**NORMATIVE-NARRATIVE SCENARIOS AS A TOOL TO SUPPORT STRATEGIC R&D PROCESSES: BENEFITS AND LIMITS**

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Extended abstract

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**Introduction**

This paper presents ongoing research in the field of application and further development of scenario-methods in strategic R&D processes. The core purpose of this study is to investigate how scientific and technological fields of innovation can be supported through participatory work with normative-narrative scenarios. The normative-narrative scenario approach focuses on a participatory communication process involving heterogeneous stakeholders and it aims at catalyzing normative positions and at developing desirable images of the future by the mean of goal scenarios. Our study asks if normative-narrative scenarios present an adequate tool to enrich R&D processes and analyses benefits, limits and factors of success.

**Methodology**

We chose to study the tool by applying different types of scenario-workshops to the so-called “High-Tech Strategy” of the German Federal Government and, in parallel, to carry out an internal evaluation. We conduct one-day scenario-workshops covering different R&D issues with a range of mainly governmental R&D stakeholders, i.e. representatives of federal ministries and agencies. We apply two different types of normative-narrative scenario processes: scenario-building (type 1) and scenario-analysing processes (type 2) and the combination of both types. The qualitative exploratory evaluation – based on immediate feedback of the workshop participants and on retrospective interviews – focuses on the perceived usefulness and observable impacts of the scenario processes on cognitive, normative, communicative and strategic dimensions.

**Results and policy impact/implications**

Given the exploratory and preliminary status of the results, they are presented in form of hypotheses. Our findings show that normative-narrative scenario processes do support strategic R&D processes in several specific ways. They suggest that one main characteristic and benefit of normative-narrative scenario work is the integration of expert knowledge and personal vision. Furthermore, the tool helps to overcome disciplinary and institutional or organisational
boundaries. At the same time, the necessity of stakeholders to integrate their expert knowledge and their position as “ordinary citizens” also seems to present a crucial factor of success of the tool. Furthermore, the perceived benefits of normative-narrative scenario-processes vary between different stakeholders depending from their professional and institutional background and the observable impact on R&D processes depends on the type of scenario processes applied.

Conclusions
From a methodological point of view, the combination of both types of scenario process tested here, which combines the production of a common scenario (scenario-building) with its primary transfer to R&D requirements during the second workshop (scenario-analysis) seems to support R&D processes best. From a more practical and pragmatic point of view – taking time and resource constraints of R&D stakeholders into account – the one-day format of scenario-analysis (type 2) seems to offer a valuable alternative. In particular, the transfer from scenarios to more concrete strategic options provided through workshops seems to match with the R&D stakeholders’ demands and needs.

References


**Paper**

**Summary**

This paper presents ongoing research in the field of application and development of scenario-methods in strategic R&D processes. The core purpose of this study is to investigate how scientific and technological fields of innovation can be supported through participatory work with normative-narrative scenarios. Normative scenarios aim at identifying goals and at building strategies. The particular normative-narrative approach focuses on a participatory communication process. This scenario tool aims at catalyzing normative positions, developing desirable images of the future by the mean of consensual goal-scenarios and identifying and specifying scientific and technological fields of innovation. By using very concrete illustrations referring to concrete persons and their use of technology in everyday situations, the method allows bringing together a variety of stakeholders from various backgrounds. Our study asks if normative-narrative scenarios present an adequate tool to enrich R&D processes and analyses benefits, limits and factors of success.

We chose to apply the tool by conducting different types of scenario-workshops to the so-called “High-Tech Strategy” of the German Federal Government and, in parallel, to carry out an internal evaluation. We conduct one-day scenario-workshops covering different R&D issues with a range of mainly governmental R&D stakeholders, i.e. representatives of federal ministries and agencies. We apply two different types of normative-narrative scenario processes: scenario-building and scenario-analysing processes and the combination of both types. The qualitative exploratory evaluation focuses on the perceived usefulness and observable impacts of the scenario processes on cognitive, normative, communicative and strategic dimensions.

