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Discussion: Research and Innovation for the Sustainable Economy

Contribution of the Advisory Board of the Scientific Coordination of Research Projects on a Sustainable Economy (NaWiKo)

The NaWiKo Advisory Board and the NaWiKo Team

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1. Context and objectives of the discussion paper

The BMBF funding programme "Sustainable Economy" was supported by a group of representatives from science, politics, business and civil society. This Advisory Board presents the conclusions of this work in this paper. The document sees itself as a contribution to transdisciplinary research and its potentials for implementation in social-ecological research.

Between 2014 and 2018, a total of 30 transdisciplinary research projects ('NaWi projects') were funded within the funding programme. These cover a wide range of topics (e.g. nutrition, mobility, sustainable textiles and other consumer goods, repairs) and use a variety of methodological approaches (e.g. real-world laboratories) with a view to the sustainable economy. These projects develop and research both technical and, above all, social innovations with regard to their potential contributions to a sustainable economy. An example of technical innovation is the development of apps with product information to support sustainable consumption. Social innovations are examined in the context of sustainable consumption or the design of working and living environments. The funding programme is a field of experimentation in which practice partners interact with research and jointly explore and test new approaches for a comprehensive transformation towards greater sustainability.

The Advisory Board, chaired by the Secretary General of the Council for Sustainable Development, Prof. Dr. Bachmann, comprises representatives from science, politics, business and civil society and met three times to promote synthesis and dissemination activities.[1] The aim was to support critically research from the perspectives of politics, business, society and science and to enhance the effects of this research in society.

This discussion paper stems from this context. This text was drafted by the NaWiKo team based on the discussions in the Advisory Board and is supported by the Chairman of the Advisory Board. It can be traced back to the creative and, in substance, continuing and sometimes-controversial discussions in the Advisory Board. The text does not claim to be exhaustive: the relationship between sustainability, science and practice gives rise to much further reflection. The incompleteness of the following discussion should be understood as an indication of the meaningfulness and necessity of further debates.

[1] Advisory Board members in alphabetical order: Christoph Bals, Bernward Baule, Uwe Bergmann, Kai Falk, Maja Göpel, Edeltraut Günther, Julia Hertin, Harald Kächele, Matthias Kannegiesser, Thomas Korbun, Kora Kristof, Reinhard Loske, Klaus Müller, Steffi Ober, Claas Oehlmann, Nilgün Parker, Katharina Reuter, Birgit Riess, Annette Schmidt-Räntsch, Bernd Siebenhüner, Max Schön, Angelika Zahrnt.

The members of the Advisory Board see BMBF's funding programme for the sustainable economy as a thematically relevant funding format that lies between (still necessary) basic research and tangible development projects. It serves as a model for the expansion of sustainability research and should be further intensified in the future. In future funding opportunity announcements, however, BMBF should structure funding programmes more strictly by thematic area. For its part, the BMBF should encourage other departments to use the funding format with its focus on transdisciplinarity and social and organisational innovations. The considerations and arguments of the Advisory Board on which this assessment is based are summarised below.

The BMBF has provided impetus for this research with the framework programmes "Research for Sustainable Development" (FONA). From the point of view of the members of the Advisory Board, this can and should be further developed and included in the ongoing agenda process for social-ecological research and for the development of *FONA 4*.

2. Impetus for research and innovation in the sustainable economy

2.1. Beyond the status quo

The funding programme "Sustainable Economy"(NaWi) is innovative and sets an example for other funding programmes.

We consider the funding measure to be exemplary because it uses innovative methods and procedures:

- Thematically, by developing and investigating sustainability innovations both socially and technically, and in their interplay.
- Politically, in that the funding measure contributes to basing political decisions on sustainable development more strongly on facts (evidence-based policy approach).
- Methodologically, by promoting the participation of a plurality of practice partners (including consumer research) and, in particular, by increasingly involving very diverse companies in research.
- With new perspectives in the sense that the sustainable economy is not only regarded as an issue for society as a whole or for the economy as a whole, but also as conditions and concepts for sustainable management in individual companies. The role of individual employees in relation to the increased orientation of companies towards sustainability criteria (e.g. recruitment of experts, participation in company decision-making processes) is also examined. The funding measure is furthermore dedicated

to international contexts.

