



European
Research Area

EUROPEAN POLICY BRIEF



Innovation futures in Europe:

A foresight exercise on emerging patterns of innovation. Visions, scenarios and implications for policy and practice

October 2010

INTRODUCTION

The **INFU** project addresses questions such as how innovation will happen in the future, what signals and trends can be detected and how this will affect citizens, companies or policy makers. Innovation nowadays follows not any longer the traditional perception of being an isolated research activity. Instead, in this project new ways of how innovation is organised are tackled.

Many examples of organising innovation such as “open innovation” or “community innovation” are currently emerging in economy and society. While these and similar forms of innovation have been discussed intensively in recent years, there is little systematic exploration about their potential for different sectors and areas and its implications for economy and society. For the first time, a foresight project is conducted to analyse and discuss the emergence and diffusion of new innovation patterns and their implications for European policy.

The project employs various methods such as scanning weak signals, organising expert panels, conducting interviews, and building and visualising of scenarios in order to construct plausible, long-term scenarios of future innovation landscapes. In the first phase of the project a set of innovation visions based on scanning weak signals has been developed and visualised. These visions have been discussed with various experts from industry and academia to assess their likelihood and various impacts on the economic, social and environmental dimension.

KEY OBSERVATIONS

Identification of 'signals of change' indicating emerging innovation patterns

Based on analysing and screening sources such as the academic literature, internet, newspapers and magazines, signals for arising innovation patterns have been identified in the first year of the project. In total, 79 '**signals of change**' were identified and structured information was collected for every signal of change. For the purpose of the INFU project a 'signal of change' is defined as a weak signal which indicates a change in an innovation pattern with a potential of disruptive impact, which is not established as a common way of doing innovation in a sector.

The identified examples and cases often combine existing ideas, concepts and strategies (which are also described in the literature) in innovative ways, show new applications and thus expand our thinking about possible innovation futures.

Assessment of innovation visions by experts

The set of identified signals served as base for the development of 19 innovation visions, which, in a creative way, amplify and combine some signals in order to develop coherent, plausible and sometimes provocative pictures of possible future forms of innovation. Thereby the team transferred an idea already applied to other sectors or generalised a signal considered to become a mainstream practice (see also the Video on the INFU web page). In addition, the team conducted interviews with various experts from industry and academia and organised an online-survey to discuss the visions.

INFU employs a number of qualitative methods which help to find answers to research questions in focus. Quantitative data in this context is a support and basis for further interpretation and exploration of research questions. Accordingly, in this policy brief no straight forward quantitative information is given, instead the visualisation of scenarios is considered as important to communicate the research results.

To illustrate the possible future development of innovation patterns, eight of these visions are presented here which are believed to have a strong socio-economic impact.

What if the bulk of innovation came from today's emerging markets?

Relocated Innovation



In this vision, the West adopts the role of a follower and has to face products primarily designed for a different cultural context. Western companies wishfully look to Asia, often with the help of industrial espionage. Creative people migrate to the new innovation hot spots in Asia and send back their money home to the US and Europe.

What are possible socio-economic impacts of this scenario? Western companies would lose market shares and significance in international markets. There is a need for restructuring of Western markets: economies focus on local needs and local products with a high quality standard and no longer on front running products. The current tendencies of “globalisation of wisdom” would be limited by specialised regional innovation clusters. In addition, Western Nations would lose wealth while people in the Middle East and Asia would benefit. Social welfare systems in the West would no longer be fundable due to tax losses and a rise of “unproductive” shares of people in society (ageing population and unemployment). The migration of highly educated people as well as industrial workers to new markets would increase. Thus, social tensions and crime could increase in Europe.

What if companies externalised innovation to an open innovation marketplace?

Innovation marketplace



In this scenario nomadic innovators bid on innovation tenders and contests in constantly changing teams. They gather in co-working spaces some of which are top-favourite employers for creative people.

What are possible socio-economic impacts? Companies may be able to draw on a much broader range of ideas and perspectives. They can manage their innovation processes more flexibly and efficiently. Co-working spaces provide an interesting alternative to nomadic isolated worklives of self-employed knowledge workers. They may also become seeds of social entrepreneurship and help integrate marginalised groups.

What if open source development becomes an all encompassing innovation pattern?

The Open Source Society



Open source software development such as the development of the LINUX computer software which competes successfully with the Microsoft software has become a significant trend. This innovation vision assumes that open source development is no longer limited to software development but becomes an all encompassing innovation pattern. Many products and services are provided by a large number of people who contribute different bits and pieces to various technological and social innovation projects. Open source business models and coordination mechanisms abound.

