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CIVISTI – A forward-looking method based on citizens' visions

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Abstract: In this paper, we present the forward-looking CIVISTI method with strong participatory elements for inter- and trans-disciplinary futures research based on citizens' visions. This multi-perspective demand side approach, has been developed and implemented since 2008 in different projects at EU, national and local level for knowledge-based policy advice mainly focussed on program development. Applying CIVISTI (Citizens Visions on Science Technology and Innovation) provides desirable futures that incorporate people's hopes and fears and provides insights to societal challenges and values. It furthermore combines this knowledge with experts' and stakeholders' recommendations for implementation.

Keywords: forward-looking, sustainable development, participation, citizen visions, inter- and trans-disciplinary knowledge generation

Introduction

Sustainable development requires forward-looking planning, which involves both imagining *and* shaping the future (Chakraborty, 2011). "Long-term plans should balance the

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proximate (now-for-now) preferences with those targeted at a more distant future (now-for-then)."[1] This kind of planning needs to deal with uncertainty of future conditions, and requires a strong commitment on the part of society. Van Schomberg (2013) proposes that through Responsible Research and Innovation (RRI), stakeholders "become mutually responsive" and tackle the "grand challenges of our time, for which they share responsibility."

Allen and Shonnard (2012, pp. 117-163) show the needs for a multi-perspective approach to deal with social challenges and provide a comprehensive overview on interrelated economic, environmental and social indicators for design for sustainability based on references such as the Brundland Report (WCED 1987), The Augsburg Material Declaration (2002), The 12 Principles of Green Engineering (Anastas and Zimmerman, 2003) and The Sandestins Green Engineering Principles (Abraham and Nguyen, 2003; Shonnard et al., 2007).

Allen and Shonnard (2012, pp. 117-163) summarize the role of technological development in global sustainable development for a high standard of living, with favourable economic returns, minimum environmental impacts, and with regard to the social condition of stakeholders to create products and meet the needs of today in an equitable fashion while maintaining healthy ecosystems and without compromising the ability of future generations to meet their resource needs.

Jansen et al. (2010) see the challenge of considering the future mainly in setting common targets inspite of uncertainties of future conditions and develop solutions that meet the society's needs. "The Challenge is not to forecast the future, but rather to envision a desirable social-ecological future that meets macro-sustainability constraints and conforms to society-agreed concepts of what constitutes a good quality of life, to set this as a target state and to work towards its realization." "The society-agreed concepts" for

[1] The description of the project Long-term Planning. The Relevance of Social and Cognitive Resources for Sustainable Economic Activities (September 2010-March 2013) at Europäische Akademie http://www.ea-aw.org/project-groups/overview-of-project-groups/long-term-planning.html (accessed 11 February 2013).

transformation are a key factor for Jansen et al. (2010). These concepts can be hidden in visions. Beers et al. (2010) define a vision as an image of a desirable future. In an analogy to Dierkes et al.'s (1996) interpretation of the role of visions in technological development, visions could generally keep developments on a specified path (Sotoudeh, 2009). Van der Helm (2009) stresses that change from the current situation is intrinsic to the nature of visions: visions are idealised expressions of a future with hidden knowledge and the aim of mobilising present potential for transformative change.

According to the principles of a sustainable development the target setting and vision generation should integrate the participatory solicitation of societal interests in the local development for generation of social robust solutions. When experts talk about "involving public opinion on a special planning object", they often mean a decision for short- and middle-term time horizon. For instance, Carlsson-Kanyama et al. (2008) evaluate "the link between decision-making and citizen participation" at local level:

> …In Sweden, where public opinion usually enters into the planning process at such a late stage as to have a minor influence on actual outcomes. This has prompted some Swedish authorities to explore new methods for involving citizens already at the very early stages of planning. (p. 44)

Setting targets for a sustainable development requires deeper and more robust knowledge than the knowledge on public opinion on a current problem. A number of participatory and bottom up approaches have been developed for social robust technical solutions with a time horizon above 20 years. These approaches considering the need of the next generation are forced through the Action Plan of the United Nations with regard to the sustainable development (UNEP, 1992). The participatory processes are required for understanding both the public opinion and future needs and building bridges between different knowledge fields.

