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1.) Introduction

Starting Point

Emerging and frontier technologies as well as their further applications are often confronted with ethical doubts and basic distrust by the general public. Genomics, stem cell research or nuclear power are instances of this. Some technologies for example nanotechnologies on the other hand are not perceived as a possible threat by the general public. Although well-known scientists have pointed out possible health issues related to this technology and although some of its applications are already on the market, no one seems to be concerned. In other cases a technology, for example nuclear power, provokes many concerns and massive protests in one country, for example Austria, and is not a public issue in others (for instance France, Czech Republic, etc.). So when and why are emerging technologies or even already established technologies perceived as a public issue?

The presupposing thesis of the project “Value Isobars” leads the origin of possible conflicts in regard to emerging technologies as well as their unquestioned acceptance back to social values. Values are inscribed in technologies and technology regulations. If the inscribed values of a technology and its regulation correspond to people's social values, then it is accepted and embraced. If the inscribed values are not compatible with people's set of values, then value conflicts in the form of severe concerns, ethical doubts, public distrust and open conflict and protest are the consequence.

Regulations and legal frameworks, which steer the development of new technologies as well as their exploitation, are mainly worked out by expert committees. These committees consist of policy-makers, scientific experts of the particular field and representatives of NGOs and industry. Nearly all of these representatives have a scientific background.

In most European countries laypeople are not included in this phase of the policy cycle, where a new technology is shaped and certain values as well as their configuration and hierarchy are inscribed into it. To shape a technology in this respect means deciding on regulations regarding standards or ethical boundaries and fostering research directions by funding.

So in the case of public concerns, protest and outcry in regard to a technology, the values of the experts in the field as well as the values of representatives of industry, politics or of a specific NGO are in conflict with the values shared by the general public.

One way to decrease the chance of value conflicts or to anticipate possible value conflicts (which means far before the technology is ready for the market) regarding a new technology, is to integrate laypeople into the policy cycle phase where a technology is shaped to ensure that the values of the general public are adequately considered.

But how should laypeople be included to make sure, that their values and value hierarchies are incorporated into the process? In the last two decades the silver bullet for issues such as this was public participation. Participation mainly took place in cases of environmental or health issues at a local level. There is a wide range of different concepts and models regarding stakeholder and public involvement and there are quite a lot of different participation and consultation methods which are adequate to strengthen transparency, accountability and inclusion in policy-making and thus improve policies in respect to effectiveness, legitimisation and credibility by meeting the needs and expectations of the public. This is achieved by setting citizens or stakeholders in different formats/framings, which are characterised by more open or more closed discussion and deliberation exercises, a higher or lower level of engagement and different features regarding the goals (process or output-oriented) and the impact (empowerment, improved policy quality, balanced interests, etc.) of the process. Nonetheless none of these methods explicitly tried to grapple with the value dimension of conflicts in regard to S&T.[1]

In order to close this gap we developed in an exploratory pilot study a new value-sensitive participative method called “Value Dialogue Science Parliament” (VDSP). Based on deliberative and anthropological participation concepts (see Renn, 2008) the hybrid model VDSP is a tool with which it is possible to shed light on how people perceive new technologies, to identify attractive scenarios in regard to new technologies, to lay open the driving values which underlie these perceptions, attitudes and preferences and last but not least to sketch probable public consensus in regard to informed laypersons.

In this report we will give account of the development of the method, we will introduce the concept of the method in detail and we will show the potential of the method by discussing the collected data regarding biometrics and pathogen research and the conclusions based thereon. “Biometrics, Security or Surveillance Technology” and “Dual Use Dilemma in Pathogen Research” were the two cases which were used to develop the new value-sensitive participation method.

As within the scope of this pilot study it was only possible to develop and test the new method with small numbers of participants, with participants of a certain peer group and furthermore with participants, who were partially engaged with one of the topics, the results of the participants' set of values and the content of the closure documents are not representative for the set of values and attitudes of the general public, but it nevertheless fulfilled the function to make visible the potential of the new method by showing what kind of data, information and conclusions are the output of a VDSP.

[1] Note: An overview of different participation and consultation methods and an assessment of their usefulness for a new value-informed participation method you find in deliverable 3.1.

In respect to governance of S&T the designed science parliament could be applicable for National Contact Points (NPCs) to obtain value-reflecting or value-based input and feedback by citizens representing the general public on EC policies in the making, for example regarding “Calls” and “Work Programmes” as well as regarding drafts thereof.

2.) Development and Presentation of the Participative Method “Value Dialogue Science Parliament”

2.1 Some Remarks Regarding the Development of the Method

The development of the new value participative method was an open process where due to relevant progress and experience the method design was adapted several times.

In the first concept for the new participative method a role-play re-enacting the work of an ethics committee was planned. This idea was soon dismissed, due to the notion that framings without role-playing elements foster engagement, involvement and concern of the participants to a larger extent and that the participants' authenticity and legitimacy within the scope of a decision-influencing participative process, and with that the relevance of its output documents, is better outlined if the participants act in their role as citizens.

Additionally the step of the parliament, which consisted of a process-oriented open consultation with an information input as low as possible was dismissed due to the experience gained in the guided pre-test interviews, where the interviewees were quite overburdened by the task of developing concrete and value-informed opinions in regard to the topics biometrics and pathogen research. Thus the science parliament now consists of different outcome and consensus-oriented deliberation steps which are based on an information input that should prevent participants from being overburdened.

The decision to integrate multi-criteria mapping (MCM) in the framing of the science parliament was qualified by the need to integrate a method into the process with which it is possible to make visible the values deemed relevant by the participants, to shed light on their hierarchy and to identify attractive scenarios. Putting values, criteria and scenarios into the spotlight at the beginning of the parliament also fulfils the function to promote a more value-sensitive deliberation. Other decision making methods could possibly also achieve this in a similar way, however the determining factors for selecting MCM and not another decision-making method (Value Tree, MaxiMin Criteria, etc.) were that we searched for an as open as possible method in regard to problem identification and structuring, which does not overburden participants with mathematical

demands and pragmatically which is adequate in regard to time and resource restrictions within the scope of this pilot study.

In September 2010 the developed framing was tested in the first VDSP in Wiener Neustadt (VDSPI). Approximately 65 students (aged 16/17) took part in the parliament, seven experts were invited for the expert hearings and four people were mainly occupied with observing the process. Twelve chairs of the European Youth Parliament (EYP) were engaged as moderators due to their experience with similar formats (moderating layperson committees in regard to complex issues). In addition to biometrics and pathogen research, four other technological issues were discussed in the parliament. This first VDSP lasted two days.

After the VDSPI in-depth interviews were conducted for evaluation. These interviews aimed to collect information to improve the method in respect to participants' engagement and motivation, to identify possible obstacles and undesired influences such as peer pressure and to explore participants' identification with the output of the parliament. Furthermore, the interviews focussed on exploring the individual set of values and the individual understanding of the values, which were used as criteria within the scope of the parliament.

Based on the experiences of the VDSPI, the second VDSP (VDSPII) was developed. It took place in June 2011 in Vienna and was tested with nearly 50 participants (aged seventeen to eighteen).

Whilst the focus of the deliberation and consequently of the closure documents of the first science parliament was on the regulation of technology application and scientific research directions in general, VDSPII integrated deliberations on concrete policies and regulations and associated with that on the funding of research projects (“Policy Discussion” and “Project Discussion”). Furthermore, a “Value Discussion” was integrated into the process, due to the notion that participants’ different understanding of values have to be made more explicit to them.

Other modifications and improvements included the expansion of the timetable, the selection of more adequate premises for discussion and the increase of transparency for the participants in regard to the process and its goals.

VDSPI as well as VDSPII were held to test the developed framing. The decision regarding both parliaments to invite students as participants was a pragmatic one. Within the scope of the pilot study it would not have been possible to organise a three-day full-time event with at least 45 participants, who are representative (of the general public) and could be motivated to take part in a participation exercise pilot study. Although regarding the experience the participants provide and in regard to the discussion culture the pilot participation events definitely differ compared to an event with a representative panel of citizens, it does not make a difference in respect to the assessed validity of the designed framing and the estimated potential of the instrument. This means that due to the selection of the participants the results regarding value hierarchies and relevant values have

limited significance. The potential of the value-sensitive participation instrument, by showing how relevant values could be identified and how value-reflecting deliberation is set, however, should become clear.

2.2 When is Value Dialogue Science Parliament Appropriate/Recommendable?

The VDSP is a participative method where 16 to 60 randomly-selected citizens discuss scientific or technical issues in general. The citizens are divided into groups of 8 to 10 people and build parliament committees for one particular issue. The main event takes three to five days. In the VDSP participants work in groups toward a consensus. This consensus becomes manifest in a closure document consisting of a.) facts, b.) justification and c.) recommendations and demands. Furthermore, the development of the consensus is traceable in the interim statements on certain policies and research projects.

The closure document is put to the vote in the “VDSP Plenum” and in the case of approval is presented to policy-makers, the media and the general public. The participants are supported by experts – there is an expert hearing regarding each topic - and moderators. Furthermore, an exercise called multi-criteria mapping (MCM) is a crucial part of the process. MCM is a decision-making method and in the course of the parliament fulfils the function to frame the deliberation and to foster consensus by increasing reflectivity in regard to relevant values and criteria.

In addition to a value discussion, a policy discussion and a project discussion in regard to the discussed issue are part of the deliberation process and on the one hand fulfil the function to give the participants an as good as possible overview regarding different aspects of the discussed issue, and on the other hand to document the process of deliberation by the interim statements (policy and project discussion) and the qualitative questionnaires within the scope of the value discussion.

The strengths of the VDSP are, that it has an educational component and produces informed citizens who benefit from group discussion and expert hearings. This also increases the quality of the process output. Further strengths are that in the course of a parliament different topics can be treated. The participants represent all citizens and not only a special interest group and the process output produced by them is made public. This basically makes decision-makers more accountable as they have to legitimise the official policies in light of the outputs of the participative method.

The crucial asset of the VDSP is its usefulness and suitability for obtaining informed and value-based opinions from laypersons, moreover it provides insights into how participants arrive at decisions and identifies the driving values in this respect.

Possible weaknesses of the VDSP are that the participation agenda is not determined by the participants, that the recruitment of panels of representative participants may be expensive and that

recommendations and demands of the participative process may not be considered by public bodies, which would result in disenchantment with politics and participation.

The recommended use of the VDSP is in regard to S&T issues in general with a strong ethical dimension, that is still neglected by the general public and people who in future will be affected by it. In this respect the VDSP's output gives policy-makers and scientists an orientation about needs, attractive visions and moral issues perceived by the public regarding a specific future technology and its societal impacts. It is the appropriate method if the interest lies in exploring the consensus potential of informed laypeople in regard to an ambiguous technology.

2.3 Presentation of the Method

2.3.1 Preparation

In the first step a first assessment of the technology has to be done. That means research on the technological issue and its possible societal impacts is necessary. Within the scope of this research answers to the following questions have to be found:

1. What is the state of the art regarding the selected technology?
2. What opportunities are salient in regard to the technology?
3. What potential does the technology have according to experts?
4. What are the most probable expected developments and advancements?
5. Which arguments do critics and sceptics cite in regard to the technology?
6. What are “the usual suspects” in reference to values in regard to this technology? That means which values are relevant to analyse in the context of the selected technology and which value trade-offs are probably crucial?

In the next step it is recommended to conduct pre-test interviews based on this analysis. As an initial approach the interviews are conducted with laypeople and aim to explore how the technology is perceived by them. The pre-test interviews should shed light on the amount and character of information which is necessary for an ongoing and vivid discussion and should give information on the probable directions discourse will take in the course of the parliament. Further popular misinterpretations might be identified.

As in the parliament participants are asked to make meaningful decisions, the pre-test interviews aim to identify in which respect participants will probably need support to feel competent enough to contribute during the process.

Based on the insights of these first analyses information material in regard to the technology is

elaborated. The depth and amount of detail to which the information material is elaborated upon depends on the complexity of the issue, the expected previous knowledge and degree of motivation of the participants and the time frame of the event. Factors such as high issue complexity, and high motivation and concern on side of the participants enable a more detailed and profound information material. A tight time frame during the parliament possibly necessitates more extensive information material.

The information material is handed out to the participants up to one or two weeks before the main event. Its function is to spark interest and deliver basic information on the technology. In the case of biometrics and pathogen research a four-paged, plainly written information booklet seemed to be the adequate amount of information disseminated before the three-day participative event in respect to partially-motivated participants with little previous knowledge.

In addition to the booklet, the information material should include a detailed timetable of the science parliament and a characterisation of the functions and goals of the different steps in the course of the parliament as well as the as a description of the overall goals. Transparency in regard to the process and the mission is a "*conditio sine qua non*" for motivated and engaged participants.

If the possibility exists the information material should be handed out within the scope of a pre-event. In this pre-event the participants are briefed about the participative exercise and its presuppositions regarding deliberative democracy and the significance of civil society. Additionally the pre-event can be used to spark off interest regarding the topics of the event and encourage people to carry out research on their own.

Another important point within the scope of the preparation is the choice of the "right" experts for the expert hearing. For the expert hearing it is not enough to find any qualified expert in the peculiar field, it is necessary that the expert has the ability to explain and summarize scientific issues in a way that laypeople understand them and in the best case also find the issues interesting. This means the experts should have experience or talent in regard to communicating science to the public.

Moreover it is recommended to invite at least two experts to the hearing. The selected experts should cover the issue and its different aspects as completely as possible, that means their fields of expertise, and in most cases their underlying ideological standpoints, should be as complementary as possible.

2.3.2 The Value Dialogue Science Parliament

2.3.2.1 Introducing Multi-Criteria Mapping

MCM is a crucial part of the science parliament and also kicks the parliament off. This decision-

making method is very useful in respect to depicting a problem-area by making visible the spectrum of options, relevant criteria, chances and risks, which the participants perceive. As the opening exercise within the scope of the parliament MCM generates a higher level of value reference and value reflection amongst the participants. It frames and structures further deliberations and thus fosters consensus. Furthermore, with MCM the relevant values and crucial value trade-offs which are perceived by participants can be identified and the hierarchies in the participants' sets of values can be sketched out. By conducting a second MCM at the end of the parliament it is possible to shed light on value dynamics and possible shifts in the participants' value hierarchies provoked by deliberation and information.

The MCM applied within the scope of the VDSPs consists of 7 steps. It includes phases of discussion/deliberation and sequences in which the MCM questionnaires have to be filled out by the participants.

The Seven Steps of the MCM Applied in the Value Dialogue Science Parliament:

1.) Development of possible scenarios by participants
2.) Selection of scenarios deemed as relevant by participants
3.) Deliberation on criteria possibly relevant for scenario assessment by participants
4.) Scenario assessment using individually selected criteria
5.) Scenario ranking
6.) Criteria weighing
7.) Sideswipe-scenario discussion

In the first step participants in groups of two or three people develop scenarios which are deemed somehow relevant in the context of the S&T issue selected. Regarding the nature of the scenarios there are no restrictions. The scenarios could focus on concrete issues and situations or large-scale societal and political developments in the context of the selected technology. They could be utopic, dystopic or realistic and they can pertain to the immediate or distant future, to places nearby or on the other side of the world.

In the second step the participants present their elaborated scenarios. A deliberation takes place regarding which scenarios are most relevant and which aspects could and should be integrated into them. At the end of the deliberation three to five scenarios are selected for further assessment.

In step three participants discuss which criteria may be relevant to assess the scenarios. The selected criteria in many cases are straight values and in most cases can directly and with high plausibility be linked to values. Nevertheless, we did not intend to develop a “multi-values mapping” due to the notion that a restriction to straight values only would narrow the participants' discourse in the scope of the parliament. Thus, the results of the multi-criteria mapping include straight values, criteria

closely linked to certain values and criteria of an ambiguous character in regard to values.

In the scenario assessment the participants rate the scenario performance of each scenario in regard to the criteria which they deem relevant. The rating goes from zero up to ten points, “ten points” means very high performance of the scenario pertaining to the criterion, “zero points” means no performance in regard to the criterion.

In step five the participants rank the scenario according to their preferences. In step six the participants weigh the criteria they deem most relevant for assessing scenarios in the context of the discussed field. They weigh them by allotting 100 points to them. The participants are free to decide how many criteria they select and how they allocate the points.

The last step of the MCM is the sideswipe-scenario discussion. In this discussion a new scenario is presented to the participants. The presented scenario must include alternative stances and aspects compared to the scenarios elaborated by the participants and this way should introduce alternative criteria to the participants or at least outline the significance of the criteria which up to that point had been mainly neglected. As it is not clear in which direction deliberation within the scope of the MCM will go and which scenarios, criteria and priorities are in the spotlight of the assessment, different sideswipe-scenarios have to be prepared. The sideswipe-scenario which is then introduced to the participants should have the biggest potential to unsettle the developed views, scenario preferences and value hierarchies. For further information regarding the seven steps of MCM see the manual in Chapter I of the Appendix.