What are possible socio-economic impacts? Competition on the market could slowly be replaced by 'strategic co-opetition' between companies. The critical question of a balanced 'co-opetition' is to regulate that a certain level of competitiveness ensures constructive improvement between monopolistic inertia and market competition. In the long term, we may also see a stagnation of innovation activities within firms as everyone is waiting for the others to move, hence, companies might more evolve towards closed innovation, and open source may finally stimulate also closed innovation. From a social perspective, the democratisation of product knowledge might give benefit to poorer societal groups and societies, and the increase of 'copy and paste' might lead to less safe products and thus higher societal costs.

What if we scanned the internet for ideas and automatically pick the best ones?

Web-extracted Innovation



Sophisticated semantic web-filters track changes in consumer preferences and new ideas in real time, and automatically extract innovations with outstanding market potential.

Thus, some types of market research would no longer be necessary, e.g. the lead-user approach would lose its attractiveness, meaning that taste, fashion and customer demands would no longer be predetermined by a small group of users. Intellectual property rights could become an obstacle on this way. Moreover, data protection becomes more important as "hacking" becomes more interesting.

What if the emphasis on innovation spread to all workplaces?

Innovation Imperative



What if the current emphasis on innovation and creativity among designers, programmers and engineers spread to all workplaces? Hence, all employees, from the janitor to top management are constantly involved in innovation activities. Creativity is part of any daily job routine and is a key in performance measurements.

If more and more people suffer from the constant innovation pressure, innovation could become something undesirable and negative. Increasingly, people may feel compelled to use their spare time to meet the innovation demands – which could have negative effects on people's health. Creativity drugs could become common. Designers and engineers may feel threatened by the distributed innovation approach. At the same time, a counter trend may be that

innovation fatigue takes over and “No-Innovation” (which is another innovation vision, too) is en-vogue in certain areas. Thus, managing that we end up with a “balanced innovation culture” is a challenge in this scenario context.

What if the principle of “Waste equals Food” (cradle to cradle) was widely adopted?

Waste-based Innovation



In this innovation model raw material databases with used components and materials serve as a starting point for innovations. The whole world becomes one eternal circle. Everything that is made of something is part of making something.

A change towards waste-based innovation would lead to a highly environmentally friendly economy. However, if recycling makes sense depends on the specific product, as in some cases recycling or reuse may have higher environmental costs. Some products might have to be banned entirely. Waste-based innovation would probably lead to a radicalisation of material awareness and could open the door for the advancement of recycling technologies and production. Trading of waste would become an even more highly profitable business.

What if innovation skills were high on the education agenda right from kindergarden?

Innovation meets Education



In this scenario it is assumed that efforts to integrate innovation culture and education starts already in kindergarden. Children are motivated to maintain their “discovery spirits” and learn how to question facts and think things differently. Learning is project oriented with a high emphasis on “bricolage”. Innovation becomes something that is taught as a matter of course, just like the ABC.

The described development would lead to a better access to qualified and creative workforce and therefore be a regional advantage not only for companies but for Europe as a whole. Moreover, if sustainable thinking and problem solving would be a part of the innovation culture it could lead to better solutions for ecological challenges. However, the pressure to be innovative rises the question what happens with those who are not able to follow the requirements?

What if cities became stronger actors in the field of innovation?

City-driven systemic innovation



In 2009, the city of Munich launched an idea contest to animate as many people as possible to generate and advance innovation concepts on energy efficiency in the fields of mobility and habitation. Cities could take on the investment risks for the development and implementation of needed innovations and use these as a new economic factor by patenting and marketing their solutions to other cities.

Possible impacts: City-driven innovation initiatives could increase the probability for people to find solutions for social and environmental problems which are beneficial for all. They could also lead to ideas which otherwise would have never been realised by private actors. At the same time, as a public customer, they can also open new market opportunities for suppliers and therefore help to reduce market risks.

RECOMMENDATIONS FOR POLICY-MAKERS

The innovation visions presented span a wide field of possible innovation patterns, and, as briefly illustrated, lead to various effects in the social, economic and environmental dimension. Although implications for policy have not been elaborated in more detail at the current stage of the project, the innovation visions indicate some fields for where policy actions may be needed.