In this paper, we present our experiences with a foresight approach including citizen participation, which has been developed during the EU project CIVISTI (2008-2011) and applied in seven EU countries within the framework of the

seventh EU research programme (2007-2013). CIVISTI[2] provides systematic and structured knowledge on societal needs regarding future developments of science, technology and innovation. The method combines vision generation in a highly heterogenous citizen panel with and a modular process of inter- and transdisciplinary knowledge generation resulting in a multi-perspective approaches for target setting within research and development agendas.[3]

In conclusion, we discuss the multi-actor communication as the main element of the method and potential of the method to contribute to understanding of social challenges for improvement of technical solutions.

CIVISTI – A forward-looking method based on strong elements of citizen participation

CIVISTI method has been developed as a future study to identify social needs in Europe for the preparation of the EU long-term research programme Horizon 2020. In the EU policy-making context, futures studies are integrated into forward-looking activities as studies designed to inspire evidence-based future-oriented policies. The CIVISTI method is one of the qualitative approaches in foresight studies and forward-looking activities to integrate people's future needs to the process. It has been mapped in the EU action catalogue for participatory methods (Engange 2020, 2014) and was evaluated as an example of the most innovative methods for responsible innovation (Rask et al., 2016). For an overview of applications and process innovation on methodological level see Gudowsky and Sotoudeh (2017), Gudowsky and Peissl (2016), Gudowsky and Sotoudeh (2015).

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[1] The EU project CIVISTI (Citizen Visions on Science, Technology and Innovation, 2008-2011, http://civisti.org, accessed October 11th, 2016).

[3] The most recent applications of the method are conducted within the EU-projects CIMULACT - Citizen and Multi-Actor Consultation on Horizon 2020 (cimulact.eu); and CASI - Public Participation in Developing a Common Framework for Assessment and Management of Sustainable Innovation (casi2020.eu).

Most forward-looking activities have taken their starting point on what could be called the supply side in conjunction with available technologies. In such approaches there is an emphasis on the participation of experts and stakeholders. CIVISTI, on the other hand, tries to foster demand-side approaches and identifies the demands of the society concerning future developments. As shown in Figure 1, the starting point of CIVISTI is the identification of citizens' visions with a clear separation of dialogues between citizens and stakeholders. Citizens are not influenced in the first steps of the process by experts' opinion or face-to-face dialogues with experts or stakeholders. The implicit knowledge of a heterogenous group of citizens and their hopes and fears generate the basis for visions with a braod spectrum of perspectives. Experts' recommendations are later developed on the basis of these visions. Next, citizens set priorities on the recommendations of experts. Contrary to scenario development approaches, CIVISTI does not aim to develop models of the real world in terms of "what will the future look like?", but rather asks "what should it look like?" It aims at identification of a braod pool of weak signals, that can be analysed and crystalized step by step to arrive at priorities for reasearch and policy. CIVISTI method starts therefore with inspiration of citizens to think about a future beyond the next 20 years and focuses on their own creativity of citizens for generation of desired pictures of future in their visions.

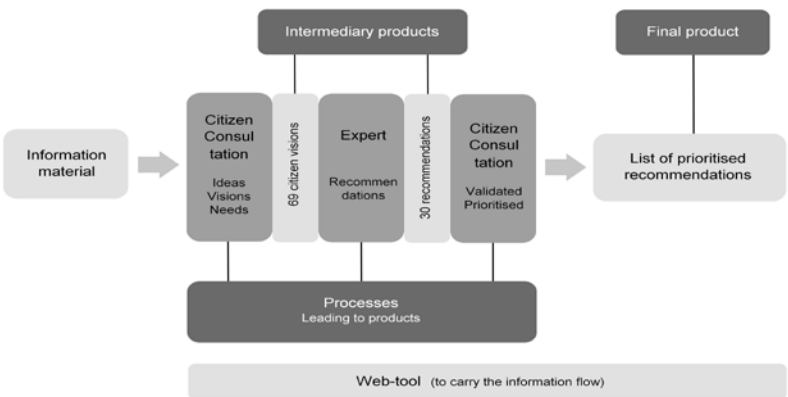

Figure 1: The CIVISTI Method
(adapted after Jacobi et al., 2011, p. 10)

Using the foresight diamond (Figure 2 adapted from Popper et al., 2007, p. 20) to position the CIVISTI-method among Europe's top ten foresight methods clarifies the method's background. The diamond is a space defined by four opposing poles: evidence, creativity, expertise and interaction. Each method is located according to its position on the two axes connecting the opposing poles. For a thorough description of this positioning see (Gudowsky et al., 2012):

> On the creativity-evidence axis, we locate the method between SWOT-Analysis (Strenghts, Weaknesses, Opportunities, Threats) and Scenarios, because a second focus of the method is the experts' contributions, in which, drawing on their knowledge and evidence, the experts moulded the citizens' work into policy recommendations. This integration of lay and expert knowledge positions the CIVISTI method approximately in the middle of the expertise-interaction axis.