Possible Conclusions Based on the MCM Results

The output of the MCM is a collective scenario ranking, a criteria ranking based on the individual criteria weighing and a scenario characterisation based on the summed up performance ratings. With these results an identification of the most important values in regard to decision-making is possible, the preferences according the scenarios can be traced back to the salient scenario performances, and tendencies pertaining to value hierarchies are representable.

2.3.2.2 Value Discussion

In the evaluation interviews regarding the VDSPI it became obvious that participants used certain values intuitively and in an often vague and unreflected way. The participants obviously had heterogeneous and sometimes even diametrically-opposed understanding of certain values. Nevertheless the different meanings of a value were not discussed in the committee work. In this case values were used as placeholders, and their vague and blurred use on the one hand could constrain consensus-directed discussion, due to participants talking at cross-purposes, on the other

hand it could also enable the elaboration of a putative consensus, which does not stand its ground when scrutinized again by the participants with a focus on wording, meaning and presumptions.
Therefore it is a necessity for the elaboration of well-reflected and sustainable consensus to which the participants feel committed, as well as for the interpretation of the MCM results, that participants discuss and question the value concepts used in deliberation and assessment of a technology. To explore how exactly participants understand criteria and values when creating and assessing scenarios and weighing criteria is also a necessity for the interpretation of the MCM.
For these purposes the value discussion was designed and integrated in the VDSP.
It makes visible for the participants, how other participants understand certain values and to kick-start a value reflection that also makes clear for the participants, how they understand certain values themselves.
In this way it has the function to increase value consciousness and reflection and to decrease the chances of misunderstandings as well as ambiguity and fuzziness of values by verbalising these understandings and by making visible shared and oppositional standpoints. This eases decision-making as well as the selection of what decisions are to be made, but it is important to consider that even if a shared meaning is developed in discussion nonetheless values are used and understood differently in different contexts.
Certainly it is not possible to discuss all values and criteria which are relevant for participants or which become relevant during the deliberation, but at least the usual suspects and the criteria with a high potential of diametrically opposite interpretations should be discussed in the value discussion.

The Structure of the Value Discussion

In the first step participants answer the question in note form what a certain value means to them, how they would explain it, in what respect it is important in relation to the discussed technology, and where they realize issues in respect to this value. (For example, Is it a value which should be protected?, Where are problems visible in respect to this value?, etc.) This should take about five minutes.
In the second step each participant introduces his/her responses to the group. After that a group discussion takes place regarding any differences in respect to the understanding of the value which exist. If participants feel that they agree on a certain definition of the value, which considers all relevant aspects, they could write a short statement of clarification.
In the ideal case this procedure is repeated with all the values, which are selected as relevant in the preparation research (four - eight values) and furthermore with all the criteria used by the participants in MCMI. The value discussion should be scheduled for an hour at least.

2.3.2.3 Expert Hearing

The expert hearing has the function to provide the participants with crucial information regarding the topic and to abolish any lack of clarity perceived by the participants. The expert's input gives participants information that should empower them to make meaningful decisions on highly complex subjects and increase the participants' feeling of competence, so that they are capable of tapping into the full potential of the value-informed knowledge that they provide.

The expert hearing is divided into two parts, in the first part the experts give an introduction on the issue and the crucial points perceived by experts. In the second part participants are free to pose questions. Depending on the issue it makes sense to invite a different number of experts, as well as experts in different fields[2]. The expert hearing should be scheduled for one hour at least.

2.3.2.4 Policy Discussion

In this part of the parliament participants engage themselves with real policies or policy drafts and give feedback about these documents. The function of this discussion is to give participants orientation as to how the subject is framed by policy-makers and experts. It also gives orientation towards what kind of policies and endeavours already exist, what goals and values are promoted and what measures are planned. Depending on the timetable of the parliament there is the possibility to present a summary of a policy document to the participants or to let them analyse a document on their own.

The policy discussion is a output-oriented discussion, where at the end participants write a short statement on if and how far they share the priorities and values to which the policy document refers, and if they deem the proposed measures as reasonable and worthy of support. Furthermore, the participants state which values, goals and measures have not been granted due significance.

The policy discussion in the case of a prepared summary of the policy document should be scheduled for one hour at least. In the case of an analysis of the selected policy document done by the participants on their own, it takes significantly longer, depending on length and complexity of the selected document. In the second case pre-tests are necessary to assess to which degree and in what time frame the task is manageable for the participants.

Within the scope of the VDSP the policy discussion is a building block of the committee work which, by its educational component as well as by the emancipatory potential of deliberation, increases the quality and sustainability of the closure document and the participants' commitment to

[2] Note: For example regarding biometrics it could make sense to invite a technician with an expertise in iris-scan pattern recognition, etc., a legal expert on citizen rights and a representative of the police or law enforcement with expertise in regard to these methods in practice. Furthermore it might be necessary to invite two experts of the same field due to different and diametrically-opposed expert views.

it.
In regard to the analysis of the parliament's output and the driving values which underlie the deliberatively elaborated consensus, the interim document of the policy discussion is used to document the deliberation process and to deliver additional information in respect to plausible interpretations of the closure document.

Regarding the large-scale potential of the VDSP, it is a legitimizing and sustainable tool which could be used for incremental policy change if institutionalised in the policy-making process as a consultation instrument regarding the value hierarchies incorporated in policy drafts. It is suitable and probably fruitful as an additional feedback loop to improve policy drafts in respect to their compatibility with commonly shared values.

2.3.2.5 Project Discussion

The project discussion could on the one hand be an amendment to the policy discussion, if the policy discussion is focussed on already implemented policies, or on the other hand it could be a discussion which should link abstract, general and speculative political or strategic discussion to practice and the ethical and social implications of real research projects of the field.
If the project discussion is designed as an amendment to the policy discussion, then its focus lies on assessing representative research projects which are funded in the framework of the policy document. Participants in this case elaborate a statement, which deals with the compatibility of goals, measures and values of the policy document and the research project and which expresses the group's view in regard to if the project should be funded by public financial means, if it serves the public interest and if regulations or restrictions are necessary in regard to the project.
If the policy discussion deals with a policy draft, then projects which were funded by previous or similar programmes are discussed in the project discussion.
In both cases it fulfils the function to sharpen participants' awareness of current set-ups and targets in regard to the discussed research area and to elicit shared views and values in regard to the issue. Similar to the policy discussion, the project discussion is a building block of the committee work and with its educational component as well as by its emancipatory potential due to deliberation, it should increase the quality of the closure document and the participants' commitment to it.
The scheduled time for the project discussion depends on the number as well as on the complexity of the discussed projects. In the parliament pilot study the selected research project abstracts were discussed on average for 30 minutes.

A possible upscale version of the project discussion would be to institutionalise it as a "Science/Public Communication Platform" to assess fundable projects. In this case the researchers of the discussed projects would take part in a hearing and there face the participants' questions. Depending on the time frame of the parliament the upscale version could also be fruitful and suitable within the scope of the parliament.

2.3.2.6 Committee Work

The committee work is designed as an open deliberation on the issue. Participants are free to discuss all aspects of the issue in the committee work. Within the scope of the committee work possible questions for the expert hearings are elaborated, the expert hearing and possible take-home messages are discussed and finally in the committee work the participants elaborate the closure document regarding the selected topic. Participants have to be well aware, that they elaborate the closure document for consultation of specific policy-makers.

The results of the MCM as well as the interim statements could be used for this elaboration and possibly frame the discussion. The moderation of the committee work is crucial for a successful parliament. On the one hand moderators should encourage participants to contribute and stimulate an open and eclectic discussion, on the other hand they have to remind participants to stay focused and issue-related in the discussion and to keep the closure document in mind. Sometimes it will also be necessary to allude to the desire for politeness and a positive engagement in conversation.

Overall it is essential that moderators are not only quite experienced in formats similar to the science parliament, but are also well-informed regarding the issue and capable of maieutically[3] steering the discussion at some points, if necessary. Moderating committee work here presents itself as walking a fine line, as the moderator's influence within the deliberation process should be as small as possible. Due to these challenges it is recommended that two moderators share duties and alternate during the committee work of one group. Furthermore, each group should be accompanied by an observer who takes notes regarding possible moderator influence as well as in regard to group dynamics in deliberation and possible contingencies in the course of the deliberation.

Basically participants are free to decide how to structure their closure document. For example in the cases were no consensus is possible, there is the possibility to write a statement which explains in which regard different positions constrained any collective recommendation.

If the participants elaborate a consensus one possibility for the closure document is a tripartite

[3] Note: For example by asking questions which make the participants aware of obvious fallacies, or which promote clarification.

structure with a.) facts, b.) justification (clarifying goals, thesis and rationale) and c.) demands and recommendations. The closure documents of the pilot study VDSP, which you find as examples in the third chapter are missing part b.), due to the fact that the insight that point b.) would be an important and fruitful further amendment, was gained in the analysis of the parliament at a later stage.

2.3.2.7 Plenum

As the highlight at the end of the parliament participants present their resolution in the parliament plenum.

After the presentation of a resolution other participants have the possibility to pose questions of clarification. These questions could be in regard to content, wording and presuppositions of the resolution. The questions are collected and one or two representatives of the group try to answer them as well as possible. Subsequently participants have the possibility to declare objections in regard to the suggested resolution.

In response to possible objections the proposing group has the opportunity to defend its resolution against the presented objections. Finally the plenum votes on whether to reject or approve the resolution.

The plenum is chaired by three of the moderators, who take the responsibility for counting the votes, admitting the speakers to the floor and restricting their time due to the schedule. In addition they moderate the collecting of questions in regard to each resolution.

The plenum as the arena where participants have to defend and explain their resolution has the function to let participants put themselves in others' shoes and keep in mind that their resolution is not necessarily self-explanatory and that it is not enough to be convinced of having found the right solutions, but it is also necessary to sell these solutions in a convincing way to other people who have not been engaged for days in a deliberative process focussing on that topic. The challenge to be clear to others and convince them with strong arguments should prevent participants from working out heedlessly maximum demands – perhaps conditioned by discussion dynamics - which are not comprehensible for others. And the challenge to be clear to others in most cases also carries with it being clear oneself, due to a more accurate checking-up of the argued position and its possible weaknesses.

A plenum, apart from considerations regarding the quality and communicability of the resolutions, also has other benefits. First it motivates the participants, who from experience of the held parliaments, enjoy presenting and discussing their resolution. Furthermore, it also strengthens the legitimization of the recommendations and demands, which have been worked out by a committee of eight to ten participants, if the participants of the entire science parliament back it up, in the case

of approval.

Regarding the timetable, discussing a resolution and putting it to the vote will take at least 30 minutes per resolution.

Plenum Preparation

The plenum preparation is actually part of the committee work. The preparation consists of preparing the presentation of the group's resolution, as well as considering which questions may be posed by the other participants. Furthermore, the resolutions of the other committees have to be studied and some participants have to prepare objections in regard to other groups' resolutions.

The preparation should be scheduled for two hours at least, however, depending on how many resolutions have been worked out within the scope of the parliament and depending on how much time organisers want to allocate to the plenum, one or two hours more may need to be scheduled.

3.) Two Case Studies of the Value Dialogue Science Parliament

In this chapter we will present two case studies of the VDSP that were held as a pilot study. These are “Biometrics - Security or Surveillance Technology?” (discussed in Chapter 3.1) and “Dual Use Dilemma in Pathogen Research” (discussed in Chapter 3.2). Each topic was discussed in two consecutive VDSPs (we will refer to them as VDSPI and VDSPII, see also Chapter 2.1).

3.1 Biometrics - Security or Surveillance Technology?

Twelve students (aged 17 to 18) participated in the VDSP on “Biometrics” in Vienna in June 2011. Ten of them were male, two were female. Not all of them took part in every session. The students attended a secondary school with a focus on chemistry. The VDSP was held in German. The sessions were moderated by a member of the European Youth Parliament, an organisation with experience with similar formats (moderating layperson committees in regard to complex issues).

The VDSP lasted three days (15th-17th of June). On the first day there was a team-building session, a first round of multi-criteria mapping (MCMI), the value discussion, and an expert hearing. The experts were Dr. Martin Kampel, a scientist working on pattern recognition and image processing, and Mag. Erich Möchel, an investigative journalist working on data protection. Martin Kampel presented the state of the scientific and technical knowledge for different biometrics applications (eg iris scans) and mentioned issues of civil liberty and privacy. Erich Möchel talked about biometrics and civil rights and described his experiences as an investigative journalist. The first day finished with a committee work session for the preparation of the closure document. On the second day the participants continued the committee work and engaged themselves with a summary of the “FP7 Work Programme on Security” (see Appendix chapter IV.1) in the policy discussion session. In this session two research projects were assessed: “Indect” – A project “aiming at developing tools for enhancing the security of citizens and protecting the confidentiality of recorded and stored information. “Indect” targets threat detection in both real environments (intelligent cameras) and virtual environments (computer networks, especially the Internet)”[4]; and “Bio-Distance” – A project which aims to investigate a number of activities aimed at making biometric technologies applicable to data acquired at a distance and on the move. The second day finished with a committee work session for the plenum preparation. On the third day there was a second round of multi-criteria mapping

[4] Note: http://www.indect-project.eu/

(MCMII). After this session there was time for the plenum preparation. The VDSP finished with the plenum session where the participants presented their resolutions. The plenum discussion was held together with the other case study group who had worked on pathogen research. After the VDSP, representatives of the parliament's participants handed the resolutions to the President of the National Council, Mag. Barbara Prammer.
For a detailed description of the VDSP method see Chapter 2; for a detailed schedule of the VDSP on "Biometrics" see Chapter V.) of the Appendix .

MCMI

As the first step of the MCMI the participants developed three scenarios describing a desirable (best case), a probable/realistic (realistic case) and a dystopic future (worst case). A scenario ranking was obsolete due to the inherent ranking. In a second step the participants discussed which criteria might be relevant for an assessment of the developed scenarios. They identified thirteen criteria: data security, freedom of opinion, "security/safety"[5], contentment, freedom, effectiveness, individualisation, cost efficiency, law enforcement, convenience, advantages for authorities, system stability, and crime detection rate. The participants were free to add further criteria in the process of rating and weighing. After the criteria deliberation each participant conducted a performance appraisal of each scenario by rating positive aspects of the scenarios for individuals or for society. They selected relevant criteria and awarded up to ten points to each. Ten points indicated the highest performance.
The last step of the MCMI was the criteria weighing. The participants rated the criteria concerning their relevance for biometrics-scenario assessments.

MCMII

On the third day of the VDSP there was a second MCM session (MCMII). In contrast to the MCMI, the participants were provided with scenarios that had been designed beforehand. Also contrary to the MCMI, a list of possibly relevant criteria was presented to the participants and no further deliberation on possibly relevant criteria took place. This criteria list had been prepared previous to the VSDP based on literature and evaluations of a VDSP pre-test. The participants could adopt these criteria to their own list which they had developed in the MCMI. The last step

[5] Note: In German the word "Sicherheit" translates as both security and safety. Thus, it might have been confusing for participants who were all from Austria to distinguish between them, since no difference actually exists in German. We therefore stick to the German word "Sicherheit" whenever used by the participants without distinguishing between security and safety.

of the MCMII was the sideswipe-scenario discussion where the moderators presented a new, previously prepared scenario to the participants. This scenario included new and controversial aspects on biometrics. The participants were asked to explain and argue if and why or why not this scenario had changed their mind. This sideswipe-scenario discussion should scrutinize how convinced the participants were about their opinions on biometrics.

3.1.1 Values Regarding Biometrics

In this chapter we present and discuss the results of the value discussion on biometrics. The value discussion consisted of a questionnaire and a group discussion.

The participants completed a questionnaire (see Appendix, Chapter II.1) about their perception of certain values. For the questionnaire in VDSPII we selected the participants' most important values of the pre-study VDSPI. These are: "Sicherheit" = security/safety, freedom, privacy, quality of life, and justice.

The questionnaire consisted of five sections, one for each of the values mentioned above. The main focus was on "Sicherheit" and privacy. For each value participants were asked to give their personal definition. There were additional items for "Sicherheit" and privacy, such as the interdependencies between the value and biometrics.

After completing the questionnaires the participants had to discuss each value as a group with the aim of identifying differences and agreement on value definitions and understanding. Although not an aim of the value discussion they even agreed on consensus-definitions. Due to time restrictions the group only discussed "Sicherheit", privacy, and freedom.
We analysed the questionnaires with regard to the predominantly expressed issues, statements and views.

In the following section we will present the participants' perception and framing of the values.

Security/Safety
The participants related the German word "Sicherheit" to both security and safety aspects. They described the term as "feeling safe and secure all the time", "being protected against any dangers, crimes or diseases", and "not needing to be afraid". They put the term in relation to precautionary measures and perceived it as a measurement for the probability of becoming a crime victim.
Although according to the participants security/safety is an issue in nearly each and every situation, they focussed on social hot spots, rundown neighbourhoods, public buildings and

transport, and the Internet.

The participants cited the following topics as particularly related to security/safety: epidemics, natural disasters, crimes (theft, fraud, murder), terrorism, war, low wages, deprivation of freedom, aggressiveness, weapons, greed, laboratories, transportation means (airplanes, cars, motorbikes), and Internet criminality. Furthermore, they stated that security/safety is endangered especially by weapon owners, terrorists, criminals (thieves, murderers), other aggressive people and hackers.

