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Innovation Futures: A Foresight Exercise on Emerging Patterns of Innovation

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Purpose

The Innovation Futures (INFU) project deals with the emergence of new innovation patterns, such as open innovation, user innovation, community innovation, social innovation and design innovation. Based on a foresight exercise, the project examines different patterns of how innovation is organised and studies implications for business and policy making. For the first time, a foresight project is conducted for analysing and discussing systematically the emergence and diffusion of new innovation patterns and their implications for European policy.

Emerging Patterns: How Innovation May be Organised in the Future

There are a number of indications that the way economic actors interact in order to transform knowledge into new products and services is currently undergoing substantial changes. The emergence of new innovation patterns involving new actors, different roles and new modes of interaction implies reconfigurations in European innovation systems with far-reaching implications for European science and technology (S&T) in the long run.

While a few radical visions have been taking up these signals and are predicting disruptive change for economy and society, there is little systematic exploration of possible future innovation landscapes and their implications for economy and society. However, in order for research and other policies to be prepared for the challenges arising from these changes and to be able to benefit from them, a more solid understanding of possible innovation futures and their implications for society is needed. At the same time, there is a need for debate among innovation actors, creating awareness, shared visions and momentum for change.

Despite growing debates in academia, industry and politics, many ***issues*** remain to be addressed, such as

- implications of new innovation schemes for ***production patterns*** (distribution and location of production),
- the ***environmental impact*** of new innovation patterns, in particular user innovation,
- implications of new innovation forms for ***regulatory framework*** conditions (both enabling and controlling these innovations),
- the role of current innovation ***agents*** (companies, researchers, engineers, designers, architects, i.e. the so called “creative class”, etc.) within new innovation patterns,
- people's ***attitudes*** towards innovation activities and their dependence on cultural context (e.g. innovation fatigue and passive consumer mentality versus individualisation and experience economy).
- the relation between new innovation models and well-known ***global megatrends***, such as demographic change, environmental threats, urbanisation etc.

The EFP is financed by the European Commission DG Research. It is part of a series of initiatives intended to provide a ‘Knowledge Sharing Platform’ for policy makers in the European Union. More information on the EFP and on the Knowledge Sharing Platform is provided at www.foresight-platform.eu

Against this background, the INFU project has defined the following ***objectives***:

- ***scanning of weak signals*** indicating changing innovation patterns with a potentially disruptive impact on 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.

The project combines various ***foresight methods*** 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 scripts for innovation futures. These bottom-up visions are then confronted with different possible socio-economic framework conditions and global mega-trends to finally synthesize consistent scenarios that 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.

In the different stages, a wide range of experts and ***stakeholders are involved***, for instance, in panel discussions, interviews, scenario workshops and online-debates.

Signals of Change

Based on an analysis of various sources, such as the academic literature, Internet, newspapers and magazines, signals for emerging innovation patterns have been identified in the first year of the project. In total, 63 “signals of change” were identified, and structured information was collected for every one of them. In our context, a weak signal indicates a change in an innovation pattern with a potential for disruptive impact that departs from the common path of innovation (in a sector).

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

New Innovation Pattern

Describing “new innovation patterns” requires a definition or at least an understanding of what is new. With “new innovation patterns” we mean novel emerging concepts, ideas and strategies of how innovation is organised, but also well-known trends, such as open source software development, which are already of importance in specific industries or areas but may have a larger impact on or potential for other areas in the future. In this sense, different concepts and strategies may be “new” for specific industries.

Twenty Innovation Visions

The set of identified weak signals served as the base for the development of 20 innovation visions, which amplify and combine some signals in creative ways, allowing to develop coherent, plausible and sometimes provocative pictures of possible future forms of innovation. The team thereby transferred an idea already applied in one sector to other sectors or generalised a signal considered to become a mainstream practice The visions have also been visualized by a video, which can be seen on the project web page: www.innovation-futures.org. 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.

We will single out seven of these visions that may have a potentially strong impact on socio-economic development to illustrate the possible future development and briefly introduce them:

The Open Source Society

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 people contributing 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 an environment so as to create a certain level of competitiveness ensuring a 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 evolve more towards closed innovation, and open source may finally also stimulate closed innovation. From a social perspective, the democratisation of product knowledge might benefit poorer social groups and societies, and the increase in “copy and paste” might lead to less safe products and thus higher societal costs.

Innocamps

Imagine that innovation camps, where people gather for a few days to innovate together, became widely established as a means of problem solving. Innovation camps are used by companies, the public sector and civil society for solving problems ranging from high-tech challenges to innovative neighbourhood facilities. Certain groups of people regularly join innovation camps.

What are possible socio-economic effects? Innovation camps are an established format for collecting the ideas of young talented people. They are systematically integrated in the education system as a new means of fostering innovation culture and increasing interest in science and research in order to meet the demands of a knowledge-based industry. The participation is organised as a reward for young people that have participated in contests before. The camps also provide perspectives for the future and opportunities for personal development (careers, grants, jobs, education etc.).

Innovation Marketplace

What if companies no longer innovated themselves but fully externalised innovation to an open innovation marketplace? 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 work lives of self-employed knowledge workers. They may also become seeds of social entrepreneurship and help integrate marginalised groups.

Relocated Innovation

This innovation vision can be sketched by asking the following question: What if the bulk of successful and disruptive innovations came from today's emerging markets? Thus, 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 their money back home to the US and Europe.

What are possible socio-economic impacts? 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" and "technological convergence" 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 could no longer be funded due to tax losses and a rise in the share of "unproductive" people in society (ageing population and unemployment). The migration of highly educated people as well as industrial workers to new markets would increase. European societies would age even more rapidly than projected. Thus, social tensions and crime could increase as the West suffers economically.

Innovation Imperative

What if the current emphasis on innovation and creativity among designers, programmers and engineers spreads 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 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 and a loss of orientation due to continuous change might be a consequence. 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" becomes en vogue in certain areas. Thus, the challenge in this scenario context is creating a "balanced innovation culture".

Waste-based Innovation

Think about the following: What if the principle of "waste equals food" (cradle-to-cradle) was widely adopted? 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, whether recycling makes sense depends on the specific product, as in some cases recycling or reuse may result in 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.

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. We could ask, what if cities became stronger actors in the field of innovation by proactively pushing for needed and demanded solutions? 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 of people finding solutions for social and environmental problems that are beneficial to all. They could also lead to ideas that otherwise would have never been realised by private actors. At the same time, as a public customer, they could also open up new market opportunities for suppliers and therefore help reduce market risks.

Future Drivers of Innovation

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.

An analysis of the innovation patterns reveals that increasing global competition is a significant driver in the economic dimension. The pressure to innovate is rising due to ever-shorter product life cycles, growing product piracy, and the transition of industrialised societies to 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 is 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. Geographical changes in innovation patterns, in particular the shift of innovativeness to developing countries, is driven by cost advantages and the rapid economic catch-up in those countries.

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 repeatedly mentioned aspect that the younger generation is about to enter the business world, bringing with them new ways of thinking about sharing (free) knowledge, collaborating and inventing. Another trend is the spread of individualisation, which, as one effect among others, 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 regarded socially: being innovative is becoming more and more socially desirable for a growing number of people.

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 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 collaboration 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 useful devices.

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

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Project home page

www.innovation-futures.org

More web links

www.thefutureofinnovation.org

www.openinnovation.eu

www.innovationwatch.com

www.researchoninnovation.org/