However, our conclusions and recommendations go beyond this status quo. A transformation to a sustainable economy requires more. It must be concerned not only with technical innovations, but also with new business models and social practices. It requires the testing of institutional and cultural framework conditions that make it possible for research and practice to devise and develop solutions that address deep-seated causes of non-sustainability. The NaWi projects demonstrate that the interaction of social and technical innovations can open up sustainability potentials. However, this is only a first step. The findings also show that, although innovations for the purpose of sustainable development are possible today, successful diffusion can only be achieved through favourable framework conditions. The NaWi projects show that already the involvement of practice partners from various user groups, in particular economic and civil society actors, offers an initial added value with the potential to be significantly expanded in future research programmes.

2.2. Research and innovation for the sustainable economy

From the above, the following can be deduced:

- The research and development of social, technical and institutional innovations as well as their interplay should be further deepened.
- A research programme for the further development of economics should be set up in which the understanding of new forms of economics is examined both theoretically and empirically (e.g. use and preservation of public goods, crowd funding, regional currencies, public welfare-oriented economic forms, inclusion of previously externalised cost effects, etc.). These aspects should also be more strongly integrated into economics education.
- Research funding should provide targeted incentives to involve practice partners and civil society actors in the development of social and technical sustainability innovations.
- The possibilities and limits of a circular economy oriented towards natural ecosystems should be investigated more systematically. The aim should also be to identify which production and consumption processes could be replaced by innovative closed-loop solutions.
- The methodological-institutional framework of real-world laboratories and living labs should be further developed and scaled.[2] It would make sense to digitally link the existing (and still to-be-developed) research and innovation infrastructure to real-world laboratories in order to develop sustainable products, services and behaviour patterns at the interface of production and

[2] Cf. Innovation Structures 4.0 Position paper on promoting the networking, development and sustainability orientation of innovation infrastructures in Germany, December 2017, download from http://innolab-livinglabs.de/fileadmin/user_upload/INNOLAB_LivingLab_Positionspapier_deu.pdf

consumption. This is necessary to make timely and effective contributions to the goals of the German Sustainable Development Strategy and the SDGs for sustainable consumption and economic patterns.

- It should be the aim to establish funding that is stable in its volume but agile in terms of content and approaches. This would support research on the sustainable economy, promote standardisation and – for example – create a constantly updated and effective pool of knowledge on the recurring 'hotspot' questions on supply chains (fish, bananas, cocoa, textiles, vanilla, tomatoes, flowers, electronic devices, etc.).
- The numerous outstanding research results on the sustainable economy represent an important and growing body of knowledge. In view of the increasing speed of knowledge production worldwide, there is the fear that this (sustainability) knowledge will not be implemented in practice and university teaching quickly and dynamically enough. There is a lack of rapid communication and feedback mechanisms tailored to the different target groups. Knowledge transfer is currently not sufficiently broad and systematic. We recommend that knowledge results be prepared more quickly for teaching at colleges and universities and, in particular, made available to vocational training institutions. To this end, open online instruments for knowledge transfer could be used. The Federal Government could bundle the transfer to vocational education and training with a to-be-created Federal Academy "Sustainable Economy".
- The options for action and recommendations developed for a sustainable economy particularly with regard to policymakers, should be reviewed regularly to ensure that they are up-to date, relevant to and compatible with policy making. This means that projects should be encouraged to reach out to political actors and to engage in policy processes.
- Knowledge transfer should not be understood exclusively as the transfer of knowledge from scientists to citizens, but rather as an exchange in "both directions". This means involving citizens in research. Some keywords in this regard are citizen or stakeholder-based science, service learning and community-based research.
- Consumer research in the field of sustainable consumption should be expanded.