They mentioned safety and security aspects as matters of industrialised as well as developing countries and proposed fighting poverty as one approach to enhancing safety and security.

The participants perceived biometrics as a technology that could enhance security/safety, but at the same time they raised security/safety issues linked to biometrics. The most frequently mentioned benefit was crime detection but biometrics was not perceived as a tool for crime prevention. Their major concerns about biometrics were data security and malfunctions of biometric devices. They were also concerned that biometrics might lead to a surveillance society.

Privacy

The participants perceived privacy as the “non-public part of life” and described it as “being not disturbed and not observed”. As examples for private information they mentioned: personal habits, thoughts, and information about relationship status, sexual orientation, family relationships, place of residence, and access codes. They refused biometric devices being used at private places, at public rest rooms and on public transportation.

They considered privacy as being threatened by the federal administration, companies and hackers. To assure privacy the participants suggest simple locks, security codes, laws, a special ethics commission[6] and data security in general.

Freedom

The participants defined freedom as “the possibility to do what you want” and "being autonomic" and "self-determined". Some of them explicitly mentioned that "the freedom of the individual ends where another person’s freedom is affected". The participants expressed concerns regarding data privacy and progression towards a surveillance society.

Quality of Life

The participants described quality of life as "being able to satisfy one´s needs", preferably not

[6] Note: In Austria, a Data Protection Committee already exists. Apparently, at this point of the deliberation, the participants did not know about its existence, duties or capabilities.

just the basic needs, i.e. this means living a perfectly happy, safe and secure life without any sorrow. They did not always distinguish between "quality of life" and "very high (perfect) quality of life". The participants reckoned that biometrics might improve quality of life by enhancing security/safety and convenience.

Justice

The participants defined justice mainly as equal opportunities and secondly as commutative justice. They wanted that everyone should get what s/he deserves.

Group Discussion

After the participants answered the questionnaire they presented their individual answers and discussed if differences in understanding in regard to these values are obvious.

In the group discussions the participants agreed on definitions of security/safety, privacy and freedom. The main aspects of their discussion are presented in the following section.

Discussion on Security/Safety

The main aspects of security/safety mentioned by the group:
- Financial security
- Protection against criminality
- Protection against undesired interference and threats from others
- Protection against diseases
- That all possibilities are considered and nothing goes wrong.
- Taking precautions against external dangers.
- Successful crime detection

Security/Safety issues mentioned were:
- Data hacking, data security
- Public buildings and places
- Problem areas, hot spots of crime
- Weapons
- Criminals
- Poverty
- Not well enough developed technology
- Dual use technologies
- A surveillance state

Discussion on Freedom

The participants' associations to freedom***:***
- No boundaries and restrictions.
- Freedom of thought
- Self-determination
- Not to be observed/monitored all the time

They agreed that one person's freedom should end where the freedom of others is affected.

Discussion on Privacy

The participants' associations to privacy?:
- An area to be alone; one's own four walls
- No observation and surveillance

- Security of sensitive data
- Not to be impaired by the state or the public.

Information/items/places which were defined as clearly private:
- Photos, personal habits and thoughts, access-codes, private information, hotel rooms, flats, sanitary facilities

How to protect privacy:
- Reasonable handling of data.

Whose duty should the protection of privacy be?
- Police
- Ethics committees

3.1.2 Criteria for Scenario Assessments

In the third step of MCM the participants collected criteria in a group discussion to assess biometrics-scenarios. These criteria were: data security, security/safety, contentment, freedom, freedom of opinion, effectiveness, individualisation, cost efficiency, law enforcement, crime detection rate, convenience, advantages for authorities, and system stability. During the process of the MCM two more criteria were adopted: protection and clientele politics.

In the following section we give an overview of the participants' comprehension of these criteria based on the written results of the group discussion during MCMI and the moderators´ observations. Therefore this section partially overlaps with the value description (see Chapter 3.1.1).

Despite the aim of having a group consensus on the definitions individual comprehension might differ slightly among the participants. There are no data on how the participants used and understood some of the criteria they individually adopted during the MCMII.

Data security: The participants understood data security mainly as the right to keep their personal data private. Participants mainly identified the administration/state and criminals as threats to personal data security.

Security/Safety: The participants understood security/safety as being protected against crime, war, terrorism and abuse of authority. It was very important for them not just to be safe but also *to feel* safe. In the course of MCMII the differences between safety and security were discussed and the participants subsequently differentiated between safety and security to some degree. They also distinguished between individual, institutional, or national security to some extent.

Contentment was understood a person's overall satisfaction with his or her life in a society.

Freedom was the overall criterion for "freedom" and "liberty". In some cases participants

specifically meant "individual freedom".

Freedom of opinion and **freedom of speech** were used synonymously.

Effectiveness was mainly used in the context of the economic system and sometimes regarding technological policies.

Individualisation was understood as an independent personal lifestyle and access to personalised goods that enhance everyday convenience.

Cost efficiency was meant in terms of economic effectiveness and economic feasibility.

Law enforcement was understood as how successfully an administration reduces crime.

Crime detection rate was understood as how successfully the police catch criminals.

Protection was understood as protection against crime including measures by authorities to ensure it.

Convenience was understood as the comfort in everyday life, eg biometric technology to increase convenience in daily routines such as withdrawing money and shopping.

Advantages for administration: This criterion was used to describe capabilities of a worst case scenario where political elites enforce their interests.

For the participants "**System stability**" was also a benefit for governments rather than for people. Still, they believe, that some kind of stability is necessary in every political system. "**System stability**" was mainly used to describe negatively perceived totalitarian systems.

Clientele politics: Like *system stability* and *advantages for administration* "clientele politics" was used as a negative criterion for scenarios in which the state provides certain groups with benefits and excludes others.

3.1.3 MCMI Analysis on “Biometrics, Security- or Surveillance Technology?”

The following analysis of the MCM focuses on participants’ preferences regarding biometrics-scenarios. The associated values are taken into account in the evaluation of the scenario performance rating and the criteria weighing. The criteria weighing depicts the participants’ value hierarchies regarding biometrics-scenarios and represents their perception, framing and issue construction.

3.1.3.1 Scenario Description, Biometrics I

The three scenarios developed during MCMI:

1.) The **best case scenario** described a future where a powerful ethics committee and rigid privacy legislation safeguard that biometric data is saved only for the needs of the consumers and with their agreement.

2.) In the **realistic case** biometric technologies are strongly applied for private use, documents and all types of ID-cards integrate biometrics and overall surveillance of crucial places and public buildings is accepted.

3.) As the **worst case** participants designed a surveillance society. Biometrics and the data gathered by biometric technologies are used exclusively by the state. People wear microchips and are intimidated by the administration. It is a strongly segmented society.

3.1.3.2 Scenario Performance Ratings, Biometrics I

The performance ratings of all three scenarios of MCMI are presented in Table 1. Each participant selected the criteria he or she deemed relevant for the scenario assessment and rated these criteria with up to ten points. The higher the importance of one criterion the more points were given. We summed up the points per criterion (see Table 1) to evaluate the perceived strengths and weaknesses of each scenario.

MCMI Biometrics Scenario Performance Ratings			
Criteria	Best case scenario	Realistic case scenario	Worst case scenario
Data security	82	29	
Freedom of opinion[7]	71	17	2
Contentment	68	38	5
Freedom	49	45	1
Security/Safety	47	378	12
Individualisation	42	18	3
Effectiveness	24	63	12
System stability	22	15	58
Convenience	9		
Protection	8	14	9
Detection rate	5	7	579
Individualisation for consumers	6		
Clientele Politics	2	2	27[10]
Advantages for administration/state		8	30
Cost efficiency		32	
Shape Social Human beings			10
Two-class society			5
Control			4
Overall performance total	**435**	**325**	**235**

Table 1: The results of the Scenario Performance Rating Biometrics, MCMI

[7] The participants used freedom of opinion and freedom of speech to some extent synonymously.
[8] 7 points of the category security/safety of civilians are included
[9] 38 points of the category high detection rate are included
[10] 9 points of the category effective clientele politics are included

The overall performance of the most favoured scenario, the best case scenario, is rated highest. According to the participants this scenario performs best in the categories “Data security” (82 points), “Freedom of opinion” (71 points), “Contentment” (68 points), “Freedom” (49 points) and “Security/Safety” (47 points). All of these criteria are rated higher for the best case scenario than for the worst case scenario. The same five criteria are also rated top in the criteria weighing of MCMI.

3.1.3.3 Criteria Weighing, Biometrics I

In this step of the MCMI the participants rated the criteria which they deemed relevant for the ranking of the scenarios. Each participant awarded a total of 100 points. More points indicate a higher importance of the criterion. Some criteria are values; nearly all are at least closely connected to a value.

MCMI Biometrics, Criteria Weighing										
Criteria	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**Total**
Data security	55	3	20	10	20	30	55	20	40	253
Freedom of opinion	35	25		30	30	15	35	30	5	205
Freedom	2	50				20	2	30	5	109
Security/Safety	5	10		15		20	5	10	30	95
Contentment	1	9		30			1		10	51
Protection			30							30
Freedom and Freedom of opinion combined			30							30
Effectiveness	2	1		5			2	10	10	30
Individualisation		1		5		15				21
Cost efficiency					20					20
Law enforcement					20					20
Convenience			20							20
Advantages for administration/state					10					10
System Stability				5						5
Detection rate		1								1
Clientele policy										

Table 2: The results of the Criteria Weighing Biometrics, MCMI
The participants’ ranking is presented in the columns (P1 to P9).

The ranking is presented in Table 2. Data security, freedom of opinion, freedom, and security/safety are the most highly ranked criteria. As the criteria overlap to a certain extent we clustered them into security/safety-related criteria, freedom-related criteria, lifestyle and consumption-related criteria, criteria related to the economy, and criteria related to the political system (see Table 3). In the clustering security/safety-based criteria were ranked highest (399 points) followed by freedom-related criteria (344 points). The other criteria clusters were ranked comparatively low with 92 points (lifestyle and consumption), 50 points (market and economy), and 15 points (political system).

MCMI Biometrics, Criteria Clustering	
	Total
Security-based Criteria	**399**
Data security	253
Security/Safety	95
Protection against criminality	30
Law enforcement	20
Detection rate	1
Freedom-based Criteria	**344**
Freedom of opinion	205
Freedom	109
Freedom and Freedom of speech combined	30
Lifestyle and consumption-related criteria	**92**
Contentment	51
Convenience	20
Individualisation	21
Criteria related to the economy	**50**
Effectiveness	30
Cost efficiency	20
Political system-related:	**15**
Advantages for the administration/state	10
System stability	5

Table 3: The clustered criteria, Criteria Weighing Biometrics, MCMI

3.1.3.4 Criteria Frequency, Biometrics I

In the chapters dealing with performance ratings and criteria weighing light was shed on participants' assessments, which they translated into numbers. The summed up scores then built the basis for a depiction of the collective sets of values and to some extent explain the preferences in regard to the scenarios. Another angle from which to look at the data, which participants have produced within the scope of the rating, ranking and weighing, is to look at how often different criteria have been used within the scope of the rating and the weighing. On the one hand this could deliver information on which criteria are constantly considered, but in spite of this are not deemed relevant by participants, on the other hand it provides us with information on possible outlier impacts, eg if a criterion is used rarely but the high ratings of one or two participants distort the results, due to the small number of participants.

The underlying thesis to the second approach is of course that criteria which are deemed relevant by the participants are also considered and used more often in the course of the assessment.

Criteria Frequency - Scenario Performance Rating:

In the table below you find the results on how often each criterion has been used within the scope of assessing the performance of each of the developed scenarios:

MCMI Biometrics, Criteria Frequency, Scenario Performances Ratings:				
Criteria	Worst case scenario	Realistic case scenario	Best case scenario	Total points

Contentment	5	5	8	18
Data security	3	4	9	16
Freedom	4	6	6	16
Effectiveness	3	8	4	15
Freedom of opinion	4	2	8	14
System stability	8	2	3	13
"Sicherheit"	2	4	7	13
Individualisation	3	3	6	12
Advantages for administration/state	6	2	1	9
Detection rate	6	1	1	8
Clientele politics	3		1	4
Cost efficiency		4		4
Protection	1	2	1	4
State's duty to protect		1		1
Two-class society	1			1
Control/Surveillance	1			1
Convenience			1	1
Shape the social human being[11]	1			1
Law enforcement	1			1
Overall	52	44	56	

Table 4: The criteria frequency of occurrence, Scenario Performance Rating Biometrics, MCMI

Contentment, data security and freedom were the criteria used most often to describe the performance of the three scenarios. Regarding the best case scenario data security, contentment and freedom of opinion were the most used criteria. Regarding the worst case scenario system stability, detection rate, and advantages for administration/state were the most used criteria. This confirms the assumption that the tendency to rate a scenario's performances with favoured values and criteria (compared to the results of the criteria weighing) positively correlates with having preferences for this scenario.

Criteria Frequency - Criteria Weighing

The criteria most often used within the scope of the criteria weighing are data security, freedom of opinion, freedom and "Sicherheit". In the table below you find in detail which criterion has been used how often:

MCMI Biometrics, Criteria Frequency, Criteria Weighing	
Criteria	**MCMI**
Data security	**9**
Freedom of opinion	**9**
Freedom	**7**
Security/Safety	**7**
Effectiveness	**6**
Contentment	**5**
Advantages for administration/state	**4**
Individualisation	**3**
System stability	**2**

[11] Note: Due to the ambiguous/opaque meaning of this criterion it has not been incorporated into the analysis.

Detection rate	**1**
Cost efficiency	**1**
Clientele politics	**1**
Convenience	**1**
Protection against crime	**1**
Law enforcement	**1**

Table 5: The criteria frequency of occurrence, Criteria Weighing Biometrics, MCMI

Comparing the most used criteria of the criteria weighing with the overall most used criteria of the performance ratings shows that there are mainly differences in regard to how often the criteria contentment and “Sicherheit” have been used.

No differences were seen regarding the top four ranked criteria between the frequency of use in the criteria weighing compared with the (ranked) results of the criteria weighing. Effectiveness is the only criterion, which has been used for rating more than five times but in spite of this has no larger share regarding the points. As the criteria which have not been used for rating more than five times regarding points do not differ significantly a comparison only makes sense regarding the top rated criteria.

Another interesting observation is that the criteria frequency of occurrence ranking of the criteria weighing compared to that of the different scenario performance ratings most resembles the column of the best case scenario.

This could indicate that participants, when pondering the shaping of technology regulations and the future, are much more focussed on shaping a desirable future than preventing an undesirable one.

3.1.4 MCMII Analysis on “Biometrics, Security- or Surveillance Technology?“

In the MCMII, the participants ranked provided scenarios, rated their performances, weighed the criteria and discussed a sideswipe-scenario. In the following section we will present the results of these topics.

3.1.4.1 Scenario Description and Scenario Ranking, Biometrics II

The scenarios had been prepared for the participants before, but they were free to change the scenarios if desired. However, the participants stuck to the prepared scenarios.

The participants were asked to rank these scenarios according to their preferences. These rankings were summarised by giving four points to a scenario each time it was ranked first, three points each time a scenario was ranked second, two points each time a scenario was ranked third

and one point each time a scenario was ranked forth. Then the scenarios were ranked by points. The scenario “Civil Rights-Oriented State” (CROS) was favoured (34 points), followed by the “Civil Rights-Oriented State with a focus on Security and Safety” (CROSFSS, 29 points) and the “Preventive State” (PREVS, 14 points). The scenarios “Night Watchman State” (NWS) and “Neoliberal State” (NLS) received 9 and 8 points, respectively. “State of Employers” (EMPL), “Class Society” (CLASS) and “Society Closed for Immigrants” (SCIFI) were each awarded 2 points.

A short description of the translated scenarios (the original scenarios in the German language are provided in Chapter III.1 of the Appendix):

1.) Civil Rights-Oriented State (CROS): To apply biometrics makes sense in some areas, but civil rights have to be considered thoughtfully and accurately. The use of biometrics may only take place under rigorous rules. Proportionality has to be scrutinized in each case.

2.) Civil Rights-Oriented State with a focus on Security and Safety (CROSFSS): Biometric technologies increase security in certain areas, but biometrics has to be dismissed as an area-wide applied technology. The employment of biometrics is regulated and controlled accurately. The government directly invests in this research area or at least fosters it.

3.) Preventive State (PREVS): Biometrics is applied area-wide. The administration has extensive means to apply biometrics, it is its main tool to assure security. All offences and crimes which could be resolved by the means of this technology are prosecuted.

4.) Night Watchman State (NWS): Biometric technologies are considered an essential threat for a free and open society and point in the direction of totalitarianism. Biometric technologies therefore are banned.

5.) Neoliberal State (NLS): Focussing on the economic potential of biometrics for society in this scenario biometrics is constructed as an opportunity to generate jobs and as a possibility to offer different services, above all for high end consumers. Thus biometrics in this scenario is primarily applied by the economy for the convenience of its consumers.

6.) State of Employers (EMPL): This scenario focuses on biometrics used and applied by the economy and employers to check and monitor employees and possible employees as well as consumers.