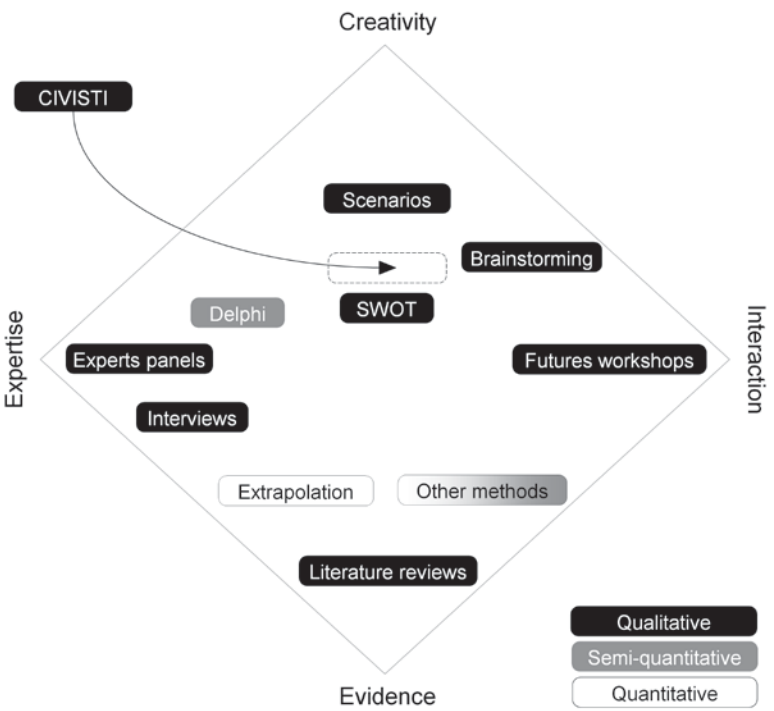

Figure 2: Positioning the CIVISTI method among Europe's top ten foresight methods using the foresight diamond (adapted from Popper et al., 2007; see Gudowsky et al., 2012)

Knowledge generation through application of CIVISTI approach

The CIVISTI method follows a multi-actor perspective. The method provides different outcomes from different moderated dialogues for the policy and decision-making. It therefore contributes to "1. Understanding the situation, 2. Exploring what could happen, 3. Debating what stakeholders or participants would like to happen, and 4. Deciding what should be done." (Cagnin, 2008, p. 6)

Desired pictures of future are generated based on different types of knowledge that are combined through the method:

- knowledge from past experiences and future hope and fears by the citizens to identify social challenges;
- knowledge of experts to specify the existing situation;
- explicit description of social values and normative principles from different points of view.

The results of the CIVISTI project (2008-2011) and its recent applications of the method show that citizens' visions include a broad spectrum of interdisciplinary issues related to social challenges such as ageing, health, food, future cities, education, energy, multicultural society, social fairness, mobility, intelligent devices, safety and security.

Citizens discuss the future in their holistic and transdisciplinary visions. Each citizen's vision in the EU CIVISTI contains multiple (approximately 9 (Rask et al., 2010)) themes at different levels of impact (individual, local, national, European and global levels).

Normally, the translation of citizens' visions to recommendations or input into concrete actions realised by experts and/or policy-makers remains inaccessible for policy-makers and the planning process. In CIVISTI this translation is part of the process, which adds a lot of transparency and additional reflection phases to the process. The product of experts' and stakeholders' work is a new input to the second citizen consultation. To facilitate the validation process of recommendations by citizens, interdisciplinary expert groups need to develop comprehensible recommendations with clear dependence on citizens' visions. This validation process adds empowerment of citizens and authenticity in relation to the visions and the citizen consultation process.

An example for CIVISTI visions and experts' recommendations for R&D

A relevant vision for environment and energy topic will be summarized here to show the development of the idea from a vision to a verified recommendation for policy making.