In addition to the direct conclusions on research on the sustainable economy, we have developed further recommendations, which are presented below.

2.3. The role of science in sustainable development

Sustainable development means that science relates to concrete problems and develops useful solutions. At the same time, science must continue to be open and unbiased, and driven by curiosity. This does not preclude a target-orientation or norm-based frames of reference, such as global responsibility. In addition, science can and should - especially against the background of social challenges and controversies - play a critical role in social debates, including reflecting on its own practice.

A constructive attitude toward failure is also important. When evaluating projects, the possibility of failure should not have a negative impact on the projects: Every scientific treatment of a question entails success and failure. Innovative research always increases the possibility of failure. Moreover, important findings can sometimes come from presumed failures; this is something that should be acknowledged in the context of evaluations. Implied in this approach is a culture of (being allowed) failure.

In future research, the internal scientific standard should be geared not only to excellence but also to a broader spectrum of relevant criteria, such as to:

- Promote the measurement of social impacts of sustainability research, especially long-term impacts.
- Initiate learning processes from failed innovations and strengthen the importance of such teaching and learning mechanisms.
- Support blue sky research and supplement a pure purpose-orientation with a general innovation principle. The aim is to build on the environmental precautionary principle inherent in innovation.
- Encourage science to critically and publicly address the challenges of sustainable development and to further develop criteria of excellence for scientific work with regard to the culture and practice of sustainability in order to initiate a further development of scientific quality.
- Focus more on the relevance of research for economic, environmental, agricultural and consumer policy.
- Identify target group-oriented needs (people in rural areas, seniors, children, migrants, those socially disadvantaged) and recommendations for action according to best-practice examples and reflecting developments in different lifestyle groups.
- Allow findings from the BMBF research programme on the sustainable economy and other projects such as TransImpact (https://td- academy.de/) to serve, among other things, to develop an indicator that focuses on and assesses the societal impact of research. This impact indicator should complement the usual measurement of the level of private and public research expenditure. An indicator like this is envisaged as a part of the German Sustainability Strategy.

2.4. Controversies over concepts of sustainable management

Sustainability is a political goal (globally, nationally and locally) that should guide the economy, society and politics. However, there are often controversies about the causes of non-sustainability, who or what is responsible for it, and the priorities and instruments that should be set and used. A key question is to what extent the growth logic of the modern economy and society itself is the central cause of non-sustainability. Various discourses, for example on efficiency and sufficiency, green economy and de-growth rebound effects, etc. provide different empirical and normative answers to this question and represent a multi-voiced frame of reference for the evaluation of innovations. Research funding and projects should, firstly, take note of this plurality. They should develop a pool of innovations, that offers ideas and concepts for different views of the future of the sustainable economy. Secondly, they should promote research and innovation that addresses and links different models of the sustainable economy so that their results can be connected in different contexts and discourses in the future. This ensures that the results can be taken up from different perspectives if a social consensus on priorities for action that deviates from the current mainstream is reached. An example of concepts that can be regarded as advantageous for sustainable business from the perspective of different models are innovations that citizens see in their roles as consumers and producers (prosumers). This concept can be combined with, for example, efficiency increases in green economy discourses, but it can also be connected to de-growth concepts.

The plurality of concepts for the sustainable economy and the need to make research and innovation adaptable to the various concepts suggest that a pluralistic participation of social actors is desirable in the development and implementation of research programmes. This will also allow different perspectives to gain recognition. Research funding in particular would be a suitable field for relating the various sustainability concepts and their communities to one another and seeking joint solutions to problems.

Future research should:

- Involve a plurality of social actors in the development of research programmes.
- Support research and development projects that appear to be compatible with different concepts of sustainable development. When innovations are compatible with different models of the sustainable economy, their likelihood of implementation increases.
- Develop a pool of innovations for social innovations as well, which establish links to different, even competing concepts of sustainability. This allows them to react flexibly to new priorities and challenges rather than to commit to specific solutions too early.
- Consider, equitably and constructively, sufficiency strategies from a

strategic economic perspective, similar to what is often already happening with efficiency strategies.