6.) Class Society (CLASS): This scenario is similar to the "Neoliberal State" but focuses on possible social impacts (eg social exclusion) of an omnipresent and expensive technology that regulates access to nearly all services.

8.) Society Closed for Immigrants (SCIFI): Biometrics is applied to control the access to societal life. Citizens have biometric identities which are checked in all daily routines; shopping, car driving, etc.. The main focus of this blanket surveillance is to prevent illegal immigrants from participating in social life.

3.1.4.2 Scenario Performances Ratings Biometrics II

The performance ratings of the eight scenarios described above are shown in Tables 6 and 7. Each participant selected the criteria he or she considered as the crucial criteria to describe the scenario's performances and rated the performances with one to ten points. The higher the importance, the more points were given. In order to evaluate the perceived strengths and weaknesses of each scenario we summed up the points overall as well as the points allotted in particular categories (clusters).

Scenario Performance Rating, Overall Results[12]	
Scenario	**Total Points**
CROSFSS	251
CROS	239
PREVS	217
NLS	212
EMPL	186
NWS	173
SCIFI	133
CLASS	129

Table 6: The scenarios' overall-performance, Biometrics MCMII

The overall performance of the scenario "Civil Rights-Oriented State with a focus on Security and Safety" (CROSFSS, the second best in the scenario ranking, see above) is rated best (251 points), followed by "Civil Rights-Oriented State" (CROS, 239 points, ranked first in the scenario ranking) and "Neoliberal State" (NLS, 212 points, ranked fifth in the scenario ranking). This ranking correlates well with the scenario ranking (see above). CROSFSS and CROS are ranked top in both, the scenario ranking and the scenario performance rating (overall results, see

[12] Note: The cluster "uncertainty/risk" (see below) was not included in the overall scenario performance rating, since the participants did not express well whether for example risk per se or minimisation of risk and uncertainty was meant, (which was ambiguous and therefore not interpretable). The same is true for the criterion "costs/high costs". Furthermore the two clusters "uncertainty/risk" and "costs/high costs" are omitted from the total due to the opposing impact (eg the higher the risk, the lower the scenario performance).

Table 6).

The detailed ratings of each criterion for the scenarios as well as the clustered performances of each scenario are depicted in the table below.

MCMII Biometrics, Clustered Scenario Performances								
Criteria	**CROS**	**CROS FSS**	**PREVS**	**NWS**	**NLS**	**EMPL**	**CLASS**	**SCIFI**
Freedom and Privacy	**54**	**44**	**25**	**45**	**27**	**25**	**16**	**16**
Freedom	46	37	25	45	27	25	16	16
Privacy	8	7						
Security/Safety	**66**	**80**	**81**	**35**	**32**	**7**	**18**	**11**
Institutional Security	24	21	24	14	8		8	
Security/Safety		14	20	5	3	2	3	3
National Security		7	15		7			8
Safety	7	17	15		7			
Individual Security	28	21	7	16	7	5	7	
Data Security	7							
Justice	**51**	**26**	**19**	**17**	**53**	**32**	**33**	**47**
Social Justice	17	9	7	17	16	15	17	19
Jobs	4		7		32	16	16	8
Transparency[13]	21	17	5		5	1		11
Global Justice	9							9
F/R/P[14]	**25**	**37**	**26**	**20**	**10**	**51**	**28**	**36**
Feasibility	9		6		5	22	6	7
Realism	16	33	18	9	4	17	9	16
Probability		4	2	1	1			
Social Acceptance				10		12	13	13
Economy	**19**	**22**	**15**	**23**	**39**	**34**	**12**	**12**
Efficiency	17	22	15	23	14	16	7	12
Competition	2					9	5	
Customer Orientation					16	1		
Promotion of Economy					9			
Profit						8		
Quality of Life and Convenience	**24**	**42**	**51**	**33**	**51**	**37**	**22**	**11**
Convenience		5	31	14	30	7	5	5
Quality of Life	24	37	20	17	21	14	17	6
Citizen Proximity				2		16		
Uncertainty/Risk	**21**	**28**	**30**	**67**	**32**	**35**	**30**	**40**
Danger	5	14	15	24	5	3	18	7
Abuse	12	8	8	15	21	32	12	33
Risk	4	6	4	8	6			
Lack of Freedom			3	10				
Maximised Freedom				10				

[13] Note: Transparency was included into the "justice cluster", because it will promote fair decisions in eg legal processes and filling jobs.

[14] Note: F/R/P means feasibility, realism, probability.

[15] Note: "Costs/high costs" was not included in the "economy cluster", since the participants did not express well whether they meant cost efficiency, high and low costs.

Increasing Risk								
Costs/High Costs[15]	15	8	3	8	16		17	8

Table 7: The results of the Scenario Performance Rating Biometrics, MCMII.
Criteria clusters as well as individual criteria are shown**.**

Quite striking, the three top ranked scenarios of the scenario ranking are also rated highest in the security/safety cluster. The scenarios ranked first, second and fourth are rated highest in the freedom/privacy cluster. Criteria from the justice cluster obviously did not really affect the ranking, such the first, fifth and last ranked scenarios are rated high in the justice cluster. Also the F/R/P, economy, quality of life and convenience and uncertainty/risk clusters seem unlikely to have affected the scenario ranking, because there are no clear tendencies in the performance rating. The same is true for the criterion costs/high costs.

Now we compared the cluster performances of the four most favoured scenarios with the four least favoured scenarios of the scenario ranking (Table 8).

MCMII Biometrics, Clustered Scenario Performance Ratings, Total Scenario Comparison:							
	Freedom/Privacy-related	Security/ Safety-related	Economy-related	Feasibility /Realism/Probability-related	Justice-related	Quality of Life/ Consumption-related	Uncertainty/Risk-related
Scenario ranking top four	168	262	79	108	113	150	146
Scenario ranking bottom four	84	68	97	125	165	121	137

Table 8: The scenario performance ratings of the top four and the bottom four scenarios of the scenario ranking.

The scenario preferences most strongly correlate with the security/safety ratings. The top four scenarios compared to the bottom four scenarios gathered nearly four times as many points in the security/safety cluster of the scenario performance ratings. Regarding the freedom/privacy cluster, the top four scenarios have twice as many points as the bottom four, rendering this the second strongest correlation.
In the clusters economy, feasibility/realism/probability and especially justice, the bottom four scenarios have more points than the top four, so their scenario performance rating negatively correlates with the scenario ranking.

Then we compared the scenario rankings according to the scenario preferences and different performance ratings (clustered and overall performances, Table 9).

Comparison: Scenario preferences, overall performance, performances regarding security/safety and freedom/privacy					
Scenarios	Scenario ranking results	Overall scenario performance ratings	Security /Safety performance	Freedom/ Privacy performance	Security/Safety + Freedom/Privacy performance
CROS	34 (1)	239 (2)	66 (3)	54 (1)	120 (2)
CROSFF	29 (2)	251 (1)	80 (2)	44 (3)	124 (1)
PREV	14(3)	217 (3)	81 (1)	25(5)	106 (3)
NWS	9(4)	173 (6)	35 (4)	45 (2)	80 (4)
NLS	8 (5)	212 (4)	32 (5)	27 (4)	59 (5)
EMPL	2 (6)	186 (5)	7 (8)	25 (5)	32 (7)
CLASS	2 (6)	129 (8)	18 (6)	16 (7)	34 (6)
SCIFI	2 (6)	133 (7)	11 (7)	16 (7)	27 (8)

Table 9: A comparison of scenario preferences and clustered/overall performances.
Points and ranking (in brackets) are shown.

When we count how many positions the ranks (shown in brackets) are shifted as compared to the scenario ranking[16], the combined clusters security/safety and freedom/privacy differ just by two (CROSSFF positions one down, CROS one up). The security/safety cluster alone differs by four positions and the freedom/privacy cluster by seven positions. The overall performance rating[17] differ by six positions.

Thus the security/safety cluster is the most important one, combining it with the freedom/privacy cluster increases the positive correlation, whereas the overall performance rating shows less correlation.

The overall ratings, therefore, have some influence, nevertheless decisive is the share of the security/safety and freedom/privacy-related criteria.

3.1.4.3 Criteria Weighing, Biometrics II

In this step of the MCMII the participants ranked 22 pre-selected criteria. Each participant awarded a total of 100 points. More points indicate a higher importance of the criterion.

MCMII Biometrics, Criteria Weighing											
Criteria	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**[18]	**P8**	**P9**	**P10**	**Points**
Freedom				10	25	30	30	30	30	25	**180**
Quality of Life			30		20	20	20	20	5		**115**
Social Justice	10		20	2	20	20			30		**102**
Abuse			20	65			5	5	5		**100**
Danger				2				40		25	**67**
Safety		40	20								**60**
Individual Security					10		20		9	20	**59**

[16] Note: Exchanges of EMPL, CLASS and SCIFI are only considered when ranked better than six, since they are equally ranked in the scenario ranking.
[17] Note: all clusters but the uncertainty/risk cluster and the cost criterion are included, see above (Table 6).
[18] Note: Participant P7 just awarded 90 points.

Efficiency	30									20	**50**
Costs	10	5			10	20					**45**
Realism	30	5									**35**
Institutional Security					5		15		1	10	**31**
Convenience	20		10								**30**
National Security		30									**30**
Security						20					**20**
Risk				10	10						**20**
Social Acceptance				2					10		**12**
Feasibility		10		1							**11**
Global Justice									10		**10**
Customer Satisfaction								5			**5**
Transparency				5							**5**
Jobs				3							**3**

Table 10: The results of the Criteria Weighing Biometrics, MCMII
The participants´ ranking is shown in columns (P1-P10)

To analyse the results of the criteria weighing the points allotted to each criterion were totalled. The ranking is shown in Table 10. Freedom is the highest ranked criterion (180 points) followed by quality of life (115 points), social justice (102 points) and abuse (which means risk of abuse, 100 points).

Since just four criteria (freedom, quality of life, social justice and abuse) were awarded 50% of the points, they are clearly the most relevant ones for the participants.

As the criteria overlap to a certain extent, we clustered them as follows: security/safety-related issues, freedom and privacy-related, uncertainty and risk-related, lifestyle and consumption-related, economy-related, justice-related (see Table 11). The cluster security/safety was ranked highest (200 points), followed by uncertainty/risk (187 points) and freedom/privacy (180 points). Justice-related criteria scored lowest (132 points).

The clusters in detail you find in the following table.

MCMII Biometrics Criteria Weighing, Clustered Criteria	
Criteria Cluster	Points
Security/Safety-related criteria	**200**
Safety	**60**
Individual Security	**59**
National Security	**30**
Institutional Security	**31**
Security	**20**
Uncertainty and Risk-related criteria[19]	**187**
Abuse	**100**
Danger	**67**
Risk	**20**
Freedom and Privacy-related criteria	**180**
Freedom	**180**

[19] Note: In the criteria weighing it makes no difference, whether the participants defined risk/uncertainty related criteria in a positive or negative way, as the figures just express the (overall) importance of the criteria in being considered for decision-making and scenario assessment. Therefore, also costs (costs/high costs) is included into the economy and market-related cluster.

Lifestyle and Consumption-related criteria	**150**
Quality of life	**115**
Convenience	**30**
Customer Satisfaction	**5**
Economy and Market-related criteria	**141**
Efficiency	**50**
Costs	**45**
Realism	**35**
Feasibility	**11**
Justice-related criteria	**132**
Social Justice	**102**
Social Acceptance	**12**
Global Justice	**10**
Transparency	**5**
Jobs	**3**

Table 11: The clustered criteria, Criteria Weighing Biometrics, MCMII

Again, security/safety-related criteria are most relevant for being taken into consideration in decision-making and assessment. The clusters security/safety and uncertainty/risk are related in that one is the opposite of the other. As in criteria weighing it does not matter whether the criterion is meant in a positive or negative way (eg high risk means low security and vice versa), since they might have been combined. However, to be consistent to the analysis rationale of the scenario performance rating, we kept them separate.

Nevertheless, since the security/safety-, uncertainty/risk- and freedom/privacy-related criteria make up 57% of the total, they obviously constitute the crucial value trade-off.

3.1.4.4 Criteria Frequency, Biometrics II

We analysed how often each criterion had been used by the participants for rating the scenario performances when weighing the relevant criteria.

Table 12 shows how often each scenario had been rated.

MCM II Biometrics, Criteria Frequency Scenario Performance Ratings									
Criteria	CROS	CROS -FSS	PREV State	NW State	NL State	2-Class Society	SCIFI	EMPL State	Total
Freedom	6	5	6	6	4	3	3	4	37
Social Justice	2	1	1	3	5	5	5	3	25
Quality of Life	3	5	4	2	3	3	2	2	24
Abuse	3	1	1	4	3	2	4	4	22
Realism	2	4	3	3	1	2	4	3	22
Danger	2	4	3	4	2	3	2	1	21
Efficiency	3	3	2	3	2	1	2	2	18
Individual Security	5	3	4	3	1	1		1	18
Convenience		1	3	2	4		1	2	13
Institutional Security	4	3		3	1	1			12
Transparency	3	2	2		1		2	1	11
Costs	2	1	1	1	2	2	1		10

Jobs	1				4	2	1	2	10
"Sicherheit"		2	2	1	1	1	1	1	9
Social Acceptance				2		2	2	3	9
Feasibility	1		1		1	1	1	3	8
Probability	1	1	1	1	1	1	1		7
Safety	1	2	2		1				6
Risk	1	1	1	1	1	1			6
National Security		1	2		1		1		5
Consumer Orientation					2		1	1	4
Global Justice	1						3		4
Citizen Proximity				1				2	3
Lack of Freedom			1	1					2
Privacy	1		1						2
Competition/ Competitiveness						1		1	2
Control/Surveillance						1			1
Data Security	1								1
Increasing Risks by Max Freedom				1					1
Profit								1	1
Passenger Transportation							1		1
Promoting Economy					1				1
Total	43	40	38	42	42	33	38	37	

Table 12: The criteria frequency of occurrence, Scenario Performance Rating Biometrics, MCMII

Freedom was most often used for the performance rating by the participants (37 times). It is followed by social justice" (25), quality of life (24), abuse (22) and realism(22).

The criteria most often used to rate the performances of the two highest ranked scenarios (see above) "Citizen Rights-Oriented State" and "Citizen Rights-Oriented State Focusing on Security and Safety" were freedom and individual security, and freedom and quality of life, respectively.

To rate the least favoured scenarios the criteria most often used were social justice (5 times: CLASS and SCIFI) and abuse (SCIFI and EMPL).

Each scenario was rated more or less equally often. So the participants´ scenario preferences obviously did not affect the frequency of rating a scenario.

In the next step we compared the ranked scenario performance ratings with the criteria frequency of occurrence. We analysed in detail the particular scenarios regarding their top performance ratings compared to the frequency of occurrence of the criteria used most often to rate them:

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CROS: Added up, the highest performance ratings were given to freedom, individual security, and then quality of life which was ranked equal to institutional security and transparency.

Regarding the most used criteria to rate the performance of this scenario the ranking is lead by freedom, followed by individual security, institutional security ranked third, and equally often used quality of life, transparency, efficiency and abuse ranked fourth.

CROSFSS: Regarding top performance ratings freedom is ranked first equal with quality of life,

followed by realism, efficiency and institutional equally with individual security.
Similar to the top performance rating freedom and quality of life are ranked equal first regarding the frequency of occurrence of being used. Followed by the equally often used performance rating criteria realism and danger ranked third. Efficiency, institutional and individual security are also equally often used for the performance rating and are ranked fourth.

PREVS: The highest performance ratings were given to freedom followed by institutional security, convenience and “Sicherheit” which were rated equally with quality of life. Regarding the frequency of use, freedom is ranked first and followed by individual security and quality of life ranked equal second, and realism, convenience and danger which have been equally often used, are ranked fourth.

NWS: The top five performances regarding the rated criteria were freedom followed by danger then efficiency and quality of life ranked equal fourth with social justice. Regarding the criteria frequency of occurrence freedom is ranked first, abuse and danger are ranked second and efficiency, social justice as well as individual and institutional security are ranked fourth.

NLS: Jobs was the criterion with the highest performance score, convenience, freedom and quality of life ranked equally with abuse were the other four top five performers of this scenario. Regarding the criteria frequency of occurrence social justice is ranked first followed by jobs, freedom and convenience which were used equally often and ranked second. Ranked fifth equal are quality of life and abuse.

EMPL: Abuse as the best rated performance of this scenario is ranked first, followed by freedom, feasibility and realism. Efficiency, jobs and citizen proximity are equally rated and ranked on the fifth place. Regarding how often a criterion has been used for this scenario performance rating the ranking is lead by abuse and freedom, which equally often have been used for rating. Feasibility, realism and social acceptance are ranked equal third.

CLASS: The criterion danger is the top performance of this scenario followed by the equally rated social justice, quality of life and costs. Ranked fifth equal are jobs and freedom. The scenario performance ratings of this scenario were quite low.
Regarding the criteria frequency social justice is ranked first followed by danger, freedom and

quality of life ranked second. Costs and jobs and other criteria[20] are ranked fifth.