Our preliminary results show that normative-narrative scenario processes can support strategic R&D processes in several specific ways. One main characteristic and benefit of normative-narrative scenario work is the integration of expert knowledge and personal vision. Furthermore, the tool helps to overcome disciplinary and institutional or organisational boundaries. At the same time, the necessity for stakeholders to integrate their expert knowledge and their position as "ordinary citizens" also seems to present a crucial factor of success of the tool. From a methodological point of view, the combination of the production of a common scenario (scenario-building) with its primary transfer to R&D requirements during the second workshop (scenario-analysis) seems to support R&D processes best.
1 Introduction

This paper presents ongoing research in the field of scenario methods in support of strategic R&D processes. It presents preliminary results of the project “HighTech Scenarios”, which focuses on the application and further development of scenario methods. Scenarios can be understood as pictures of possible future situations and/or the pathways leading to these situations (cf. e.g. Greeuw et al. 2000). Scenario methods – in a broad definition – are all techniques and approaches working with scenarios and generally sharing the aim to deal with possible future developments. Scenario methods have been in use in strategic management, futures studies and technology assessment for several decades and there has been an important diversification of approaches and techniques (cf. e.g. Bradfield 2005; Mietzner /Reger 2004).

Scenario methods are often generally grouped into analytic and normative approaches (see e.g. Van Notten et al. 2003, Alcamo 2001). Our study focuses on (explicitly) normative scenario approaches and more specifically on the tool of normative-narrative scenarios. This technique has been increasingly applied since 2001 (cf. Gaßner /Steinmüller 2006).

The project’s aim is to further develop and apply this tool in support of strategic R&D processes. We analyse how scientific and technological fields of innovation can be (further) specified by participatory work with normative-narrative scenarios. The project applies and evaluates normative-narrative scenarios to the so-called “High-Tech-Strategy for Germany” of the German federal government. The tool is thus applied with stakeholders of governmental R&D processes consisting mainly in representatives of different federal ministries and agencies. This paper concentrates on the usefulness and impact of normative-narrative scenario processes. Our central research questions are: Do normative-narrative scenarios present an adequate tool to support strategic R&D processes? What are benefits and limits of the tool and which factors of success are crucial?

We describe the methodological approach of normative-narrative scenarios and specify the goals of its application on strategic R&D processes (chapter 2). Then, the project design - consisting in application, (further) development and evaluation of the tool - is presented (chapter 3). We present preliminary results of the evaluation in form of hypotheses with regard to the usefulness of the tool as perceived by the participating stakeholders of R&D processes and with regard to its observable impacts (chapter 4). Finally, we sum up the effective support of the tool for R&D processes and also draw preliminary methodological conclusions (chapter 5).

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1 The project (“High-Tech Scenarios”) is designed and conducted by IZT – Institute for Futures Studies and Technology Assessment, Berlin and funded by the German Federal Ministry of Education and Research.

2 For a recent comparative overview of different scenario-techniques see also Kosow /Gaßner 2008.

3 For instance, the tool has been applied in the project “Futur – the German research Dialog”.

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2 Normative-narrative scenarios in the context of strategic R&D processes

To specify the object of this study, first, we shortly present general features of the methodological approach of normative-narrative scenarios; second, we outline the expected impact of its application in the context of strategic R&D processes.

2.1 Normative-narrative scenarios

This specific scenario technique is characterized by three key parameters: it is normative, narrative and participatory (Gaßner /Steinmüller 2004; 2006).

First, the scenario technique is explicitly normative. In contrast to explorative scenarios, which mainly fulfil analytical functions by asking what-if-questions, normative scenarios focus on questions such as “What do we want?” and “How could we get there?” (cf. Eurofound 2003, 8). A basic assumption of normative scenarios is their understanding of future. They assume that there is (some) potential to actively design and create the future. The normative-narrative scenario technique focuses on desired and possible futures, not on most likely futures. Still, it considers technological developments within the frame of principal feasibility. It aims at identifying and/or specifying goals and also at preparing strategy building. Its function is to crystallize implicit normative aspects by surfacing underlying wishes, visions and aims. It is a tool to construct consistent and positive pictures of the future to give orientation for present decisions.

