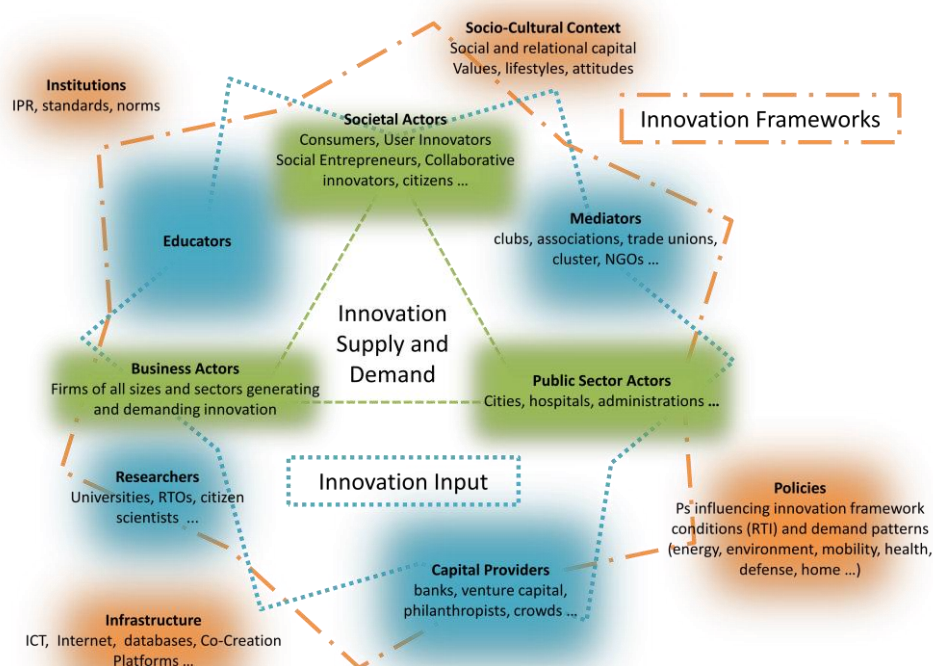


Position paper

Innovation system – thinking broader: Five theses addressing innovation policy for a new understanding of innovation systems

Conclusions from the initial research at Fraunhofer ISI

Fraunhofer Institute for Systems
and Innovation Research ISI



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Karlsruhe
October 2016

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Developing the innovation systems approach further – Strengthening the ISI core competence "Understanding the innovation system"

Since the foundation of the Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI) in 1972 the concept of the innovation system in its national, regional, sectoral and technological manifestations has constituted a fundamental foundation of thinking and core competence of the Institute. While until the end of the 1980s the concept was enshrined rather implicitly in the work of Fraunhofer ISI, since the beginning of the 1990s a diffusion of this approach has even extended to politics, incorporating new insights from national and international innovation research. To begin with, innovation policy was taken up by the European Commission and a few Scandinavian countries such as Sweden, today innovation policy without taking into account the systemic perspective and the objective to support networking between organizations on the international, national and regional level, is almost inconceivable. The graphic heuristics of the innovation system which has entrenched itself in the consciousness of many scientists and politically active persons, is based on work which has been done at Fraunhofer ISI. Accordingly an innovation system is created from several sub-sectors (industrial system, research system, system of the intermediaries, political system) and influenced by framework conditions such as infrastructure, demand and institutions. Innovations are understood as being organizational as well as technological and are based on research and development.

In the work of Fraunhofer ISI it has been recognized in recent years that changes in the understanding of innovation, particularly with a view to societal demands on innovation as well as the development of new or so far neglected groups of actors which have an impact on innovation processes, require a new perspective of the concept of the innovation system. Initial activities on this are reflected in the publication for the 40th anniversary of the Fraunhofer ISI in 2012 with the title "Innovation system revisited – Experiences from 40 years of Fraunhofer ISI research". In the year 2014 it was decided to go a step further and to fundamentally review the innovation system concept from different scientific perspectives. For this purpose a self-financed initial research project across the institute was created in order to significantly strengthen the core competence "Understanding the innovation system" of Fraunhofer ISI. This was done interdisciplinary and across Competence Centers in five sub-projects, coordinated by a superior project management: 1. understanding innovation and actors in innovation systems, 2. further development and dynamization of the concept of sectoral and technological innovation systems, 3. developing an approach to measure the impact of policy instruments on the diffusion of innovations using the example of energy efficiency in industry, 4. outlining a system dynamic model of the dynamics of innovation systems as well as 5. new approaches to the governance in innovation systems. Insights, which were gained in these projects, are summarized and illustrated in the form of five theses.¹

¹ The new innovation system concept consisting of the three dimensions 'innovation supply and demand', 'innovation input' and 'innovation framework conditions' is shown on the title page.