SCIFI: Abuse, social justice, freedom and realism equally rated on rank three followed by social acceptance have the best performance scores regarding this scenario. The scenario's performance ratings were overall very low. Regarding the frequency of occurrence “Social Justice” is ranked first followed by abuse and realism which are ranked second equal. Freedom is ranked fourth. Social acceptance is one of many criteria ranked fifth.

The bottom line comparing the MCMII criteria frequency and the MCMII scenario performance ratings:
Due to the overall higher number of different criteria it is more difficult to recognise any tendencies here compared to MCMI. Overall the scenario performance ratings correspond to the frequency of occurrence rankings, but as many criteria are equally often used for performance ratings this is not a valid base upon which to draw any conclusions regarding outlier influence and whether or not the results are distorted.

Criteria Frequency in Criteria Weighing:
As in the scenario performance rating in the criteria weighing the most often used criteria (see Table 13) are freedom, social justice and quality of life. In the following table you find the ranking in detail:

MCMII Biometrics, Criteria Frequency Criteria Weighing	
Criteria	**MCMII**
Freedom	**6**
Social Justice	**6**
Quality of Life	**6**
Abuse	**5**
Danger	**4**
Costs	**4**
Individual Security	**4**
Institutional Security	**4**
Efficiency	**3**
Convenience	**3**
Safety	**2**
Feasibility	**2**
Risk	**2**
Social Acceptance	**2**
Realism	**2**
National Security	**1**
Lack of Freedom	**1**
Transparency	**1**
Jobs	**1**
Global Justice	**1**

[20] Note: Abuse, social acceptance and realism.

Table 13: The criteria frequency of occurrence, Criteria Weighing Biometrics, MCMII

The "Criteria Frequency in Criteria Weighing" and "Criteria Weighing" results match very well overall, the most often rated criteria also were allotted the most points.

3.1.4.5 Sideswipe-Scenario, Biometrics

The text: "Poorhouse Europe" (see box below) was presented to the participants. After having read the text, they were asked to say whether or not this scenario had influenced their opinion and participants were asked to give reasons why.

Sideswipe-scenario: Poorhouse Europe:

Europe's economic decline due to a lack of competitiveness in a globalised market in comparison to India, China, Brazil and USA causes among other things a high unemployment rate (approximately 30%), the pauperisation of large parts of the population and an increase in crime.
Another consequence is political radicalisation: Nationalistic, communistic as well as fundamental religious movements are very popular and are openly campaigning for members. They are experiencing exuberantly growing numbers of members.
All of these movements also have militant and extremist splinter groups. These groups launch terror attacks to frighten people who are in employment and integrated in societal life and to destabilise the political system and the institutions, which protect people.
In the light of these threats a majority of citizen supports consigning the administration with extensive rights that undermine today's standards regarding data privacy, privacy and individual freedom.

Do your priorities regarding scenario ranking or criteria weighing change in the light of a societal development like the one described above? Why?/Why not?

The sideswipe-scenario included not yet considered aspects and stressed connections, that had not been recognised by the participants before. Seven participants out of ten stated that this sideswipe-scenario had not affected their preferences and priorities, while four said that it possibly affected their point of view.
The scenario was instantly developed based on the observations made on participants' deliberation in the whole parliament.
The participants made their decisions presuming a deliberative democracy in an open and wealthy society. They were up to that point to a broad extent discussing if certain security and safety measures are really necessary in the safe and secure context of Austria (arguments pointed out were eg: "terrorism is an American problem", "surveillance is a problem in non-democratic systems"), this kind of dystopic scenario seemed quite adequate.

The (translated) responses in detail:

No:

-No, because it does not affect my life.

-It stays the same.

-Because this situation does not affect me.

-You have to stick to your priorities: There have to be ways of ensuring protection and freedom. Eg the economical situation has to be improved instead of convicting all criminals.

-No, because I would emigrate if this became a reality.

-No, because security, freedom and quality of life are in general values which I find deeply connected with my integrity.

-No, because without these surveillance methods such regimes will not come into existence.

Yes:

-Because in times of crisis people driven by angst are ready to do things which they would not do in other/normal situations.

-Because if you fear losing your livelihood and you are also responsible for other human beings you will do everything to perpetuate the status quo. Although I suppose my basic principles would not change and above all I would not harm other people.

-My personal utopia would not change, but I would probably be forced to lower my sights and to put up with some changes, thus the goals I pursue in daily routines would probably be other ones.

-Because the priorities of an individual shift in the respect that security becomes more important in comparison to freedom.

3.1.5 Summary of the MCM Results on Biometrics: Identified Preferred Scenarios, the Underlying Driving Values and Emerging Value Dynamics:

3.1.5.1 Explaining Participants' Scenario Preferences by the Scenario Performance Ratings:

In this chapter the scenario preferences of the participants are discussed in light of the results of the scenario performance ratings.

In the MCMI the participants decided to develop three scenarios[21], which covered three different

[21] Note: As described in this chapter the scenarios had the following features:
The best case scenario was developed as a scenario in which ethic committees and rigid regulation ensures that biometric data is not saved by the administration. Biometric data which is saved for the convenience and wants of the consumers by companies are allowed.
The realistic case depicts a society where biometrics is used where it is assumed to be crucial, eg airports, train stations etc. and for all kind of identity cards. Furthermore biometrics is widely used in the private sphere for convenience.
In the worst case scenario the participants created a "Surveillance State", people wear implanted chips and the administration collects data on a broad basis for controlling the frightened population. Furthermore this society

cases, a desirable, a realistic and an undesirable case. The developed scenarios as the problem perception as well as the decision-making frame of the participants depicted the polarisation of a citizen rights-oriented state and a surveillance state with a mixed model between them. The assessment of the scenarios was strongly influenced by “Sicherheit” and freedom. In the best case scenario performance rating 60% of all points were allotted to these criteria[22], nearly 46% in the performance rating of the real case scenario and only ca. 34% in the worst case scenario performance rating. In the criteria weighing 82% of all points were allotted to security/safety- and freedom-related criteria.

Thus the best case scenario is probably favoured because of its estimated eminently strong performance regarding freedom- and security/safety-related criteria and possibly of secondary importance because of its strong performance regarding lifestyle and consumption-related criteria.

Also the overall performance of the best case scenario is clearly better compared to the realistic case scenario (435 to 325), where the difference of 110 points is mainly generated by the performances regarding the criteria freedom of opinion, data security, freedom and “Sicherheit”, in which the best case scenario performs 121 points better.

In comparison to the best case scenario the real case scenario according to the participants performs eminently strong regarding economy-related criteria (71 points better). The criteria freedom and security/safety are quite similar in both scenarios, although the best case scenario’s performance is rated better. In contrast to the criteria data security and freedom of opinion where the real case scenario is by far no match for the best case scenario.

In contrast to best and real case scenarios, the worst case scenario performs poorly regarding freedom and privacy, lifestyle and consumption-related criteria as well as security/safety-related criteria. Its main focus is on real political criteria. In addition its overall performance is clearly worse compared to the best case scenario (-200 points) and the realistic case scenario (-90 points).

This highlights that the participants’ scenario preferences in MCMI strongly correspond to their scenario assessment in regard to freedom and security/safety-related criteria as well as to the scenario's overall performance. This analysis is also coherent in respect to the performance of the participants’ most preferred scenario. According to them it performs best regarding the criteria data security, freedom of opinion, freedom in general, “Sicherheit” and contentment, thus the strong focus on the values freedom and security/safety is further documented.

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is marked by strong social segmentation and suppression, it’s a two-class society.

[22] Note: Freedom, freedom of opinion, "Sicherheit", data security, protection, detection rate.

In the MCMII on biometrics the participants ranked eight scenarios. The two scenarios which were clearly ranked best on average are the scenarios “Citizen Rights-Oriented State” (CROS) and “Citizen Rights-Oriented State with a focus on Security/Safety” (CROSFSS). These scenarios’ performance is rated best in respect to the merged/combined clusters security/safety and freedom. According to the participants CROS performs best regarding freedom and is ranked third regarding security/safety. CROSFSS is ranked second regarding security/safety (only one point less than PREVS) and ranked third regarding freedom (one point less than NWS). In the performance rating of the CROS and CROSFSS nearly 50% of all allotted performance points were security/safety- or freedom-related. In comparison the share of these categories regarding the three least favoured scenarios is only approximately 21%. This tendency regarding where the favoured scenarios perform eminently well and the least favoured ones perform extremely poorly was also visible in the MCMI on biometrics.

When analysing the correlation of each criteria cluster with the participants’ scenario preferences, the scenario ranking most strongly correlates with the security/safety ratings. The three top ranked scenarios of the scenario ranking are also rated highest in the security/safety cluster.

Thus the security/safety cluster is the most relevant one regarding participants’ scenario preferences. Combining it with the freedom/privacy cluster increases the positive correlation even more. The overall performance rating in contrast shows less correlation to the scenario ranking than the security/safety cluster. Nevertheless the overall ratings correspond quite well to the scenario ranking.

Justice, F/R/P, economy, lifestyle/consumption and uncertainty/risk clusters do not seem to have obvious effects on the scenario preferences.

This outlines that the overall ratings have some influence, nevertheless decisive is the share of the security/safety and freedom/privacy-related criteria.

3.1.5.2 Which Values Do the Participants Deem Relevant?

In the MCMI data security, freedom of opinion, freedom, “Sicherheit” and contentment are the criteria weighed highest and therefore deemed most important for decision-making in regard to biometrics. When building a criteria cluster such as in the table “MCMI Biometrics, Criteria Cluster I” criteria based on the values security and safety are most important closely followed by freedom-based criteria. Both clusters make up more than three quarters of all the points. Lifestyle and consumption-oriented criteria as well as economy and market-related criteria are only also-runs. That implicates at the beginning of the parliament the crucial focus to comprehending the

technology in its context was located on the trade-off between security and freedom.
Overall the results of the criteria weighing are coherent with the results of the scenario performance ratings of the MCMI when factoring in the scenario ranking: the top performances of the best case scenario correspond very well to the ranked list of weighed criteria, that means the results of the criteria weighing regarding values could explain to a large degree the participants' scenario preferences.

The criteria weighed highest in the criteria weighing of the MCM II were freedom, quality of life, social justice and abuse. These four criteria make up over 50% of the total points allotted to the overall 21 criteria selected by the participants within the scope of the criteria weighing of the MCM II. The top ranked criterion freedom alone has 18% of the total points.
However, putting the criteria in order such as in the Table “Criteria Cluster Biometrics MCM II” seems more descriptive and informative regarding the preferred values of the participants according to the weighing:
Security/Safety-related criteria cluster makes up 20% of the total points, if the points of the criteria cluster uncertainty/risk are added to it, 39% of all points are covered. This indicates participants choose their criteria for shaping regulations on biometrics and value biometric futures with a strong bias for high security and safety standards and low risks as well as a low probability of abuse and emerging dangers. Freedom although weighed as the single most relevant criterion nonetheless clearly is subordinate to the security/safety and risk complex. That means in the value trade-off between security and freedom, security is clearly deemed far more relevant by the participants.
Comparing freedom in relation to lifestyle and consumption, economy and market or justice-related criteria clusters the gaps are rather small. Even the smallest cluster, justice-related criteria, makes up for 132 points which is 13%. Nevertheless the impact of these criteria was not visible within the scope of the scenario performance rating.

3.1.5.3 Comparing the Different Results of MCM on Biometrics in Regard to Value Coherence and Value Dynamics.

Comparing the criteria weighing of the first and the second run it becomes obvious that on the one hand deliberation, and on the other hand the taking into consideration of additional possibly relevant criteria (justice- and uncertainty/risk-related criteria) strongly affected the estimated significance of freedom-related criteria (nearly 39% of all points in the criteria weighing of the MCMI and only 18% in the criteria weighing of the MCMII). Overall the criteria relevant for the trade-off between security/safety and freedom, due to the up-valuing of alternative criteria, eg

justice- and economy and market-related criteria, lost shares. In spite of this participants maintained a clear priority for security/safety, and freedom remains the value deemed second most relevant in all units of the MCM on biometrics: the security/safety-, freedom- and uncertainty/risk-related clusters make up for 57% of all allotted points of the second criteria weighing (whereas security/safety and freedom-related criteria made up for more than three quarters of all the points in the criteria weighing in the MCMI).

Regarding the criteria in detail, comparing the criteria weighing of the MCMI and the MCMII the following becomes salient: data security was the criterion regarded as most important, freedom of opinion was weighed second highest. In the MCMII criteria weighing data security and freedom of opinion were not rated as relevant criteria at all.
Overall 21 criteria were used in the criteria weighing in the second run. Fifteen were used in the first run. Only three criteria were used in both runs (freedom, “Sicherheit” and convenience).
In regard to the scenario performance rating, the criteria effectiveness, contentment, advantages for administration, individualisation and system stability, detection rate, cost efficiency, clientele politics, protection against crime and law enforcement were not used as criteria to assess scenario performances in the second run.
Nonetheless this is also partially caused by shifts in criteria wording. Feasibility, realism and efficiency for instance are quite connected to aspects of effectiveness or cost efficiency. “Sicherheit”, system stability, detection rate, protection against crime and law enforcement are quite related to aspects of national, individual and institutional security, safety, danger, risk, abuse or perhaps even jobs (correlation between unemployment and delinquency rate).

This quite nicely shows the context relatedness of at least expressed values even if the basic hierarchies regarding the sets of values stay the same. In this case information, deliberation and reflection did not change the values perceived as crucial for assessing biometrics and its implications: “Sicherheit” and freedom as the dominant intrinsic values, where “Sicherheit” has priority, all other values in the context of the biometric technology assessment had instrumental or subordinate significance. However, the changed context, where the participants got another, perhaps more differentiated view of biometrics and its possible implications through deliberation, lead to an up-valuing of criteria and criteria clusters which had not been spotted as crucial in the immediate assessment or had not even been considered at all.
The results of the criteria weighing and the scenario performance rating in relation to the scenario ranking are quite coherent regarding participants' sets of values. “Sicherheit” and freedom were prioritised in all of these assessment steps. Dynamics have become obvious

regarding the consideration of more criteria and in respect to a slight change to a more balanced scoring proportion due to information, reflection and deliberation (although the hierarchies did not change).

3.1.6 The Interim Statements in the Course of the Parliament

3.1.6.1 Policy Discussion, Biometrics:

In the course of the science parliament the participants also discussed the goals, measures and expressed values of an "FP 7 Working Programme" theme relevant to the development of biometric technology and funding research in that field. The goal of that exercise was to get a document, where participants state their view on the goals, measures and the incorporated value hierarchies of the theme. The policy discussion should orient participants on which approach biometrics policy-makers have and is a supportive step or a preparation for developing the closure resolution. In this case the work programme “Cooperation - Theme Security” was discussed and the participants were able to consensually elaborate the following statement:

Closure Document Policy Discussion Biometrics:
Regarding the basic presumptions underlying the security theme:
To ensure prosperity security is necessary. Security is no condition for freedom. It can constrain it on one hand and increase it at the same time in other areas. To advance justice, security is a basic requirement. Transparency regarding knowledge is to be guaranteed by security.

Regarding the goals of the security theme:
Basically we agree on the goals expressed in the document. As not as important we consider the strengthening of competitiveness of the European security industry, because security should not be dependent on economic interests.

Regarding the measures presented in the security theme:
Increasing security in the area of infrastructure is important, but should not lead to total surveillance and no means should be wasted unnecessarily.
The development of intelligent surveillance systems and the increasing of border security is viewed critically by a majority within the group.
Increasing capacities to re-establish security and safety in case of crisis is important, in this case quick reaction is necessary to minimise damage and harm.
The improvement of integration, interconnectivity and compatibility of security systems is viewed critically, due to the fear of total surveillance. In some special cases this nonetheless could lead to an increase regarding security.

Regarding the in the “Theme Security” document formulated constraints of research in order to protect human and citizen rights:
Due to imprecise and fuzzy formulations and definitions, interpretations in nearly all directions are possible.
Proper and accurate legal regulations are necessary to protect human rights. Above all a definition of privacy is important.

Regarding the values mentioned in the "Theme Security" document.
We deem health, freedom, justice, security, social cohesion and environment protection as very important.
Market suitability, competitiveness and prosperity we deem as less important.

3.1.6.2 Project Discussion

In the project discussion on biometrics two scenarios were presented and then discussed if the participants would fund the project and how they assess its goals and underlying values, also in regard to the policy discussion. The presentation of the projects took place by handing out the official abstracts of the projects, which the participants had to read before discussing.