Second, this tool is called narrative, because the scenarios are elaborated almost literally. The scenario texts are designed as short stories accounting for possible future situations through fictive human protagonists and/or institutions and a rudimentary plot. This particular style of writing requires drafting very concrete and detailed pictures. Plausible and consistent normative-narrative scenarios generally require a high degree of realism (Gaßner /Steinmüller 2006). By using very concrete illustrations referring to concrete persons and their use of technology in every-day situations, technological issues are placed and discussed in their social, economic, and cultural contexts.

Furthermore, its participatory communication process characterizes the tool. Normative-narrative scenarios are a workshop-based technique. The process is prepared and accompanied by a scenario-team. The instruments applied during the workshop focus on creativity, intuitive knowledge and exchange between the participants more than on analytical work. Examples are creative group work, brainstorming, mind mapping of key-factors, writing of futures headlines, and development of seed visions. The workshops aim to distil desired and non-desired aspects of future developments and to consider concrete technological ideas and options to achieve desired developments.

Following the workshop, the results are documented and edited. Then, the scenario-team writes a scenario text via several feedback-loops with the workshop participants. Mostly, the scenario is

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4 Plausibility and consistency being main criteria for “good” scenarios (see amongst others Greeuw et al. 2000; Wilson 1998).

5 These instruments partly origin from future creation workshops (“Zukunftswerkstatt”) (see e.g. Jungk /Müllert 1989).
designed as one goal scenario, integrating the workshop results into a consistent picture of the future. The workshop also is important to gain participants' commitment to the scenario, to foster a sense of ownership (cf. Wilson 1998, 81) and to avoid 'not-invented-here-effects'.

**Example of a normative-narrative scenario text, excerpt from a scenario about the future of health:**

[Han a Chinese au pair boy has just arrived in Germany and is shown around the house by his guest father, Sascha.]

"May I ask you…", Han starts to ask, while Sascha clears up the last few remnants of the morning muddle, ‘…why there is no analyser toilet?’ He sounds disappointed. Perhaps Han had thought that every German household possesses a ‘toilet lab’? Sascha thinks these high-tech gadgets are too expensive, then they require too much maintenance, and finally they cause unnecessary hypochondria: ‘Heavens, too much uric acid in my pee!’ These toilets make sense for people who are chronically ill or who belong to a specific risk group. The health insurance will then take over part of the costs. Well, and maybe they are good for pregnancy tests, too…"

These scenario texts often provoke criticism and arouse discussions. This is no failure of the tool but in contrast, an important feature: the reader should spontaneously develop clear positions and attitudes towards the issues of the scenario, independently, if he or she had been familiar with the issue before. This is why the tool is adequate to bring together participants from different backgrounds and allows interdisciplinary exchange.

### 2.2 Expected support for strategic R&D processes

We apply normative-narrative scenarios in the context of strategic R&D processes, because we expect them to support R&D processes on different levels, i.e. mainly specifying goals of R&D, considering desirability and visions of R&D and strengthening the focus of R&D on needs and demands for technology as well as on the user perspective.

First, the work with normative-narrative scenarios is expected to define and (further) specify goals of technology development. In R&D processes the definition of goals is crucial to answer strategic questions such as “Where do we want to go?” and “What do we want to achieve?”. Normative-narrative scenarios aim at catalyzing normative positions and developing desirable images of the future by the mean of consensual goal-scenarios. They are expected to provoke normative assessments (either positive or negative) of complex issues such as future technologies. Their aim is to strengthen the normative positioning towards and assessment of possible future technological developments.

Second, with their explicitly normative approach, normative-narrative scenarios focus on wishes, visions and desirability. They strengthen the normative side of technology development. Technology development often has been described as technology driven. With this tool, possible technological futures are considered not mainly by technological possibilities or technological probability but from the point of view of desirability of future R&D. The tool aims at surfacing

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6 In more analytical scenario techniques, it is generally necessary to design more than one scenario to anticipate a bandwidth of possible future developments. In this normative approach, it makes sense to draft only one - consensual - goal scenario, but it is also possible to draft several scenarios to illustrate diverging goals or different solutions to conflicting goals.
underlying wishes, visions and aims of R&D by focussing on questions such as “How do we want to live in the future?” and “What concrete technologies might be appropriate to reach these goals?” “What tasks for R&D result from these visions?” and “How could we avoid non-desired impacts?”. Thus, the tool is expected to generate strategic orientation of research and technology development.7

Third, normative-narrative scenarios are expected to bring a concrete “lifeworld” perspective (German: “Lebenswelt”) into strategic R&D processes. They focus on user perspectives and on possible future daily-life applications of technologies and thus strengthen awareness and knowledge of possible futures needs and demand for technology.