1 New actors and organizations, which are neither sufficiently considered by the traditional innovation system concept nor by politics, influence the innovation process

For several years, the high degree of relevance of phenomena such as social innovation, collaborative innovation and user innovation have been increasingly noticed. Examples are Open Source Innovation, jointly created Wikis, repair cafés and many more. The emergence of new intermediates such as collaboration platforms and clusters, the direct and indirect influence of civil society groups on innovation, its diffusion and prevention and the growing significance of philanthropists in the shape of private persons and enterprises are related to this. The traditional innovation system perspective does not take these developments into account as the new actors and their functions which are relevant to innovation cannot be located in the subsystems defined there. From an innovation policy perspective, new forms of innovation, new actors, their functions and impacts have to be included in a reflection of the innovation process as otherwise a part of the innovation landscape which is becoming increasingly more relevant and its social and economic effectiveness is left out. This results in the challenge for innovation policy that many of the new actors are organized informally and policies geared to formal organizations reach their limits. In addition, these types of innovations demand new forms of supporting infrastructures such as platforms and property rights for the open exchange of innovation approaches.

2 A clear allocation of actors to functions in the innovation system is no longer possible. Multi dimensional challenges aggravate innovation political design

Actors can perceive different functions in the innovation process. In early phases of the innovation process they are active in searching for new knowledge while they act close to the market in later phases. For example, social actors can no longer be reduced to the role of the consumer but rather they actively contribute to innovations by actively generating knowledge and innovative ideas as well as by other functions such as financing (crowdfunding). It is essential for a transformative innovation policy, which is oriented towards the big societal challenges, to recognize in a broad perspective the interdependencies between regimes (established innovation paths) and niches (search process for new knowledge) to identify the functions of actors, who to some extent act multi-dimensionally (equally in niches, regimes and different stages of maturity), in order to initiate and promote search processes in niches in terms of policy design.

3 Radical innovations emerge in niches. Niches and their actors can be positioned nationally and internationally

New ideas are developed in niches and implemented for the first time. A transition towards a new regime is possible when niches generate innovations, grow and replace regimes or change through radical innovations. Niches and their actors can be positioned across technologies as well as internationally. In addition, often not only technological but social and organizational innovations are at the center of a niche. Innovation policy support measures contributing to transition management should therefore take the international dimension into account. They should also not so much draw on already existing technologies, but should in a systemic and cross-technological perspective support opening processes in niches. This can be done for example in the form of a 'plea' through legal changes. This also includes taking innovation relevant framework conditions into account. National and international regulations which are geared towards existing technological systems and have here an impact which supports innovations can impede new developments in niches (e.g. decentralized energy supply systems require other regulations than central systems). Through market selection subsequent consolidations are possible, which either result in the disappearance of the niche or in its strengthening in such a way that a transition towards a new regime takes place.

4 In order to recognize niches and their future relevance, strategic intelligence is necessary which can not be made available by so far dominant discourse formats and search processes

Often innovation policy discourse and participation formats are geared towards established organizations. The role of 'change agents', often not formally organized and who drive innovations in niches, is not taken into account. New search and analysis processes are needed to identify 'change agents' and to measure the development, significance and degree of maturity of niches and 'change agents'. New search processes and new analytical tools are needed, which do not orientate themselves on existing sector and technology classifications but follow an open search mode. Approaches are creative, structured foresight processes, which specifically scrutinize the traditional actor configurations and perspectives. Systematic screening processes such as social media analysis, text mining or Web crawling, can support the underlying opening actors and system analyses. In innovation policy, relevant information facilitates the recognition and strengthening of the relevance of niches.

5 New forms of innovations and new demands on innovation require new forms of policies in the sense of a mixture of reflection and policy experiments

The point of view of innovation policy which has been dominant in the last few decades that innovation has a value in itself, is increasingly criticized. Today innovation policy increasingly faces the challenge to influence the innovation process in socially desired directions. Closely associated with this is the demand for an explicit orientation towards far reaching societal problems which need to be addressed by cross-sector systemic approaches. To be successful in this respect, research and innovation oriented decisions have to be opened for additional perspectives. Reflexive processes are needed in order to identify societal needs. The origin of key subjects and prioritization has to be transparent. An important characteristic of such processes is transparency about who gets involved in such processes. Accessibility should also be ensured; in particular such processes should include new actors who have so far not been organized, outsiders and lateral thinkers (e.g. patient groups, transition towns, globalization-critical movements) and bring them together with the groups which so far have participated. This means a new quality of participation in order to pick up developments beyond already known paths and involve in political processes. The complexity of such processes which results from the social interactions, the uncertainty of future developments and the necessity of a consistent approach demands an experimental approach. Reflexive processes and political experiments are approaches which should be used more strongly than up to now by innovation policy to develop innovation policy strategies in the sense of facilitating inclusive goal finding and transition.

Further information

The results of the five sub-projects have been documented in working papers.

Link:

http://www.isi.fraunhofer.de/isi-en/p/publikationen/diskpap_innosysteme_policyanalyse.php

Working papers No 48 to 52