INDECT:

The first discussed project was the "Indect" project, the discussed abstract you find below:

Indect (SEC-2007-1.2-01**)**
The main objectives of the INDECT project are:
to develop a platform for the registration and exchange of operational data, acquisition of multimedia content, intelligent processing of all information and automatic detection of threats and recognition of abnormal behaviour or violence, to develop the prototype of an integrated, network-centric system supporting the operational activities of police officers, providing techniques and tools **for observation of various mobile objects,** to develop a **new type of search engine** combining direct search of images and video based on watermarked contents, and the storage of metadata in the form of digital watermarks, to develop a set of techniques supporting *surveillance* of Internet resources, analysis of the acquired information, and detection of criminal activities and threats.
The main expected results of the INDECT project are: piloting installation of the monitoring and ***surveillance*** system at various points of city agglomeration and demonstration of the prototype of the system with 15 node stations, implementation of a distributed computer system that is capable of acquisition, storage and effective sharing on demand of the data as well as intelligent processing, construction of a family of prototypes of devices used for mobile object tracking, construction of a search engine for fast detection of persons and documents based on watermarking technology and utilising comprehensive research on watermarking technology used for semantic search, construction of agents assigned to continuous and automatic monitoring of public resources such as: web sites, discussion forums, usenet groups, file servers, p2p networks as well as individual computer systems, building an Internet-based intelligence gathering system, both active and passive, and demonstrating its efficiency in a measurable way.

Regarding the project the participants' group established the following consensus:

Indeed the project is designed to achieve enhanced security for the public and to increase the efficiency and effectiveness regarding security systems as well as the competitiveness of the security industry and in this respect meets the goals expressed in the "Security Theme" document. Furthermore it could also promote justice by increasing the detection rate, nonetheless there are serious issues which have to be considered:

Regarding responsibilities pertaining to freedom and data privacy the project is not satisfactory. Human rights and privacy issues are not taken into consideration. In this aspect we deem that the project does not meet the requirements of the “Security Theme” document.
We are opposed to the development and implementation of an integrated network centric system which is a tool for total surveillance and sees the development of such a platform for data exchange as a mixed blessing. As a tool to support the police regarding criminal offences it makes sense to a certain degree, but it has to be ensured that unsuspicious data is deleted and the operators of the system are monitored. Furthermore we are against the surveillance of Internet sources, because this is seen as an intrusion of privacy.

The majority of participants did not totally decline the funding of the project but nearly all participants saw some modifications necessary to be funded within the scope of the "Security Theme" criteria.

Bio-Distance

The second project discussed was the project "Bio-distance". Due to a tight time schedule it was not possible to discuss the project in detail and elaborate an extensive assessment of the scenario.

Bio-Distance (FP7-PEOPLE-2009-IEF Marie Curie)
The main objective of this proposal is to investigate a number of activities aimed to make biometric technologies applicable to data acquired at a *distance* and on the move**.** We propose the use of face and iris as the reference modalities, being the two traits that are attracting more efforts thanks to the possibility of their simultaneous acquisition. This aim is an important technological challenge, since the major limitation of current face and iris commercial systems is the degree of control and cooperation required during the acquisition. This project is an integrated approach that covers the whole structure of a biometric system, including basic research and algorithm development for the different stages of the system, as well as practical results through case studies implementation and evaluation.

Participants realised that the aim of the project is among other things to verify identities and to identify people who are not aware of being monitored or scanned, due to the fact that proactive cooperation is no longer needed. This may be of assistance to security staff, but it demands the responsible and professional use of data. The participants came to the preliminary assessment, that the technology may be useful, but its application is probably an issue. Further elaboration on this and deliberation whether or not the project should be funded was not possible due to time restrictions.

3.1.7 The Resolution

As the closure document the following resolution was worked out in the committee work by the biometrics committee group. One representative of the group presented the resolution to the plenum of the science parliament, where it was approved by the plenum. The resolution as the main and final document of the parliament and as the manifest consensus on which the participants work for days in order to express their concerns, views and recommendations is the crucial ouput of the participative method according to the participants who take part.

Resolution regarding Biometrics as Security and Surveillance Technology, Science Parliament Vienna 2011:

The Science Parliament Vienna 2011 regarding biometric technologies states:

A.) Noting that biometric technologies are mainly used for
Identification,
Verification
and Pattern recognition

B.) Considering biometrics as a technique to increase the detection rate, but which is not capable of taking preventive action in practice.

C.) Aware of the facts that biometrics as a quick verification process could increase convenience and thus quality of life.

D.) Concerned that this technology has great potential but is not sufficiently explored and thus is not forgery-proof or area-wide applicable. Up to now its applications are below expectations.

E.) Considering that due to the fact that biometric systems are not fully developed, high costs for users and operators are to be expected.

F.) By connecting different surveillance systems and databanks there is the threat of a stricter control of the civilian population, which causes psychological pressure and constraints regarding individual freedom.

G.) Concerned that due to improper use of biometric data, abuse and intrusion into citizen's privacy are possible.

H.) Concerned that inadequate protection of biometric data against the access of unauthorised persons leads to an undesired access to private data.

The Science Parliament Vienna 2011 demands and recommends:

1.) Demands that biometric methods should not be applied in public places until the technology is to a sufficient extent forgery-proof in its applications.

2.) Emphasises that decisions pertaining to the approval of biometric systems have to include

ethical criteria.

3.) Suggests the Data Protection Committee as a contact point regarding the complaints of citizens, whose rights have been affected by biometric applications, has to be stocked with further means to warrant its functions.

4.) Demands that biometric systems in public places are only to be operated by inaugurated and well-trained staff.

5.) Demands that it is assured that all human beings are able to continue enjoying privacy and surveillance measures are only taken in special cases; eg if there is a strong suspicion of a criminal offence.

6.) The handling of biometric data has to be strictly confidential and proper laws pertaining to the handling and use of biometric data is necessary.

Interpreting the Resolution Regarding its Value Dimension:

In the first part of the resolution, the description of the technology, participants refer explicitly or implicitly to the criteria security (forgery-proof), justice(the relation detection rate and justice is established in the project discussion), quality of life, convenience, costs, freedom and privacy (all explicitly). Participants perceive biometrics as a technology with potential.

In the “demands and recommendations” section, the crucial part of the resolution, participants focus on threats which are probable when using the technology. That means basically biometrics is supported but high standards regarding security (forgery-proof, inaugurated and well-trained staff, proper laws regarding the data handling) are demanded. Three of six recommendations focus mainly on security aspects, but not in the respect more security by biometrics than in the respect that security is needed when using biometric applications. Two recommendations focus mainly on human and citizen rights, especially privacy, one recommendation refers to ethical criteria. What this means is not made explicit, possibly justice could be associated here. Furthermore the formulation “enjoy privacy” could be an indication of quality of life . Costs and convenience do not play a role in the demands and recommendation section.

This content of the resolution corresponds to the results of the MCM on biometrics which diagnosed security and safety as a priority and had a strong focus on the criterion data security in MCMI. Freedom, the second most relevant value of the MCM, is not mentioned explicitly in the demands and recommendations section, but privacy and the refusal of surveillance are outlined, which points to freedom; in the first part of the resolution the connection that surveillance systems constrain individual freedom is established.

3.1.8 The Background and Context of the Resolution:

This chapter is the attempt to explain and contextualize the nature of the resolution by shedding light on participants' perceptions and sets of values in regard to biometrics. This of course relates to the results of the MCMI, the MCMII and the outputs of the value discussion and the interim statements.

As stated in the resolution as well as in the value discussion participants perceive biometrics as a technology with great potential, that could enhance security standards and promote justice but nevertheless is not adequate to prevent crime. Due to possible and probable threats (biometric data could fall into the wrong hands, malfunction of biometric devices, abuse by administration to develop a surveillance society, issues stemming from a not fully-developed technology brought prematurely onto the market) the participants advocated within the scope of the value discussion for “maximised precaution” as a principle for regulating biometric technologies.

This is also quite coherent with the results of the multi-criteria mappings. “Sicherheit” (security/safety) was in both of them the value deemed most relevant and important for decisions and assessments regarding biometrics.

According to the results of the value discussion “Sicherheit” means for the participants feeling safe and secure all the time. It means to be protected against dangers, crimes or diseases and that there is no need to be afraid. Furthermore it means that specific precautions have to be taken in every area.

Crime, especially Internet criminality, and terrorism are identified as security threats by the participants (Furthermore hackers are identified as one major threat regarding privacy). In the policy discussion participants agreed, that border security is not an issue, and that in spite of different security issues in general, there is no need to overspend in that area.

Furthermore security according to the participants' policy discussion statement is a necessary condition for prosperity and justice.

The second most relevant value according to the results of the MCM is freedom. It is clearly subordinate to "Sicherheit" according to the results of the MCM, nevertheless participants stated in the policy discussion that security is not a condition for freedom.

According to the results of the value discussion participants understand freedom “as the possibility to do what you want and as the autonomy and self-determination of a person. Some of the participants explicitly expressed that the freedom of one person ends, where the freedom of another person begins and that freedom is limited where it does damage or harm to other people.” In the value discussion participants mainly had concerns, in respect to biometric technology and its impact on freedom, regarding privacy matters. This suggests that participants perceived privacy as a condition for freedom. In the resolution nevertheless surveillance as a

possible threat to individual freedom was directly outlined.

3.2 Dual Use Dilemma in Pathogen Research

In this chapter the results and outputs of the VDSP Vienna in regard to pathogen research and their interpretations are summarised. The results cover mainly the results of the different rounds of the MCM. The outputs include the interim statements which the participants wrote within the scope of the policy discussion and the project discussion, as well as the resolution which was developed by the participants during the value-sensitive deliberations and discussions within the scope of the whole parliament. The resolution also presents the closure document of the parliament. The interim statements and the resolution thus document the solutions which the participants developed during the parliament in regard to the "Dual Use Dilemma in Pathogen Research".

Furthermore possible interpretations of the results of the MCM and the resolution are discussed. In this respect the results of the MCM originally were intended to provide contextualisation cues regarding the resolution and to make transparent on which value-trade-offs participants' solutions and views were based. In the course of the interpretation of the results and outputs of the VDSP in respect to "Dual Use Dilemma in Pathogen Research" it became obvious that not only the results of the MCM are a contextualisation to the output documents, but also that the output documents are likewise a valuable contextualisation of the MCM results, and thus are fundamental for understanding and interpreting them. The relation between the interpretations of result and outputs thus is a mutual/circular one.

Now to the Course of Action of the VDSP Group Focusing on "Dual Use Dilemma on Pathogen Research":

Thirteen students (aged 17 to 18) took part in the VDSP committee on "Dual Use Dilemma in Pathogen Research". The students attended a secondary school with a focus on chemistry. Eight of them were male, five of them were female. Not all of them took part in every session of the VDSP. The VDSP was held in German. The sessions were moderated by a member of the European Youth Parliament, an organisation with experience with similar formats (moderating layperson committees in regard to complex issues). Furthermore a PhD student of biology, Mag. Cornelia Klein, supported the EYP member in moderating and provided technical advice in case of urgent and fundamental questions regarding pathogens, if those were posed by the participants.

The VDSP lasted three days (15th to 17th June). The first day consisted of a team-building exercise, the first run of multi-criteria mapping (MCMI), the value discussion and an expert hearing.

In the expert hearing Mag. Dr. Seipelt, an expert in applied and basic research in virology, who lectures as an Assistant Professor at the Medical University of Vienna gave a talk on “The Dual Use Dilemma in Pathogen Research”. In his talk Dr. Seipelt focussed on virology and illustrated its dual use dilemma by discussing two examples: the synthetic construction of a polio-virus by the research group of E. Wimmer (2002) and the exploration as well as the reconstruction of the pandemic influenza virus of 1918 by American research groups. Within the scope of these examples the questions, when the publishing of research results could be an issue, under which conditions research should take place at all, which are the possible, undesired side effects of pathogen research and to which degree a better understanding of pathogens and the enhancement of people’s health legitimises research, were discussed.

The first day finished with committee work, the participants discussed the new input of the expert hearing and its relevance for their resolution. On the second day the participants continued with committee work and within the scope of the session ‘policy discussion’ engaged themselves with a summary (see Chapter IV.2 of the Appendix) of the health theme of the "FP7 Work Programme Cooperation 2010". In the session ‘project discussion’ they assessed two research projects which were funded under the 7th FWP within the scope of the theme health. The first project “Predicting Antibiotic Resistance (PAR)” (2009) dealt with dynamics of antibiotic resistance development at the level of the drug target, the microbe and the host. The second project “Genetic Analysis of the Host-Pathogen Interaction in Tuberculosis (TB-EURO-GEN)” (2007) based on an extended collection of DNA extracts of TB-patients explored the role of identified mycobacterial factors such as PE variants and the effect of this variation on aspects of innate immunity as influenced by newly-identified TB-associated genes. The second day finished also with committee work. This time the participants prepared for the plenum. The third day started with a second run of multi-criteria mapping (MCMII). After the MCMII the participants had time for further preparations for the plenum. The plenum was the last session of the VDSP. In the plenum each resolution was introduced by a representative of the particular committee and after it was discussed the resolution was put to the vote. The resolution on “Dual Use Dilemma in Pathogen Research” was approved and the parliament representatives of the VDSP participants subsequently handed it over to the President of the National Council, Mag. Barbara Prammer.

For a detailed description of the VDSP method see Chapter two, for a detailed schedule of the VDSP on “Dual Use Dilemma in Pathogen Research” see Chapter V of the Appendix.

Description of MCMI on "Dual Use Dilemma Pathogen Research"

Eleven participants took part in MCMI. It took approximately two and a half hours. As the MCM was conducted in German you find the questionnaire of the MCM in the original German version in the appendix (xyz). Within the scope of the scenario development the participants created seven scenarios which they then merged to three relevant scenarios. In the next step participants deliberated which criteria may be useful and relevant to assess these scenarios. Eighteen criteria were selected by the participants: "Sicherheit"[23] (security/safety), health, human rights, risk, progress, freedom of research, panic, accountability, tolerance, cost efficiency, social justice, jobs, constraints, prosperity, implementation, place of implementation, education and 'two-class society'.

After the criteria deliberation the participants conducted a performance appraisal of each scenario by rating the benefits and positive[24] performances which it provides. They selected the criteria[25] which they deemed relevant and awarded up to ten points to each. Ten points indicated the highest performance, zero points indicated no performance. The last step of the MCMI was the criteria weighing. In the criteria weighing the participants rated the criteria in regard to their relevance for decision-making and scenario appraisal in the context of the dual use dilemma in pathogen research.

Description of MCMII on Pathogen Research:

Twelve participants took part in the second run of the MCM, which took place at the end of the science parliament event. The MCMII on pathogen research took approximately two hours.

Four scenarios had been prepared for the participants. The participants discussed the scenarios and were allowed to make changes or even to replace a scenario as a whole. As the participants did not make any changes the presented scenarios were ranked and rated. Additionally a list of possibly relevant criteria had been prepared for the participants. The participants were free to use this list as a support within the scope of the ranking and weighing. The list of possibly relevant criteria had been prepared previous to the VDSP based

[23] Note: In German the word "Sicherheit" translates as both security and safety. It might have been confusing for participants who were all from Austria to distinguish between them, since no difference actually exists in German. We therefore translated "Sicherheit" with "security/safety" whenever the participants did not distinguish between safety and security by using the word "Sicherheit".

[24] Note: Nevertheless, the participants did not stick only to positive criteria.

[25] Note: The participants were free to use further or alternative criteria in the process of rating and weighing. With the exception of 'place of implementation' all the criteria which were gathered in the criteria deliberation were used in the scenario rating. Freedom was the only criterion which was added to the original list.
In the scope of the criteria weighing fifteen criteria were used, the criteria two-class-society, place of implementation, education and freedom were not considered for the criteria weighing.

on literature and evaluations of a VDSP pre-test.
The participants used over thirty criteria in the scenario performance rating of MCMII. In the following analysis of the results some were merged due to unclear distinctions by the participants ("accountability" also includes "accountableness", "responsibility", "responsibilities" and "clear responsibilities", "risks", "risk" and the predominantly used "societal risks" are merged to "societal risks").
Within the scope of the criteria weighing the participants deemed twenty criteria as relevant for decision-making and scenario assessment.

In the next chapter the understanding of certain values and criteria by the participants is discussed based on observations and a summarising interpretation of the participants' responses to the qualitative questionnaire which kicked-off the value discussion.
Thereafter we present the results of the MCMI and MCMII. In Chapter 3.4 the conclusion of the MCMs is discussed, in Chapter 3.5 the interim statements are presented and in Chapter 3.6 the closure document is presented and is discussed in the context of the other outputs and results of this case study.

3.2.1 Clarification of Values and Criteria Used by the Participants

In this chapter light should be shed on the participants' understanding and use of values and other criteria. In the first sub-chapter the value discussion's output relevant for that is presented. In the second sub-chapter observations made by moderators or observers in regard to participants' understanding and use of values and criteria are documented.
In contrast to the value discussion on biometrics the participants did not produce a common description regarding the values dealt with in the discussion. Therefore the only output of the value discussion in this case is the analysis of the participants' answers in the value discussion questionnaire. The qualitative questionnaire focussed on the "usual suspects", which were identified within the scope of VDSPI in the context of pathogen research, namely "Sicherheit[26]" (security/safety), "freedom of research" and "progress". In the analysis the analogous answers which were expressed by all or at least most of the participants are summarised. If only a minor group expressed a certain statement, the statement is qualified by

[26] Note: As the discussion and the deliberations of the science parliament took place in German, the concept of the value "Sicherheit" was used by the participants. "Sicherheit" is the German term for security as well as for safety. In the course of the parliament participants of the pathogen's committee were introduced to these distinctions and to some extent adopted the English concepts by using the terms security and safety.

the number of the participants who expressed it. The interpretation of the participants' statements is aimed at the probable intended meaning of the statement. In the case of uncertainty the ambiguous meaning is accommodated by qualifications such as "(3-4 participants)" which indicates that regarding one of the four statements no certainty is given, but that it offers this interpretation too.