Furthermore, the tool allows the integration of a variety of stakeholders from different backgrounds. Thus, it seems to be an appropriate approach for interdisciplinary, inter-organizational and inter-ministerial R&D processes.

On a more general level, the tool is expected to support strategic R&D processes by generating orientation for discussions among a variety of stakeholders in the different fields of research. On a more concrete level, it is expected to provide ideas and input for the formulation of R&D programmes and strategies.

3 Methodological design

To test and to enhance the tool of normative-narrative scenarios in the context of strategic R&D processes, we chose to apply the tool by conducting different types of scenario-workshops and in parallel, to carry out an internal evaluation.

3.1 The projects’ scenario-processes

We conduct one-day scenario workshops following the normative-narrative approach. As empirical context for our study in the field of strategic R&D processes, we refer to the “High-Tech Strategy for Germany”8. This is the national strategy for innovation policy of the German federal government. It covers all federal ministries and defines priorities of innovation policy by establishing objectives for 17 fields of R&D. Each of our workshops covers one issue out of these R&D fields.

Every workshop takes place with a broad range of stakeholders of the “High-Tech Strategy”, i.e. mainly representatives of different federal ministries and agencies. The (around) 20 participants per workshop are mainly administrators but also researchers from governmental and academic research institutions. The participants of each workshop thus are professionals from different levels of strategic R&D processes and policy.

We apply two different types of workshop design. The first type is a scenario-building workshop, which is a rather classical application of the tool of normative-narrative scenarios. The second type is a scenario analysing workshop, which is a methodological innovation within the application of this tool. The scenario building process (type 1) focuses on the distillation of goals and desirable future technological developments. It consists in elaborating a common set of key factors, a collection

7 For the impact of normative scenarios see also Minx /Böhlke 2006, 18.
8 For more information see: http://www.hightech-strategie.de/_media/faktenpapier_hts_englisch.pdf
of settings in which technologies might be relevant in the future, an edition of futures headlines and further elaboration of seed visions and desired pictures of the future. Following the workshop, a goal-scenario is written by the scenario team, validated and commented on by the participants. The scenario thus is the result of the scenario process.

The scenario-analysing process (type 2) focuses on the transfer of these scenarios to more concrete strategic elements. It starts with an already existing scenario and consists in a subjective evaluation of desired and non-desired elements by analysing and assessing the goals implemented in the scenario, identifying important areas of R&D and developing requirements of R&D to reach these goals.

By combining both types of workshops, we apply a “third type” of scenario process. For one issue, a scenario-building workshop is conducted, a scenario is written and this scenario is then analysed during a second workshop several months later with mainly the same participants (see Fig. 1).

Until now, we have conducted four workshops, covering the three different scenario process types (building, analysing or both). The workshops focussed the issues “information and communication technologies”, “water technologies” and “security technologies”, further workshops will follow, e.g. “nutrition”.

Fig. 1 Types of normative-narrative scenario processes

Source: IZT 2008
3.2 Evaluation

In parallel and in order to assess the support provided for strategic R&D processes, we conduct an internal evaluation focusing on the usefulness and the impact of the scenario processes.

Usefulness and impact concern different dimensions: Challenging and widening the participant’s thinking and understanding of the issue (cognitive dimension), identifying or specifying goals, desirability and visions (normative dimension), developing a shared, interdisciplinary understanding of the issue (communicative dimension) and gaining input for strategic planning by opening new paths of action (strategic dimension).

One main challenge of this evaluation is that usefulness and impact are often referred to in terms of soft and subtle categories that are not directly accessible. Consequently, we focus on *perceived* usefulness by the stakeholders themselves and differentiate between directly *observable* impacts and potential and indirect impacts.

We decided against any a priori quantitative evaluation approach, as it is often done by questionnaire-based surveys. Instead, our heterogeneous sample is evaluated following a qualitative-exploratory approach. This seems more appropriate to cover adequately the broad range of stakeholders, four different workshops designed according to two scenario process types and covering different issues.