- Analyse and develop instruments to avoid rebound effects.
- Improve communication between the various "schools" of research sociology.

We have observed various strands of discussion about the content, opportunities, necessity and limits of sustainable development. The discussion is carried out differently in different fields of practice. This is the case, for example, with regard to the understandings of growth/de-growth/stagnation or different future scenarios and sectoral differences in value chains and networks.

We suspect that this is not only due to strictly factual reasons, but also to the contexts of (different) social groups, historical paths and sectoral reference points. A better understanding of these differences and their background could contribute to greater convergence and common reference points. A "Sociology of Ecological Discourse" could be helpful if it structured and classified various concepts and interpretative patterns on the subject of sustainability. A corresponding research programme could analyse the various facets of sustainability discourses with regard to their ideological and theoretical derivation, core demands, problem views and actors as well as their relationship to one another (contradictions, commonalities, links) and in particular seek connection to the sociological development of theories of society and action. It should take up global responsibility in view of the Agenda 2030 and be helpful in dealing with alternative transformation paths and guiding principles. This makes it easier to assign innovations to different visions and to establish links to the discourses. Ultimately, this could increase the legitimacy and acceptance of strategies for a sustainable economy.

2.5. Effects of research and innovation diffusion

Whether or not innovations for a sustainable economy are taken up and widely used depends not only on their quality, but to a large extent on the social and, in particular, institutional framework conditions. This especially applies to systemic and disruptive innovations, since incremental innovations are more likely to be introduced within a given framework. Research that takes into account the conditions for the diffusion of sustainability innovations must therefore also address the conditions that exist and those that must be created in order to scale sustainability innovations. This includes studies on awareness, routines, governance, political economy and culture.

Corporate forms and strategies that already make a major contribution to sustainable development should be further researched and promoted as best practices. These are, for example, cooperatives that play a major role in the

expansion of renewable energies, solidarity-based agriculture, prosumer models, newly founded companies that make use of social innovations (exchange, sharing, lending) as the basis of their business practices and thereby reduce material consumption (e.g. car sharing).

Innovations and the precautionary principle are often interpreted antagonistically in the expert public debate. The precautionary principle is accused of hindering innovation. This is countered by the fact that the precautionary principle was originally intended to act as an impetus for innovation, insofar as it forces a change of path. Moreover, the precautionary principle does not stand alone and generally corresponds with specifications on the extent and the binding nature of liability and burden of proof. However, even sustainability innovations are not without risks per se and what appear clearly to be sustainability innovations could possibly lose acceptance and fail to shape the future. If the precautionary principle is used primarily to avert known dangers, it may prove unsuitable to shape the future or future policies. Without ignoring risk precautions, it seems necessary to redefine the relationship between the precautionary principle and innovation. On the other hand, it is argued that the precautionary principle would be particularly suitable for risk prevention in assessing basic innovations from the point of view of precaution, provided that corresponding knowledge-based processes are established for this purpose. An "innovation principle" of equal rank does not appear to be necessary.

This debate must be conducted within a broad framework and beyond specialised groups. For the design and implementation of research, this also means that the principles of socially responsible research must be given greater weight. Research and development should become aware of social values and take them into account. In particular, an early and participatory assessment of the ethical implications of research and innovation, including sustainable development, can contribute to this debate.

Practice, as far as interested economic circles and active members of civil society are concerned, should

- Not only ask about obstacles from the given framework conditions, but also ask how alternative configurations could be made possible and corresponding options developed by means of practice-oriented science.
- Formulate their requirements and needs for dynamic regulations and minimum requirements for scientific innovation and diffusion.
- Demand, use and challenge methods and principles that improve the social responsibility of research and innovation.
- Test the willingness of companies, government procurement agencies and consumers to pay for particular goods and services in real situations or provide the information necessary to better scientifically examine the market elasticity for sustainability innovations.
- Examine the willingness and constraints of manufacturers to proactively

produce sustainable products for which there is still little or no demand.

