Technological Forecasting & Social Change 80 (2013) 453–466

Contents lists available at SciVerse ScienceDirect

Technological Forecasting & Social Change

Envisioning structural transformation — lessons from a foresight project on the future of innovation

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ARTICLE INFO

Article history:
Received 14 May 2011
Revised 25 June 2012
Accepted 23 August 2012
Available online 2 November 2012

Keywords:
Vision
Structural transformation
Inductive approach
Foresight methodology
Innovation pattern
Visualisation
Scenarios
Weak signals

ABSTRACT

The paper aims to contribute towards building foresight capacities for systemic and structural transformations. Experiences from a foresight project exploring future innovation patterns (www.innovation-futures.org) are discussed. Four specific features were applied in order to underpin the recognition of structural transformation:

- Inductive foresight approach with an emphasis on capturing indications for extra-systemic change at a micro level instead of extrapolating seemingly dominant macro-trends.
- Visual inspiration, to mobilise tacit knowledge, support a creative spirit and an easy exchange of ideas among people with different disciplinary backgrounds.
- Rigorous assessment of coverage of dimensions of change, to foster the explicit consideration of possibly unrecognised/hidden structural changes
- Extended openness for diversity, to avoid the exclusive interpretation of weak signals only in the context of the existing structures.

The findings of the project indicate interesting changes in the nexus of innovation demand and innovation supply. A wide variety of hybrid value creation models with novel configurations of innovation actors emerged. We explain the approach and findings of the project and discuss in particular the implications for foresight methodology. We argue that all four innovative methodological features contributed in a specific way to opening up new perspectives on the future of innovation and potential structural transformation of innovation processes.

1. Introduction

Envisioning structural transformation in foresight exercises is challenging. When exploring alternative futures, many foresight exercises do not look into paradigm shifts but rather tackle different variants of the established system view. In many cases "mode 1 foresight" [1] that fosters the recognition of intra-systemic alternatives, underpins the optimisation of robust strategies within the existing paradigm, and aligns aspirations and ideas across stakeholder groups is suitable for meeting the objectives of the foresight exercise. For a growing number of cases, however, the need to think about "change in the conditions of change" [2] is being recognised.

One prominent example is the case of priority setting for science, technology and innovation policy—a highly relevant domain of foresight activities. Increasingly, innovation policy strategies such as the European Commission's Innovation Union flagship initiative [3] are addressing socio-economic challenges such as sustainability, health, and security.

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0040-1625/$ – see front matter © 2012 Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.techfore.2012.10.008

In such "mission-oriented" STI strategies the socio-economic impact becomes the key criterion for STI priority setting. Accordingly, picking "key technologies" is no longer sufficient. Transformative priorities [4] that indicate the arenas for "collective experimentation" [5] with various solutions for societal problems are required.

Sustainability is another realm where the need for foresight methods that are able to unlock the potential for paradigmatic change rather than just highlighting incremental improvements along current trajectories is strongly emerging. Sustainability researchers are emphasising that optimisation of current patterns of production and consumption is not sufficient to achieve the order of magnitude in reduction of ecological footprint required to preserve the earth's eco-sphere. A number of studies are pointing towards the need for more fundamental changes using notions such as "transformative innovation" [6], system transition [7], and systemic eco-innovation [8]. All these concepts are calling for transformative visions, scenarios and roadmaps challenging today's paradigms and basic assumptions on system dynamics.

A third arena where systemic change needs to be addressed is "innovation" itself as its very definition seems to be shifting. Early models saw innovation processes as a linear sequence of functional activities distinguishing only between "technology push" and "market pull". The limitations of such a model are clear; in practice innovation is a coupling and matching process where interaction is the critical element [9]. Rothwell's "fifth-generation innovation" concept describes innovation as a multi-actor process which requires intensive interaction at intra- and inter-firm levels [10]. For decades the dominant definition of innovation as "new products and processes that are introduced to the market" combined with the common understanding of companies as the main actors in this process was hardly ever questioned. Nowadays new innovation concepts are being suggested from a number of different directions.

Increasingly, phenomena like social innovation, service innovation, low-tech innovation, relational innovation and value innovation are recognised as highly relevant innovation arenas extending the standard definition [11–13]. At the same time, with the notion of "open innovation" the focus on the firm as the key innovation actor has substantially broadened towards social entrepreneurs, users, customers, public sector and citizens [14,15]. Creativity as the innovation competence is no longer exclusively assigned to specific professions such as designers and artists or entrepreneurs but extends to "ordinary people" and everyday life. Accordingly, a change in innovation can no longer be investigated as a change in direction or priority but needs to be recognised as a change in kind. Future innovation landscapes may function according to a different logic all-together.

The INFU (Innovation Futures) foresight project was set out to explore such future innovation landscapes. INFU was financed by the European Commission in the 7th Framework Programme Area Social Sciences and Humanities (SSH). It was carried out between 2009 and 2012 by the Austrian Institute of Technology AIT (Austria), Fraunhofer ISI (Germany), Z_punkt (Germany) and Solutioning Design Scenarios SDS (Belgium). The foresight project comprised four distinctive phases with different methodological approaches:

1. screening for signals of changes linked to innovation in a wide range of online and print media
2. stepwise clustering of the findings into visions in interaction with innovation actors through interviews and an online survey
3. development and assessment of scenarios of future innovation landscapes
4. generation of policy implications.

The INFU findings were documented in a number of reports and policy briefs which can be found on the project website.[1]

When investigating new patterns of innovation INFU was focussing on fundamental transformation in the way innovation is organised in business, public sector and society [16]. Accordingly, the methodological concept of INFU was tailored to capture systemic and structural transformation.

In Section 2 we outline the methodological framework of the INFU foresight exercise and highlight in particular the features that were foreseen to enable the capture of structural transformation. In Section 3 we introduce the main findings of the INFU project and discuss lessons learnt in terms of methodology. Section 4 presents conclusions for future applications of "transformative foresight".

2. INFU methodology

The INFU project envisioned and discussed possible future innovation landscapes together with innovation actors from a wide range of backgrounds. In order to do justice to the transformative nature of the subject, the methodological framework comprised several specific elements. In particular, the following four features served to enable the discovery of structural change in innovation:

- Inductive foresight approach
- Visual inspiration
- Assessment of coverage of dimensions of change
- Extended openness for diversity (prolonged divergence).

In the following sub-sections these features are described in more detail.

2.1. Inductive foresight approach

There is a wide variety of foresight approaches differentiated not only by their objectives but also by the distinct steps for building the scenarios or visions of the future. In the case of scenario building the model-based approach is in widespread use in Europe, whereas an intuitive approach without any software support has been practiced for many years in the US [17]. Both these

[1] www.innovation-futures.org.