The evaluation is based on two main data sources:

First, we collect participants’ immediate feedback at the end of each workshop. The participants are asked for their assessment of the workshop as to its method, the quality of the results and the expected benefit for their work. In total, the immediate feedback of 54 stakeholders has been collected until now.

Second, we conduct qualitative in-depth interviews with selected participants 3 to 6 months after the workshop. The key dimensions of the interviews cover an assessment of the workshop and its later usefulness and impacts in terms of working ambiance and output, perceived usefulness and effective use of the results (including documentation and scenario) with regard to the participants’ professional activities, contacts with other workshop participants and networking.

The interviews are semi-structured to explore cautiously each participant’s perception of the usefulness and to explore the potential impacts. We proceed by questions as for instance: “Did you tell somebody about the workshops results?” or “Did you discuss the scenario with somebody?” Then, we further ask about occasions, purposes, contexts and reactions. This allows us to track potential impacts of the scenario-process in the participants’ daily work – avoiding being too suggestive and without distorting the participants’ experience by our expectations and interpretations. So far, 17 interviews have been conducted covering all types of workshops, all issues and the range of participants.

The data from both sources is analysed via qualitative data analysis (Mayring 2000). The complementary qualitative results provide an exploratory approach to analyse the impacts and usefulness of normative-narrative scenarios in R&D processes.
4 Preliminary results of the evaluation

As the approach of the evaluation is qualitative and explorative, the results are formulated in form of hypotheses (H1 to H9). As the project is still ongoing, one has to consider these results as preliminary. There have been no significant shifts from the immediate perception (feedback round) and the retrospective assessment of the tool (interviews), thus we are able to present the combined results.

4.1 “No business as usual”: Cognitive and normative impacts on the individual level

Via normative-narrative scenario work, one can observe important impact onto the individual stakeholders’ awareness and perception (cognitive level) and priorities (normative level) within their issues. Still, this impact requires the important precondition of willingness to open up to non-daily routines during the scenario workshop.

**H1 Normative-narrative scenario processes allow considering R&D issues under a new perspective: awareness for the lifeworld, needs for technologies and the user perspective.**

Almost all of the participating stakeholders experience the scenario-work allowing a new perspective on the issues discussed. Most stakeholders experience a strong focus on the “lifeworld” and on daily life aspects, i.e. “a perspective less focussed on technological feasibility or on political considerations as usually”, as one stakeholder stated. “Human aspects have obtained a central role, that’s not always given”, as another stakeholder commented. During the workshop, technologies are anchored in concrete and specific daily-life situations. This orients the focus on application, deployment of technology and its social contexts, conditions and effects. This embedded view on future technologies has been highly appreciated by many of the stakeholders, who state they often lack knowledge about needs and demands for technology. Via this scenario-work, an overview has been created helping to orientate participants’ own work. Stakeholders report that they got sensitised for the user perspective and for the desirability of technologies. This has had the effect to raise awareness for aspects, which are often neglected in the daily business (“I rarely think this way in daily work”). Sometimes, this even challenges the stakeholders’ priorities within their issues. The tool thus was successful in widening the participants’ thinking of their R&D issues on a broader, interdisciplinary perspective by integrating different dimensions.

The “normative sensatisation” is supported by the style of the scenario itself. Many participants stress that the scenario stimulates to take over a perspective of “potential individual concern” which – via emotional access – allows clear positioning towards desired and non-desired elements of future technology developments. The presentation of a broad range of elements in one coherent scenario has been judged as tangible and descriptive and as highly useful to stimulate creative and normative discussions. Many stakeholders asses the fact that the workshop “transcends the daily routine”, as very positive.
H2 Normative-narrative scenario processes are perceived as stimulating and generating orientation but do require personal commitment to working formats perceived as unusual.

Most stakeholders view the process and results as having a stimulating character. Many stakeholders appreciate the broad overview of the issue that is achieved by the workshop, which provides orientation and inspiration for their daily work by strengthening the general frame of reference. “I have the workshop in my mind and I am able to ‘virtually check’ aspects of my daily work”, as one stakeholder put it. Some stakeholders also stress that they gained concrete ideas and concrete input. Still, for most stakeholders the usefulness of the process consists in providing general orientation rather than detailed ideas. The results have a stimulating character, “they now have to be further detailed and specified in my daily work”, several stakeholders said.