The regulatory framework conditions (e.g. intellectual property rights) are enabling and controlling new forms of innovation

An analysis of the innovation patterns reveals that a significant driver in the economic dimension is the increasing global competition. The pressure to innovate is rising due to ever-shorter product life cycles, growing product piracy, and the transition of industrialised societies into knowledge economies. The key question is: How can we develop better ideas, implement them faster and spend less money while doing so? Another economic driver of changing innovation patterns are changes in the work world: Flexible working patterns, outsourcing and the increasing number of professional freelancers foster and enable the emergence of new innovation concepts. Moreover, companies have started to realize the direct (money) and indirect (reputation) economic value of social and environmental innovations, so there is a growing interest in both of these areas.

Risk to end up with stronger disparity in society, ending up in a “creative” and “non-creative” milieu

In the social dimension, many innovation futures are driven by people's growing ability and willingness to deal with social media and collaboration tools. This driver is closely connected to the already mentioned aspect that the younger generation is about to enter the business world, bringing with them new ways of knowledge sharing, collaborating and inventing. Another trend is the spread of individualisation which increases people's ambitions to express themselves by influencing the design of products and/or to change the functionality of solutions and services according to their individual needs. Finally, there is also evidence that there is a change in the way innovators and being innovative is perceived socially: Being innovative is becoming more and more socially desirable for a growing number of people.

Some new forms of innovation have negative impacts on the environment

From an environmental point of view, the growing awareness of climate change, social grievances and the inefficient use of resources are driving forces for emerging innovation patterns. However, new innovation concepts could fail for precisely these reasons if they turn out to be resource-inefficient or to produce tons of new waste.

From a technological perspective, especially new Web 2.0 applications are bringing about changes in innovation patterns as they make knowledge sharing and collaborating easier and more affordable, also on a global scale. Furthermore, many new innovation concepts are expected to result from the upcoming technology wave (sustainability technology), and general technological progress, i.e. cheaper, more powerful and usable electronic devices.

In the next stage of the INFU project, the various impacts, likelihood, opportunities and threats of selected innovation futures will be discussed and elaborated in more detail.

RESEARCH PARAMETERS

Objectives of the research

While there is much research investigating specific forms of innovation such as open innovation, network innovation or social innovation there has been little systematic exploration of possible future innovation landscapes and their implications.

INFU explores new patterns and structures of innovation, their potential for different sectors and its implications for economy and society. An analysis and assessment of different innovation patterns allows the design of policies and measures in order to benefit from the potential challenges arising from these changes.

In order to address these needs, the INFU project pursues the following objectives:

- scanning of weak signals indicating changing innovation patterns with a potentially disruptive impact for European S&T in the long run,
- systematic exploration of relevant and plausible future innovation landscapes through participative scenario building,
- assessment of scenario implications for the content of academic and industrial research, and key policy goals such as sustainability,
- deriving strategic options and guidelines for European research policy and relevant multipliers,
- initiation of an interdisciplinary, boundary-spanning stakeholder and expert debate on new innovation patterns.

Methodology

The project combines various foresight methods (weak signal scanning, expert panels, scenario development, scenario assessment) and builds on the existing academic literature on new innovation patterns.

The INFU dialogue starts by identifying emerging signals of change in current innovation patterns and then progresses by increasingly integrating diverse perspectives and knowledge sources towards consolidated innovation futures scripts. These bottom-up visions are then confronted with different possible socio-economic framework conditions and global mega-trends to finally synthesize consistent scenarios which integrate micro, meso and macro elements of possible innovation futures with particular emphasis on changes in the nature and content of research. Finally, policy strategy options are developed to prepare for the identified changes in innovation patterns.

PROJECT IDENTITY

Coordinator	Dr. Karl-Heinz Leitner, Austrian Institute of Technology, Austria
Consortium	Philine Warnke, Fraunhofer Institute for Systems and Innovation Research, Germany Francois Jegou, Strategic Design Scenarios, Belgium Vanessa Watkins, Z_punkt The Foresight Company, Germany
European Commission	Perla Srour-Gandon, DG Research, Unit L.2
Duration	1 June 2009 – 31 January 2011 (32 months)
Funding Scheme	Collaborative Project
Budget	482,889 Euro
Website	www.innovation-futures.org
Further reading	Stamm, B. von, Trifilova, A. (2009) (Eds.): The Future of Innovation, Gower, Surrey. De Jong, J., Vanhaverbeke, W., Kalvet, T., Chesbrough, H. (2008): Policies for Open Innovation: Theory, Framework and Cases, Research project funded by VISION Era-Net, Helsinki.
Related websites	www.thefutureofinnovation.org www.openinnovation.eu www.innovationwatch.com www.researchoninnovation.org www.iknowfutures.eu
For more information	Email: karl-heinz.leitner@ait.ac.at