- Develop additional possibilities for consumers who want to consume sustainably to implement this with as little effort as possible.
- Identify ways to simplify sustainable consumption decisions, facilitate sufficient lifestyles and stimulate demand.
- Offer modernisation sceptics and deprived milieus opportunities and make research an experiential part of their lives.
- Develop positive future scenarios.
- Formulate concrete recommendations for sustainability policies.

2.6. Further development of sustainability assessment

Diverse concepts of sustainability and the innovations associated with them promise different benefits and offer different perspectives on what constitutes a good life. This has become clear not least in light of the controversial nature of measuring sustainability and progress, including in the former Enquete Commission of the Bundestag on Growth, Prosperity and Quality of Life.

Innovations for a sustainable economy reflect this plurality and aim not only to increase efficiency and additional income, but also quality of life as a whole, whether by promoting community and social cohesion, improving self-efficacy or increasing time autonomy, etc.

A number of methods has been developed for the evaluation of innovations, products, companies, supply chains, business models, etc. In order to meet the requirements of a comprehensive sustainability assessment, indirect effects, interactions and international aspects should also be considered. The German Sustainable Development Strategy provides indicators for relevant aspects such as sustainable consumption (Sustainable Development Goal No. 12). The further development of the sustainability strategy, which is planned for 2018, provides for the concretisation and supplementary improvement of these indicators, as the existing measurements of market shares of products with the state eco-label and of energy consumption and CO2 emissions of private households represent only first, partial steps. They do not do sufficient justice to the (by now achieved) breadth of sustainable consumption patterns, the effects of consumption on value chains or the topic of sufficiency. Sustainability assessments should be comprehensive and transparent with regard to their evaluation bases and disclose the associated concepts of a sustainable economy.

Future research should:

- Further develop and apply methods of sustainability assessment with reference to the indicators of the national sustainable development strategy. This includes cost-benefit analyses of the introduction of sustainability innovations in companies and the creation of an appropriate context in terms of precaution and innovation (see above).
- Consolidate indicators to measure sustainability, interpret them in a

practical manner and make them available for the purposes of the sustainable economy.

- Develop indicators and assessment procedures for social/subjective benefit categories (time policies) and map socio-cultural patterns.
- Place greater importance on the circular economy in indicators.

2.7. International dimension of the sustainable economy

The supply chains of goods consumed in Germany often extend far beyond the geographical borders of Germany. They are therefore highly relevant to other countries. If these supply chains and their social and environmental effects in the country of origin are adequately taken into account, the environmental performance of industrialised countries with high trade intensity tends to deteriorate and in some cases significantly. The international effects of economic activity, e.g. along supply chains and economic interdependencies, are considered by the United Nations 2030 Agenda with its 17 universal sustainability goals, which have also been a reference point of the German Sustainable Development Strategy since 2017. However, this aspect still receives too little attention in research. The aim is to better understand and evaluate the international effects of production and consumption and to develop solutions that can be introduced in and beyond Germany.

Future research should:

- Investigate the international effects of consumption and production, including sustainability innovations.
- Focus on the supply chains that are particularly problematic for social or environmental reasons.
- Examine the transferability of sustainability innovations between Germany and other countries and consider which cultural and economic framework conditions are to be observed.
- Investigate whether and how international framework conditions for the diffusion of sustainability innovations can be influenced.
- Support the further development of well-known indices and calculation tools for economic development[3] towards hybrid prosperity measurements.
- Investigate to what extent political framework conditions that create a level-playing field (national and international) and incentive structures for sustainably operating companies can lead to changes in the market.

Develop proposals for a stronger anchoring of sustainable economic activity in international trade agreements as well as in the EU Treaty and the Euratom Treaty.

[3] As suggested by Ernst Ulrich von Weizsäcker and Anders Wijkman (Weizsäcker and Wijkman (2017). *What we have to change if we want to stay.* On the occasion of the 50th anniversary of the Club of Rome 2018, Gütersloh: 3rd edition, p. 335).