The value discussion took place after the first run of the MCM on "Dual Use Dilemma in Pathogen Research", thus it is rather a representation of what the participants thought at the beginning of the event. Eleven participants took part in it. The output of the value discussion is presented at the beginning of the "Dual Use Dilemma in Pathogen Research" chapter to promote the readers' understanding of how the participants probably understood some of the values used within the scope of the MCMs.

3.2.1.1 Values Regarding Pathogen Research

In the following chapter the participants' predominantly expressed views and perceptions in regard to values and in regard to the discussed research field pathogen research are summarised. It is a summary as well as an interpretation of the non-standardised answers which the participants gave to the qualitative questionnaire of the value discussion. The German questionnaire as well as the answers can be found in the Appendix (Chapter II.2).

<u>How did the participants perceive pathogen research and pathogen issues?</u>

In pathogen research the participants on the one hand saw the potential to prevent infections and pandemics or at least to better protect against them, but they stated too that pathogen research does not necessarily improve health, safety and security standards.

The majority of the participants (six) did not feel endangered or threatened by pathogens. They had faith in the Austrian security and safety standards, in scientists to act reasonably and in their own immune system. The minority (three-four participants) had concerns because pathogens are everywhere and there is always a residual risk (human beings are loose cannons and safeguarding against pathogenic germs escaping from the laboratory is beyond control).

<u>What did security/safety mean to the participants and how did they understand the term?</u>

Security/Safety meant that civil population and researchers are protected against dangers by regulated and sound procedures. Further security/safety was defined as a feeling of not having

to be afraid of uncontrollable and dangerous occurrences. To the participants it meant being protected in the case of threat and not being concerned regarding basic needs, human rights and overall conditions.

As issues which endanger personal security/safety and as threats against which protection is needed participants mainly identified:

Diseases caused by germs, viruses, bacteria, etc., criminals, terrorists, natural disasters and atomic accidents.

According to the participants security and safety issues exist nearly everywhere. Responsible for this are among others criminals and also careless, disrespectful and thoughtless people who do not adhere to regulations.

Regarding security/safety specifically in the context of pathogen research

According to the participants security/safety in this context meant sterile and sound working and doing research only in secure and self-contained areas. It meant making sure that pathogenic germs on which research is done do not leave the secured environment of the laboratory.

How freedom of research (FoR) was understood by participants

The vast majority (eight to ten) of the participants explicitly understood freedom of research as the opportunity to do research without ethical or morals restrictions and considerations. Only one participant defined freedom of research as “the ability to research and test without restrictions, but under consideration of ethical and moral values”.

According to the participants FoR has the function of fostering new developments, to achieve and accelerate progress and to increase efficiency. For one participant FoR is the *“conditio sine qua non”* for research. Nearly all participants saw FoR as endangered.

The normative approach of the participants to FoR

There was no predominant view noticeable with respect to against what and how and FoR should be protected. Two participants thought that no protection is necessary, one was quite sceptical whether or not FoR has to be protected and three participants voted for protecting it against religion, against people, whose only focus is profit and power, and against the media, respectively.

FoR would in no way be tolerable, acceptable and justified according to the participants, if it

was abused by the military, if it trespassed on ethical or moral principles, abused human rights or threatened to extinguish human kind.

How did the participants explain, understand and perceive progress?

First and foremost participants identified progress with technological advancement, new and innovative technologies and the development of new technologies. These new technologies were perceived as possibilities to make working life easier and enable new scientific findings as well as a resource for new gadgets.

Overall the group was quite equally divided, for one half the dangers and challenges caused by progress and the responsibility which goes with that, were the main consequences of progress, the other half outlined opportunities, convenience and the problem-solving capacities of progress. Nevertheless all participants agreed on the potential dangerousness of progress.

Regarding whether or not there is an ethical or moral progress of human kind most participants advocated a relativistic position; “there are developments, whether or not it is progress depends on how you look at it”.

Furthermore the group was also quite divided on the subject whether progress is unstoppable. Opinions ranged from progress “comes no matter what”, “comes no matter what presuming that we are talking about societies with free markets and competition between corporations” and “comes only under certain conditions”. Progress for most participants was the end and the means as well.

3.2.1.2 Criteria for Scenario Assessment

The participants collected possibly relevant criteria in the group discussion which was the third step of the MCMI. The participants were free to individually adopt further or alternative criteria for assessing and weighing in the course of the MCM.

In this chapter the observations of the moderators and observers regarding how some of criteria which were used by the participants were understood by them, are listed.

Regarding ambiguous criteria which were not discussed in this chapter we have no further indications on how participants understood them exactly.

Prosperity and capitalism were in some parts used synonymously. For some of the participants capitalism seemed to be a condition for prosperity.

Education and jobs were seen to be directly connected by some participants. This means that education was reduced to a means for filling a job-related position.

Constraints participants understood as constraints in regard to research. For the majority it seemed to be a negatively connoted criterion.

Panic the participants understood as the probability of a panic breaking out within the scope of the scenario. Panic was a negatively connoted criterion.

The criterion **two-class society** was understood as the end of the development of an increasing disparity between the rich and the poor. The criterion described the probability of a scenario being a two-class society, where the poor are strongly discriminated against compared to the rich in respect to chances, rights and perspectives.

Accountability, accountableness and clarified responsibility were terms used by the participants, a clear distinction regarding in which context they used which term was not noticeable.

Implementation, the participants understood the criterion implementation as a measurement of how easy it is to implement the scenario. It was used synonymously with feasibility.

Tolerance was mainly understood as tolerance to research and to freedom of research.

3.2.2 MCMI Analysis on “Dual Use Dilemma in Pathogen Research”:

3.2.2.1 Scenario Description and Scenario Ranking, Pathogen Research I

In this chapter the three scenarios which were elaborated for assessment by the participants, are introduced. Furthermore the results of the participants' scenario rankings are presented.

The Scenarios, MCMI Pathogen Research:

The “Military Focus” Scenario

The scenario “military focus” includes the following assumptions/conditions: pathogen research is carried out on a broad basis and mainly in a military context and in secrecy. The probability of bioweapons-terrorism is low, but there is secret warfare and sometimes 'unexplainable' pandemics occur.
Also the official research (military and civil) which claims to aim at the control of pandemics and to increase protection against bioterrorism and against ABC-attacks in reality serves the goal of promoting military power and is often used as a camouflage for secret military projects. The regulation regarding pathogen research is the affair of individual states. Due to the amount of research in this field drugs are quite cheap.

The “Medical Focus” Scenario

The “medical focus” scenario describes a world in which intensified research in the medical field takes place. Research at military institutions’ does not play a role in regard to pathogens.
In this scenario pathogen research is not directly regulated by the state, but an independent committee of experts, natural scientists, representatives of the economy and jurists is in charge to regulate R&D in regard to pathogens.

The “Embedded Civil Society” Scenario

In the “Embedded civil society” scenario pathogen research regulation is decentralised. Laypersons are integrated into creating and developing ideas. Dissemination of knowledge and informing people regarding S&T and the basics of scientific development have an increased significance. Interdisciplinary committees of experts are the gatekeepers who promote the useful regulation ideas of laypeople to further exploitation/implementation. No military research on pathogens is allowed.

Scenario Ranking, MCMI Pathogen Research

Each participant ranked the scenarios, which were developed beforehand in the deliberation and had been deemed relevant. In the analysis the individual rankings were summarised by giving two points to a scenario each time it was ranked first by a participant, and one point each time it was ranked second by a participant.
The thus totalled individual scenario rankings:

Scenario ranking, MCMI Pathogens	
1.) Medical Focus	18 points

2.) Military Focus	8 points
3.) Embedded Civil Society	7 points
Overall	33 points

Table 14: The results of the Scenario Ranking Pathogen Research, MCMI

Participants clearly favour the medical focus scenario. Preferences between the scenario with the military focus and the scenario with the embedded civil society are almost negligible.

3.2.2.2 Scenario Performance Ratings, Pathogen Research I

In the scenario performance rating each participant rated the performances of the developed scenarios in respect to the criteria which s/he deemed relevant. The rating scores ranged from zero to ten points in regard to a criterion. Ten points implied the highest possible performance, zero points implied no performance in this respect.

In the table below you find the totals of the scenario performance ratings of each scenario in respect to the chosen criteria.

Scenario Performance Ratings, MCMI Pathogen Research			
Criteria	Medical Focus	Military Focus	Embedded Civil Society
Security/Safety	83	65	58
Progress	72	54	64
Health	70	23	52
Cost efficiency	63	71	50
Prosperity	58	44	33
Human Rights	57	22	61
Tolerance	51	30	60
Constraints	21	11	11
Jobs	17	28	27
Education	13	7	9
Panic	**8**	**27**	**5**
Risk		**60**	**36**
FoR		31	26
Accountability		36	40
Two-class society		**24**	**8**
Freedom		9	9
Social Justice		3	27
Implementation		14	26
Overall	513 (8)[27]	559 (111)	602 (49)

Table 15: The results of the Scenario Performance Rating Pathogen Research, MCMI

The criteria panic, risk and two-class society, written in bold, were probably used as negative

[27] Note: The numbers in brackets represent the total negative criteria of the particular scenario.

criteria by the participants, that means that a high point rating in this respect does not promote the attractiveness of the particular scenario. If the negative criteria are not included in regard to the overall performance of each scenario, then the embedded civil society scenario performs best with 553 points. The scenario with the medical focus is ranked second with 505 points overall and the scenario with the military focus is ranked third with 448 points. Even if the negative criteria are subtracted the scenario ranking in regard to the overall performance ratings stays the same: embedded civil society (504 points) ahead of the scenario with the medical focus (497 points) and ranked last the scenario with the military focus (337 points).

The ranking of the scenario according to their overall performance ratings does not make sense if the "negative criteria" are included as positive criteria, at least in comparison to the total scenario ranking results of Chapter 3.2.2.1. In this case the scenarios ranked first and last would switch places, due to the fact that the scenario with the medical focus, which is ranked first in "the total individual scenario rankings" of 3.2.2.1 is ranked last regarding the overall performance ratings, if the negative criteria are included. For the embedded civil society scenario the opposite is true.

This implies that the exclusion or even the subtraction of scores belonging to the probably negative criteria is plausible and produces a trend coherent with the results of the scenario ranking of 3.2.2.1.

Comparing the total performance ratings of all three scenarios nevertheless does not seem to indicate any clear trend, this does not change either if ambiguous criteria such as risk, two-class society and panic are excluded or even subtracted from the overall numbers.

This suggests, that the scenario ranking (in regard to which scenario the individual participants prefer) is mainly influenced by certain criteria and not by the total overall performance of each scenario. Therefore in the next step we shed light on the individual strengths of each scenario.

Regarding a characterisation of each scenario by the criteria in which it performs highest

Compared to the other scenarios the medical focus scenario performs best in regard to the criteria security/safety, progress and health. These criteria are also the top performances of the scenario. The performances of the scenario with the military focus are rated best in regard to cost efficiency, security/safety and risk. Risk, as already said, is probably used as a negative criterion in this scenario performance rating and depicts the dangerousness for the civilian

population within the scope of the particular scenario.
According to the participants the embedded civil society scenario performs best in respect to the criteria progress, human rights and tolerance.

Another perspective to look at the scenario performances is to put the criteria in clusters. Of course there are different interpretations possible regarding how to order the criteria and plausible reasons should be offered in respect to the particular order. As in this study we focus on participants' values, our criteria clusters were ordered in respect to noticeable values. Security/Safety and progress which are values on their own and which are "the usual suspects" in the field of pathogen research build the first two clusters. Economy consists of the criteria cost efficiency and prosperity. Of course it could be discussed if economy is a value in itself, as discourse in neoliberal times was much shaped by the principles "If it is good for the economy it is good for the people." and "The free market is the most efficient regulation of society.", we decided to use this cluster for analysis. The cluster freedom consists of freedom, freedom of research and tolerance. The first two criteria are obvious, tolerance was included here, due to the observation that most participants used tolerance in the sense of tolerance for research and for freedom of research.
Health could be a cluster on its own but it is integrated in the catch-all category justice and health due to the reasoning that health and education are human rights and human rights are a dimension or at least an interpretation of justice. Jobs and education were intermingled strongly by participants in the respect that education was for them the condition and guarantee for jobs.

Clustered Scenario Performance Ratings, MCMI Pathogen Research

Criteria	Medical Focus	Military Focus	Embedded Civil Society
Security/Safety	**83**	**65**	**58**
Progress	**72**	**54**	**64**
Economy	**121**	**115**	**83**
Cost Efficiency	63	71	50
Prosperity	58	44	33
Freedom	**51**	**70**	**95**
Freedom		9	9
Tolerance	51	30	60
FoR		31	26
Health and Justice	**157**	**119**	**216**

Social Justice		3	27
Accountability		36	40
Education	13	7	9
Jobs	17	28	27
Human Rights	57	22	61
Health	70	23	52
Negative Criteria	**8**	**111**	**49**
Panic	8	27	5
Risk		60	36
Two-class Society		24	8
Other	**21**	**25**	**37**
Constraint**s**	21	11	11
Implementation		14	26
Overall	513 (8)[28]	559 (111)	602 (49)

Table 16: The clustered scenario performance ratings, Pathogen Research, MCMI

As visible in this table the medical focus scenario performs best in respect to security/safety, economy and progress. Furthermore it also performs best in regard to negative criteria, where a low scoring is the best scoring. In respect to health and justice it performs quite well, in respect to freedom it is surprisingly ranked last.

The military focus scenario performs best in none of the clusters which are built within the scope of this analysis. Moreover it performs worst regarding negative criteria (where a high scoring is the worst scoring). In the scenario ranking it was nevertheless rated a little better than the embedded civil society scenario.

The scenario ranked last in the participants' scenario rankings, embedded civil society, performs best in respect to freedom and justice and health (and moreover also regarding the criterion implementation).

Compared to the military focus scenario, disregarding the criteria where it performs best, it performs better in respect to progress and clearly worse in respect to economy. Furthermore it performs a little worse regarding security/safety (7 points).

Due to the results of the scenario ranking this could be interpreted that economy and security/safety had a big influence in respect to the scenario preferences of the participants. Additionally this thesis can be backed up by the fact that the most preferred scenario, medical focus, performs best in respect to the latter two criteria clusters.

[28] Note: The numbers in parentheses represent the total negative criteria.

3.2.2.3 Criteria Weighing, Pathogen Research I

In this chapter the results are presented regarding how important the participants deemed each (criterion) of the most relevant criteria for assessment.

Remember during this step of the MCM, the participants were asked to rate the criteria, which they deemed most relevant for scenario assessment. Each participant allocated 100 points in all . The more important a criterion was in his/her opinion, the more points he/she allotted to the criterion. As can be noticed, the criteria found and rated by the participants are partly values. In the table below you find the results of criteria weighing of MCMI Pathogens.

Criteria Weighing, MCMI Pathogen Research

Criteria	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	Total
1.) Security/Safety	11	30	50	35	20	10	1	45	15	20	40	277
2.) Health		15	10	13		10	1	40	15	20	20	144
3.) Human Rights	9	15	20	10		30	1		10	20	10	125
4.) Risk	11			15		10	46		15	20	2	119
5.) Progress	12				30			5	10	10	10	77
6.) Freedom of Research		15			30				10	10	5	70
7.) Panic							50					50
8.) Accountability	11			7		10		10			6	44
9.) Tolerance	11			20		5	1		5			42
10.) Cost Efficiency	8	10	15								2	35
11.) Social Justice	10					20					5	35
12.) Jobs		15	5						10			30
13.) Implementation					20							20
14.) Constraints	9					5			5			19
15.) Prosperity	8								5			13
Overall												1100

Table 17: The results of the Criteria Weighing Pathogen Research, MCMI

Security/Safety, health, human rights, risk and progress are the criteria deemed most relevant for scenario assessment by the participants. Security/Safety to which more points have been allotted than to the second- and third-ranked criterion together is clearly deemed as the crucial value in regard to pathogen research.

When setting this into relation with the scenario rankings, it becomes salient that the most favoured scenario, medical focus, performs best in four of these five categories, provided that regarding the criterion risk, as a negative criterion, the lowest score counts as the best score.

In the next step of the analysis of the criteria weighing results we put the criteria in a plausible order, in order to compare if this makes certain value hierarchies visible:

Clustered Criteria, Criteria Weighing MCMI Pathogens	Total
Justice and health-related criteria	**378**

Health	144
Human Rights	125
Accountability	44
Social justice	35
Jobs	30
Security/Safety	**277**
Perception of scenario regarding risk, danger, abuse and possible panic	**169**
Risk	119
Panic	50
Freedom-related criteria	**112**
Freedom of Research	70
Tolerance	42
Progress	**77**
Progress	77
Economy and market-related	**68**
Cost Efficiency	35
Implementation[29]	20
Prosperity	13
Constraints	19

Table 18: The clustered criteria, Criteria Weighing Pathogen Research, MCMI

The clustered criteria table outlines the significance of justice and health-related criteria. On the one hand this is qualified by the character of the justice and health category, which is a kind of catch-all category, but on the other hand it is quite reasonable to construct this cluster this way. [30]

Jobs possibly could be integrated into another cluster and was integrated into the justice and health cluster, as it seemed that participants understood having a job as a result of education and education as already mentioned is a human right. However the criterion jobs, with a total of 30 points, is no criterion which could produce significant tendencies when associated with another cluster.

