway and encompasses the following characteristics:

- It is an iterative, adaptive and reflexive approach: assessment is made *ex ante* to anticipate future events and build a first impact pathway and *real-time, i.e.* on a recurrent basis with the aim to trigger learning and look at how intermediate results may lead to reconsider the initial impact pathway;
- It uses a principle of parsimony of information: because of the radical uncertainty related to the research process, collecting detailed information on all the possible outcomes and impacts is neither possible nor useful. The approach has to clearly define which information is necessary to build the impact pathway at each different stage
- A principle of flexibility and agility in the decision-making helps to fully take advantage of learning effects and information growth. ASIRPA real-time approach has to be associated with a governance process that allows flexibility and responsiveness.
- It is a nested approach that develops tools at the level of the program and at the level of the projects. The tools are practitioner-oriented, i.e. developed for program and project managers to help them steer R&I in a desired direction.

As compared to the previous approaches, ASIRPA$^{\text{Real Time}}$ incorporates explicitly -two further dimensions:

- It is an anticipatory approach, based on endogenous futures thinking. The anticipatory exercise starts from the present and expands into the future. There are path dependencies at play but also rooms for path creation and divergence. ASIRPA $^{\text{Real Time}}$ helps producing a first representation of the impact pathway with anticipated expected transformations, productive configuration of actors, critical points, role of intermediaries. However, in the meantime, it is necessary to take into account explicitly that the transformation targets may move and that some causal relations identified may be challenged. We use the concept of “rational myth” (Meyer and Rowan, 1977) to take into account this important cognitive characteristic: the need to draw on the current vision (transformation target, causal chains), to consider it as true, while being aware that this is a convention that may be challenged by the production of new knowledge.
- We base our analysis of the impact generating processes on theoretical contributions related to *innovation studies* (Garud, Tuertscher and Van De Ven, 2013)*, actor network theory* (Callon, 2001) and *transition studies* (MLP, SNM…)

3 Contribution

Lessons and insights from the extensive ASIRPA$^{ex\text{-}post}$ studies combined with the emerging literature focusing on the monitoring of complex situations dealing with systemic changes allows us to present guiding principles for ASIRPA$^{Real\ Time}$. The latter seeks to provide useful intelligence for analyzing impacts at the level of a project and a program focusing on transformative research and innovation activities.

ASIRPA$^{Real\ Time}$ is based on the development of an anticipatory impact pathway specific to each level: the programming level which translates the objectives stated by the mission (or orientation layer) into interventions (experimentations, funding, R&I performers, selection criteria…) and the project level which produces knowledge and innovations through R&I activities, networking, infrastructures…

Full integration of ASIRPA$^{Real\ Time}$ in project and programs, or similar stylized approaches, will require cultural and institutional change as well as capacity building in applying the tools and making use of the intelligence it provides. In this paper, we offer some first approaches to mitigate these hurdles, and observe that the key challenge is to experiment with these tools through intervention into real-time projects and programs.

4 References

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