However, there is a central precondition to achieving these cognitive and normative impacts. This kind of normative-narrative scenario work requires stakeholders’ willingness to participate in working processes perceived as no daily routine. For most stakeholders, the creative and group work dominated process had been unusual. Open formats as e.g. brainstorming are seen to be challenging: “For people not used to, these methods always have the touch of not being serious”, as one participant remarked. Furthermore, the more personal, normative and even emotional perspective requires the stakeholders’ willingness to leave the mere professional level. “If you want to stay completely functional and technical or scientific, it will not be comfortable to come to more personal considerations”, as one stakeholder put it.

The impact on communication and exchange processes among heterogeneous stakeholders are summed up in the following section.

4.2 Communicative impact among heterogeneous stakeholders

During the workshops, very heterogeneous stakeholder groups from different disciplinary and organisational backgrounds come together. They come from different ministries, agencies and R&D units and they are of different age and position. The applied tool allows cooperative work and work on an equal footing of heterogeneous stakeholders including valuable exchange within their R&D community.

H3 Normative-narrative scenario processes foster cooperative work on an equal level of heterogeneous stakeholders from R&D processes.

The overall atmosphere of the workshops has been perceived by all stakeholders as open, focussed and productive. This was mainly due to the cooperative interactions during the process. Many participants observed that the process has been unusually open. People were interacting on a direct and constructive working level, bringing in their ideas and listening to each other’s. “People have been ‘receiving’ more than ‘broadcasting their message’”. Stakeholders experienced that the workshop participants where communicating on an issue-oriented level “without the usually necessary self-portrayal of the different institutions and organizations”, as one stakeholder described it.

Furthermore, the workshop has been experienced as work at eye level: differences in position, age, qualification and hierarchy have been of subordinated importance. One stakeholder described: “No matter if high ministerial official or young researcher - everybody could contribute equally and has been taken seriously”.

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H4 Normative-narrative scenario processes allow stakeholders from R&D processes to exchange their positions and priorities within their R&D community.

First, the perspective of “potential individual concern” reveals to the workshop participants the sensitivities and similarities of different stakeholders of their R&D community. “It’s interesting, to see the personal sensitivities and individual concerns professionals/experts do have on their issues”, as one participant said.

Second, many participants were astonished and enriched to see that stakeholders from very different backgrounds share the same or at least very similar concerns and sensitivities. Through the exchange during the workshop these similarities on a more personal level became visible. Furthermore, it has been experienced as “comforting” that inside of institutions and organisations, there is a broader range of positions and attitudes than had been expected before by the participants. This shows possible future points of contact “It’s good to know how people think and function”, one stakeholder said. “The process has shown to me how people work, how one can work with others and what questions people are concerned with”, another stated.

Third, the tool allows cross checking one’s priorities with those of the group. To get to know the others’ positions and priorities has revealed points of common interest and helped to confirm “that I’m working on the right themes”, as one participant said. Many participants appreciated that they got to know where the issues of the R&D community lie, what the community is concerned with.

The perceived usefulness and the impact on normative and cognitive dimensions as well as the specific communicative experience during the workshop can be presumed to form the base for any potential impact of the normative-narrative scenario work on strategic R&D processes after the workshop.

4.3 Impacts on the stakeholders’ work in R&D processes

As the impact of normative-narrative scenario work on strategic R&D processes is difficult to “prove”, we limit our hypotheses on the observable impact on the stakeholders’ work in R&D contexts. The scenario-work does influence the stakeholders’ work on an “in-house” level, e.g. they spread results inside of their organisations but also on an inter-organisational level via new or intensified contacts and new cooperation.

H5 The results of normative-narrative scenario processes are communicated and spread into the R&D stakeholders’ home-organisations.