Vision (Finland, 2009): The worst environmental threats have been beaten

Global warming is brought under control. Sustainable development. New transportation solutions. Decreased use of toxic substances. Development of technologies with less burden on the environment. The benefits are the *habitable environment for both humans and other forms of life, less disease,* better economic situation *of Funds for health care. Increased wellbeing.* **The challenge would be** *restricting consumption hysteria and achieve the commitment of developing countries to commit to these goals, because they have a great number of other problems to solve.* It is necessary to *raise public awareness, steer companies towards environmentally sounder solutions. It takes both will and commitment from society, businesses and private citizens to translate good ideas and goals into practical measures.*

Expert's recommendation based on this vision:

(Sofia-2010): Foster the use of biorefineries. Use biorefineries to produce natural fossil-based chemicals.

Importance

This recommendation is of a very high importance since fossil resource running out. And use of renewable resources may reduce the degree of global warming.

Timing

Biorefineriesare being given attention in FP7 and in the U.S. research programs. They have to be strongly integrated in the next research programmes and in European national research programs too.

Additional comments from the experts on the recommendation

Shortage of fossil resources is not only a question of energy resources, but also a shortage of raw materials for producing

chemicals such as food nutrients, packaging materials, tyres for bicycles and cars, various medicines, etc. We need renewable materials to replace the fossil raw materials. We also should develop the technology for producing the necessary materials in a sustainable and biodegradable form. The technology is called biorefinery. It has to be implemented as a research program on the European and national levels. In order to reduce transportation of biowaste, biorefineries could be in various sizes. So, small biorefineries doing the first refining of biowaste could be put in place locally, where the waste is produced and the basic chemicals could then be transported to processing plants where they are further developed into the needed goods (for example tyresor packaging materials).

Local biorefineries can produce bioenergy, which can be stored and used locally to reduce the need for external energy sources in agriculture or processing plants and actas a buffer when other renewable energy sources, such as wind or solar energy, are short.

Validation of the recommendation

Recommendation was validated in Finland in the second citizen consultation in October 2010. "The recommendation was assessed rather faithful to the original vision. Still the citizens were quite critical in their comments. The recommendation was considered to describe only a part of the vision. It was considered to be a good starting point, but its means are based on the present, not on the future. It was also condemned for forgetting general public education and awareness raising of citizens and corporations, and therefore considered unable to affect their actions or behaviour. The recommendation was also blamed for loosing the original vision's emphasis on individual responsibility, and limiting only to promotion of use of biorefineries." (Saastamoinen & Rask, 2010, p. 12) This example shows that the process of knowledge generation (from vision to validation of recommendations) supports a new type of research questions for the technology development with a stronger focus on social values.

Conclusion: Potential of CIVISTI method for inter- and transdisciplinary research

For CIVISTI we do not ask "what will the future look like" but rather what it should look like from different perspectives for identification of future needs and definition of long-term targets. This question does not end with the paradigm of economic growth as the ideal of development or the deterministic theory of technology push. The social and environmental innovations should be at least as important as technical innovations and might be much important for some reasons at some special points. The key role of future visions as a source of knowledge is here a supporting role for their broadness that indicates complex social challenges. Through visions fears and hopes regarding the future become explicit (including social and environmental challenges) and address technical and social spheres. They can also exemplify activities for co-evolution of technical and social innovations for transition to sustainable development. Understanding of citizens' visions supports engineers and other experts to identify social demands and provides at the same time the multi-dimensional criteria for validification of their solutions.

Visions indicate for citizens' societal values and impact categories such as scarcity or availability of resources, pressure on local resources, quality of life of workers and neighbours to the production site in addition to the environmental impact categories such as global warming, eutrophication, strastopheric ozone depletion, etc.

Generated visions are generally a rich source for identification of new research topics in an inter- and transdisciplinary environment. In addition, CIVISTI method legitimizes the plurality of perspectives. The "plurality of legitimate perspectives" poses an enormous challenge for technological development in a democracy. Funtowicz et al. (2001, p. 18) describe this plurality of perspectives as a source for conflict: "We may imagine a group of people gazing at a hillside. One of them 'sees' a particular sort of forest, another sees an archaeological site; another one sees a potential suburb, yet another sees a planning problem." Although the

diversity of needs increases the complexity and the challenge in coordinating research activities, research for sustainable development profits from multi-perspective concepts such as CIVISTI.

CIVISTI Citizens' Visions of desirable futures in 40 to 50 years include the societal context into research for sustainable development. Supported by a standardised facilitating method and splitting the roles, citizens, experts and stakeholders with different knowledge generate ideas, review results and validate the work of others and deal with questions related to sustainable development. Involved citizens and researchers gain in this way a higher awareness on diversity of solutions and innovations.

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