Almost all stakeholders state that they have read the workshop documentation after the workshop and that furthermore they have reported on the results in their department or workgroup. These reports had either formal or informal character. The occasions to tell about the workshop and its results can be divided into two main groups. On one hand, stakeholders report that the issue which had been discussed during the workshop is on top of their institutional agenda and the colleagues and superiors, aware of the different activities in the field, greeted to get to know the scenario-workshop’s approach to the issue. On the other hand, stakeholders report on rather concrete strategic activities in their institutions for which the results of the workshop became interesting. These more concrete activities refer to the orientation of research focuses, the formulation of R&D programmes as well as guidelines or new invitations to tender.

H6 Normative-narrative scenario processes support low threshold contacts between stakeholders from different organisations and institutions and thus provide a strong networking effect.
On the inter-organisational level, due to the workshop(s), a strong networking effect can be observed. First, all stakeholders report they got to know interesting new colleagues during the workshop. People only known by name or via Email contacts “became faces and personalities to me”, as one stakeholder expressed it. Many participants also report that it had been very interesting to get to know their colleagues in a new context and in a novel, more intense and direct way. Second, a big majority of stakeholders has actively initiated new contacts to other participants after the workshop. Those participants who have not contacted anybody yet state they have the participants list in mind and think to go back to it in case of concrete occasions. Third, old contacts have changed through the workshop. Some participants report their estimation of single colleagues has been positively changed through the more personal exchange during the workshop. Others stress the fact that they had won different and new contacts in already known organisations and institutions, which had offered new connections. Also, the workshop had been used by several stakeholders as an occasion to intensify fresh contacts or to re-establish and renew old contacts.

H7 Normative-narrative scenario-processes foster new cooperation between R&D stakeholders.

The stakeholders initiated new contacts with different aims. On one hand, participants sounded new perspectives and intents of cooperation, on the other hand participants also report on effective new cooperation. This new cooperation concerns mutual information on R&D activities or scientific contacts but also the common development of new concrete projects and reinforced cooperation in strategic boards.

Further impact of the scenario-processes on cooperation as well as on the stimulation and orientation of R&D processes might happen through more diffuse and indirect levels, which are not testable empirically by our study.

4.4 Benefits for different groups of stakeholders

The analysis of the results revealed also diverging experiences of benefits in terms of perceived usefulness and impacts for different groups of stakeholders.

H8 The perceived benefits of normative-narrative scenario-processes vary between stakeholders from different professional and organisational backgrounds.

Roughly, the workshop participants in our study can be distinguished into two groups: On one hand, there is a majority of stakeholders from administrative ministerial backgrounds; on the other hand, there are stakeholders from research and development backgrounds. The former perceive to gain more concrete benefit the latter rather to obtain more general benefit. Scientists, and this holds true especially for technology developing scientist, often state, that they do not see direct connectivity between normative-narrative scenario processes and their daily work, because the approach to the issue is much broader than in their professional focus. In opposite, ministerial stakeholders often report on direct connectivity. The broader perspective on the issue provided by the workshop thus seems to support R&D stakeholders with ministerial background more directly than classical scientists. Still, scientists do perceive usefulness, but less on concrete daily work level, but more indirectly via the broad perspective which is often missing in their daily work and thus is felt as enriching. Furthermore, for scientists, the direct
contact to stakeholders from ministerial background during the workshop is assessed as highly attractive.

The diverging usefulness and impact experienced between the two groups might be explained by the typical daily work approach to the topic of the workshop by the different stakeholder groups. Stakeholders from ministerial background generally have a more general approach to the issue under discussion, Stakeholders from research and development backgrounds have mostly a more specific and detailed approach to the issue in their daily work.

As to the methodological format, on the opposite, it is the group of researchers who is more comfortable with and used to creative group processes. On this level, there are some barriers to cross for administrative stakeholders, who mostly are not used to this style of workshops.

Overall, the approach seems to present a balanced compromise in terms of depths vs. overview of the issue to bring together heterogeneous stakeholders, who are then able to benefit in divergent ways, according to their predispositions.

4.5 Impact on R&D processes by different types of scenario processes

The comparison of the three different scenario process types, which have been applied during this project, suggests there might be the following relation between methodological design and impact:

H9 Direct impacts of normative-narrative scenario work on R&D processes seem to vary with the type of scenario approach applied. The scenario-analysing type seems to provide more impact than scenario-building type, whereas scenario processes covering both formats seems to be able to generate most impact.

These differences do concern direct impacts in terms of:
- perceived usefulness;
- perceived connectivity to the stakeholders’ work;
- intensity of reporting on the results, particularly spreading results at concrete occasions of strategic orientation of R&D;
- the networking effect;
- the effect of new cooperation.

Even though stakeholders from R&D processes, who participated only at a scenario-generating workshop, mostly appreciated the scenario work as interesting experience and perceived usefulness on a personal and general level, most of them had difficulties to see direct connectivity to their work. They reported less on the results and developed less new contacts to other workshop participants. On the other side, stakeholders participating at scenario-analysing workshops appreciated the more concrete level of workshop results in form of R&D requirements and showed more follow-up activities. Stakeholders who participated at both workshop types for one issue experienced a broad exploratory and creative approach to their issue, which then was focussed, and “brought down to earth” not only via concrete technologies but also via ideas about concrete R&D approaches. Furthermore, those participants’ cognitive, emotional, normative and communicative examination of the issue in exchange with their R&D community via normative-narrative scenario work seems to lead to more sustainable effects.

As the sample this comparison is based on is very small, this hypothesis H9 has to be read cautiously as a preliminary one.
5 Conclusions and lessons learned

Under the restriction of the preliminary status of our results, the following main findings can be summed up: As expected, normative-narrative scenario processes can support strategic R&D processes in specific ways:

One main characteristic and main benefit of normative-narrative scenario processes is their integration of expert knowledge and personal vision. Stakeholders from R&D processes experience cognitive and normative impacts. By taking over the perspective of “potential personal concern”, they broaden their perspective on the issue, become aware of otherwise often neglected aspects as the user perspective, needs and demand for technology and are sensitized to the desirability of future technological developments. The work with normative-narrative goal scenarios allows stakeholders a clear positioning towards future technological developments. They are better enabled to reflect their daily work in R&D processes due to the normative and ‘lifeworld’ approach of the workshop design. They bring together their expertise and normative considerations and thus develop embedded and more holistic approaches of future R&D already during the workshops. Furthermore, the normative and consequently (also) personal perspective provides a very specific communicative impact among heterogeneous stakeholders. Diverging stakeholders do work together in a remarkable cooperative way and on an equal footing, issues and positions become more important than institutions, organisations, positions and hierarchies. The R&D community present at the workshop appears more open and understandable for the individual stakeholder, mainly, because people get to know each other differently than in classical working-contexts. Subsequently, this more personal exchange during the workshop facilitates new and intensified contacts among participants after the workshops and is leading to new potential and to new effective cooperation. Thus, there is an important networking effect. Finally, the tool thus helps to overcome disciplinary and institutional or organisational boundaries: during the workshop via an integrated perspective and after the workshop via fostering new contacts.

The necessity of stakeholders to integrate their expert knowledge and their position as “ordinary citizens” also seems to represent a crucial factor of success of the tool. This particular normative-narrative scenario work requires the participants’ willingness to allow the integration of perspectives. This approach seems to be non-typical compared to the participants’ daily work, it’s “no business as usual”. For scientific stakeholders, this approach can thus be difficult, because first, it requires the willingness to adopt a broader perspective than in daily work, which often is more detailed, more concrete and more technology driven; and second, because it requires participants to involve personally, i.e. at least adopting the focus of “individual concern as a citizen”. For ministerial stakeholders, the more open and creative approach sticks out of their more formalized daily working procedures as being rather unusual.

From a methodological point of view regarding the different types of normative-narrative scenario processes, the following result can be summed up: The combination of both scenario process tested here, which integrates the production of a common scenario (scenario-building) with its primary transfer to R&D requirements during the second workshop (scenario-analysis), seems to support R&D processes best. From a more practical and pragmatic point of view – time and resource constraints of R&D stakeholders given – the one-day format of scenario-analysis (type 2) alone seems to offer a valuable alternative – if a suitable scenario is already
available! Its character of scenario-transfer to more concrete strategic options seems to match with the R&D stakeholders' demands and needs.

We presume that the need for transfer of scenarios to more concrete R&D requirements also presents a challenge within other scenario-approaches. Different scenario techniques can fulfil different specific functions, but “there always comes the point, where scenarios do not help you any further”, as one stakeholder turned it.

References