There are good arguments to integrate risk and panic into the security/safety cluster within the scope of the criteria weighing analysis. The consideration of possible risks and their impacts are quite related to security/safety, due to the nexus that minimizing risks means increasing security and safety standards. Due to the possible ambiguity of the criteria panic and risk, a

[29] Note: Implementation was integrated into the economy and market-related criteria cluster due to the thought, that feasibility and implementation quality depend most of the time on economical conditions.

[30] Note: See the argument in the last chapter regarding the clustered scenario performance ratings.

decision was made to stick with a distinction between the two clusters.

It should be kept in mind that the combined risk/security/safety cluster with 446 points would be by far the criteria cluster with most influence.

However the clustered criteria depict a value landscape, where justice, security/safety and the prevention/minimisation of risk are perceived as the crucial values for scenario and technology assessment by the participants.

3.2.2.4 Criteria Frequency, Pathogen Research I

In this chapter we present the results of the analysis regarding which criterion has been used how often to rate or weigh within the scope of the MCMI on pathogen research.

In the following table the criteria frequency of occurrence within the scope of the scenario performance rating of each criterion and each scenario is presented:

Criteria Frequency Ranking, Scenario Performance Ratings MCMI Pathogens				
Criteria	Medical	Military	Civil Society	Total
Security/Safety	10	11	8	29
Human Rights	8	9	8	25
Progress	8	7	8	23
Accountability	7	8	7	22
Tolerance	7	6	8	21
Cost Efficiency	8	8	5	21
Health	8	5	6	19
Risks	6	7	6	19
Prosperity	7	5	5	17
Jobs	7	4	3	14
Implementation	4	4	6	14
Constraints	5	4	3	12
Freedom of Research	3	4	4	11
Social Justice	2	2	6	10
Panic	3	4	2	9
Two-class Society	1	4	2	7
Freedom	2	1	2	5
Education	3	1	1	5

Table 19: The criteria frequency of occurrence, Scenario Performance Ratings Pathogen Research, MCMI

The criteria most often used to characterize the scenario performance of the three scenarios in the first MCM-round were security/safety, human rights, progress, accountability, tolerance and costs.

The medical focus scenario, as the scenario which was ranked best overall by the participants was rated most often regarding security/safety (ten times), human rights, progress, costs and

health (each eight times). Quite similar were the criteria used and their rating frequency in regard to the least favoured scenario embedded civil society: security/safety, human rights, progress, tolerance (each eight times) and accountability (seven times). Regarding the military focus scenario the criteria most often used for the performance rating were security/safety (eleven times), human rights (nine times), accountability (eight times), costs (eight times) and risk as well as progress with seven times.

When comparing the three scenarios with each other regarding which scenario has been rated with which criteria, the numbers are overall similarly distributed. Only social justice in context of the embedded civil society scenario and jobs in the context of the medical focus scenario are exceptions in this respect. Thus to compare the criteria frequency of occurrence ranking with the individual scenario performance ratings did not make sense as the criteria frequency of the often used criteria is very balanced[31]. The comparison of the totals of the scenario performance rating of all three scenarios regarding each criterion, nevertheless lends itself to tracking down possible tendencies in regard to which criteria are used often although the participants assessed low ratings in these categories.

If we sum up the scenario performance ratings of all three scenarios regarding each criterion we get the following ranking:

1.) security/safety (206 points overall), 2.) progress (190 points), 3.) cost efficiency (184 points), 4.) health (145 points), 5.) tolerance (141 points), 6.) human rights (140 points), 7.) prosperity (135 points), 8.) risk (96 points), 9.) accountability (76 points) and 10.) jobs (72).

The top ten of the criteria frequency of occurrence ranking regarding the scenario performance ratings include the same criteria, but there are some shifts in respect to the rankings:

1.) security/safety (29 times), 2.) human rights (25 times), 3.) progress (23 times), 4.) accountability (22 times), 5.) tolerance (21 times), 6.) cost efficiency (21 times), 7.) health (19 times), 8.) risk (19 times) 9.) prosperity (17 times), 10.) jobs (14 times).

Compared to how often a criterion was used for rating and how many points were allotted to each criterion human rights and accountability were often used to rate scenarios' performances, nevertheless the total scenario performance ratings in these categories are rather mediocre or low. This suggests that although the scenario did not perform well in respect to these two criteria, they were more often taken into consideration to rate a scenario than other criteria with similar overall performance rating scores. This could imply that human

[31] Note: For example the criteria frequency at the scenario performance ratings of the medical focus scenario: security/safety (10 times), human rights, progress, health and cost efficiency, all eight times.
Regarding the embedded civil society scenario: security/safety, human rights, progress and tolerance, all eight times.

rights and accountability were deemed quite relevant for rating scenarios and that the participants expected ideal scenarios to perform better above all in these categories.

In regard to how often participants used a criterion within the scope of the criteria weighing the following table shows the details:

Criteria Frequency of Occurrence Ranking, Criteria Weighing MCMI Pathogens	
Criteria	**MCMI**
Security/Safety	11
Health	9
Human Rights	9
Risk	7
Progress	6
Accountability	5
Tolerance	5
Freedom of Research	5
Cost Efficiency	4
Social Justice	3
Constraints	3
Jobs	3
Prosperity	2
Implementation	1
Panic	1

Table 20: The criteria frequency of occurrence, Criteria Weighing Pathogen Research, MCMI

Security/Safety, health, human rights, risk and progress were the criteria most often used in the weighing. Quite often used were the criteria accountability, tolerance and freedom of research. On the whole this ranking is quite similar compared to the criteria frequency of occurrence results regarding the scenario performance ratings.

Comparing the ranking of criteria deemed relevant in the criteria weighing of MCMI on pathogen research and the criteria frequency ranking of the table above shows the nearly no differences.

The top five ranking is identical. In both cases security/safety is ranked first and ahead of health, human rights, risk and progress. Regarding the frequency ranking accountability, tolerance and freedom of research are ranked sixth (each one was used five times). Regarding the criteria weighing ranking freedom of research, accountability and tolerance are ranked sixth, seventh and eighth, respectively. Cost efficiency and social justice follow ranked ninth and tenth, respectively. This also corresponds to the criteria frequency ranking.

In the criteria weighing the question how often a criterion was selected thus strongly

influences how much importance is accorded to it according to the results of the criteria weighing. The criteria frequency ranking of the criteria weighing and the ranked results of the criteria weighing strongly correspond. There was no indication of any outlier influences.

3.2.3 MCMII Analysis on "Dual Use Dilemma in Pathogen Research"

In the following chapters the results of the MCMII on pathogen research are presented. In Chapter 3.2.3.1 the results of the scenario rankings are presented, Chapter 3.2.3.2 deals with the results of the scenario performance rating of MCMII, in Chapter 3.2.3.3 the results of the criteria weighing are presented and in Chapter 3.2.3.4 the results of the criteria frequency of occurrence analysis are discussed.

3.2.3.1 Scenario Description and Scenario Ranking, Pathogen Research II

As previously mentioned the participants stuck to the presented scenarios within the scope of MCMII and therefore ranked the following four scenarios:

Scenario 1: Total freedom of research in respect to pathogens, marginal security/safety restrictions. (Total Freedom)
In this scenario pathogen research is seen as a generator of progress. Scientists are considered as highly responsible people whose self-control is sufficient to ensure safety and security. Control and surveillance by the state is regarded as expensive, useless and hence as redundant in this field. The remaining risk of pathogen research which is regulated in this manner seems appropriate given the potential, the opportunities and chances of this specific scientific field.

Scenario 2: Extensive freedom of research, limited security/safety restrictions. (Extensive Freedom)
In this scenario pathogen research is described as a field with a huge potential, nevertheless the remaining risk has to be dealt with appropriately. Basic ethical codes and rules have to be prescribed by the lawmaker. Area-wide controls and surveillance by the state are not necessary, but in the light of administrative penalties in case of broken regulations or codes of conduct, spot tests should be sufficient to ensure safety/security and a diligent handling of risks.

Scenario 3: Security and safety are provided by rigid restrictions, freedom of research

regarding pathogen research is limited. (Limited freedom)

In this scenario pathogen research is described as a risky endeavour with various dangerous consequences. Pathogen research therefore has to be regulated by the state and pathogen research projects have to be scrutinised on a case by case basis by the administration as well as by the scientific community. This also implies a diligent regulation of pathogen research including effective surveillance and controlling mechanisms. In the case of neglected regulations the penalties include high monetary penalties for institutions and licence withdrawal for staff members.

Scenario 4: Security and safety is warranted by a total ban on pathogen research. (Total Ban)

Pathogen research as a highly risky endeavour with non-assessable threats for mankind has to be banned. This has to be ensured by area-wide and permanent controls. Infringement against pathogen research regulations is sanctioned draconically, eg with high fines which endanger the survival of an enterprise and long-term prison sentences for responsible individuals.

The results of the scenario ranking

The individual rankings were summarized by giving four points to a scenario each time it was ranked first by a participant, three points each time a scenario was ranked second, two points for ranking third and one point each time it was ranked fourth.

Scenario Ranking, MCMII Pathogen Research	Points
1.) S3 Limited Freedom	52
2.) S2 Extensive Freedom	41
3.) S1 Total Freedom	26
4.) S4 Total Ban	18

Table 21: The results of the Scenario Ranking Pathogen Research, MCMII

As becomes visible the majority of participants within the scope the of scenario ranking preferred solutions which are a balanced trade-off between freedom of research and security/safety. Comparing the total points of the security/safety scenarios (S3 and S4) and the FoR scenarios (S1 and S2) the former has a slight majority. [32] Nevertheless these results should not be over-interpreted, as the differences regarding S2 and S3 in regard to security and freedom of research as well as in regard to the depiction of pathogen research are very nuanced.

[32] Note: S3 and S4 have 70 points, S1 and S2 have 67 points, which makes a difference of three points.

3.2.3.2 Scenario Performance Ratings, Pathogen Research II

To shed light on how the participants perceive the ranked scenarios and to possibly gain some insights into why certain scenarios were preferred by the participants we analysed the scenario performance ratings of each scenario in this chapter. Thirty-three criteria were used by the participants within the scope of the scenario performance rating. To get a better overview we put the criteria in order and built six clusters. Security/Safety, uncertainty and risk, freedom, progress, justice and health and economy. The criteria attractiveness of the scenario and national interest did not seem to fit in any of the criteria clusters. In the following table you find the performance ratings of all four scenarios regarding each criterion:

Clustered Scenario Performance Ratings, MCMII Pathogen Research

Criteria	***S1***	***S2***	***S3***	***S4***	***Total Points***
Security/Safety-related	***63***	***77***	***136***	***168***	***444***
Security/Safety	*15*	*21*	*40*	*48*	*124*
States Duty to Protect	*11*	*7*	*24*	*18*	*60*
War on Drugs/Law Enforcement	*8*	*8*	*1*	*13*	*30*
National Security	*16*	*20*	*30*	*38*	*104*
Food Safety	*11*	*9*	*8*	*15*	*43*
Foreseeability	*2*	*5*	*8*	*26*	*41*
Precaution		*7*	*25*	*10*	*42*
Uncertainty and Risk-related	***135***	***101***	***70***	***37***	***343***
Probability of War	*25*		*12*	*11*	*48*
Risk	*09*	*15*	*3*	*0*	*27*
Societal Risks	*32*	*17*	*11*	*10*	*70*
Abuse	*69*	*69*	*44*	*16*	*198*
Freedom-related	***133***	***115***	***54***	***19***	***321***
Freedom of Research	*108*	*93*	*42*	*13*	*256*
Freedom of Opinion	*7*	*7*	*7*	*6*	*27*
Freedom of Information	*18*	*15*	*5*		*38*
Progress	***86***	***88***	***52***	***20***	***246***
Medical Progress	*86*	*88*	*52*	*20*	*246*
Justice and Health-related	***42***	***57***	***63***	***73***	***235***
Social Justice		*4*			*4*
Health	*19*	*26*	*32*	*23*	*100*
Justice	*7*	*6*	*5*	*1*	*19*
Human Dignity	*4*	*2*	*8*	*19*	*33*
Global Justice		*5*	*1*	*2*	*8*

Accountability[33]	*2*	*8*	*14*	*15*	*39*
Right to Life	*10*	*6*	*3*	*13*	*32*
Economy-related	***48***	***67***	***62***	***25***	***202***
Cost Efficiency	*38*	*37*	*18*	*7*	*100*
Economy			*6*	*5*	*11*
Efficiency	*10*	*8*		*0*	*18*
Prosperity		*7*	*16*	*8*	*31*
Realism		*15*	*22*	*5*	*42*
Attractiveness of the scenario	*43*	*55*	*61*	*7*	*166*
National Interests	*8*				*8*
Overall with negative criteria subtracted	*288*	*358*	*358*	*262*	
Overall[34]	***423***	***459***	***428***	***299***	

Table 22: The results of the Scenario Performance Rating Pathogen Research, MCMII

Characterisation of the scenarios by their highest ratings

In this subchapter we will shed light on the participants' perception of the scenarios in regard to the scenario performances. We characterise each scenario regarding its five highest ratings and in regard to the criteria categories, where it performs best.

The five highest ratings of each scenario on average account for over 50% of all points which were allotted to the scenario and in this sense the top five should give a good overview over the strengths and weaknesses (negative criteria) of each scenario.

"Total Freedom" (S1)

This scenario has the highest performance ratings regarding freedom of research, medical progress, abuse, attractiveness of the scenario and cost efficiency. Regarding freedom of research and abuse (equal to S2) it has the highest ratings in this category compared to the other scenarios, where the high rating in the category abuse does not make the scenario attractive to the participants, due to its negative character.

"Extensive Freedom" (S2)

Freedom of research, medical progress, abuse, attractiveness of the scenario and cost efficiency were the five highest ratings of the extensive freedom scenario. An identical ranking compared to S1. The criteria where S2 performs best compared to the other scenarios are medical progress and abuse. Regarding abuse S1 and S2 have equally the highest ratings.

[33] Note: Accountability subsumes also responsibility, responsibilities, accountableness and clarified responsibility.

[34] Note: Again the negative criteria of the cluster „Uncertainty and Risk" are not included in the analysis of the overall scenario performance ratings.

For criteria with a rating of less than 20 points this kind of comparison hardly makes sense.

When comparing S1 and S2 regarding their top ratings there are hardly any noticeable differences. S1 tends to have more focus on freedom of research but in spite of this the participants did not deem its performance in regard to progress higher than S2's performance in this respect.

"Limited Freedom" (S3)

Attractiveness of the scenario, medical progress, abuse, freedom of research and security/safety are the criteria with the highest ratings in respect to S3. Compared to the other scenarios S3 performs best regarding attractiveness of the scenario and health.

Compared to S1 and S2 it is salient that security/safety is a top five criterion and attractiveness of the scenario is rated higher than medical progress, freedom of research and abuse. So possibly the high overall performance in combination with high security/safety standards and, in comparison to S1 and S2, low risks make this scenario so attractive for the participants, who ranked it first.

Total Ban (S4)

Overall the performance ratings of this scenario are quite low. The highest performance ratings of this scenario are in regard to security/safety, national security, foreseeability, health and medical justice. Regarding security/safety and national security S4 performs best compared to the scenario ratings of the other scenarios.

What do the clustered scenario performance ratings tell us?

Overall Performance

The total performance ratings of each scenario show that there is little difference between the total freedom, extensive freedom and limited freedom scenarios. Only the total ban scenario clearly performs lower.

Scenarios	*S1*	*S2*	*S3*	*S4*
Overall with negative criteria subtracted	*288*	*358*	*358*	*262*
Overall[35]	*423*	*459*	*428*	*299*

[35] Note: The negative criteria of the uncertainty and risk cluster are not included in the analysis of the overall

Table 23: The scenarios' overall-performance, Pathogen Research MCMII

The extensive freedom scenario which is ranked second in the scenario rankings performs best overall. Limited Freedom, the participants' favourite in the scenario rankings, is second. Total freedom and total ban are ranked third and fourth in both rankings.

If the scores of the negative criteria of the uncertainty and risk cluster are subtracted from the overall performance ratings the ranking becomes very close to participants' scenario ranking results. Limited freedom and extensive freedom both with 358 points are ranked first equal, Total freedom and total ban are ranked third and fourth, respectively, as in the results of the participants' scenario ranking. This seems to be the most suitable and plausible way to interpret the scenario rankings in light of the scenario performance ratings.

The scenarios' performances regarding each cluster

The total scenario performances of all four scenarios regarding the criteria clusters were highest in the respect to security/safety, uncertainty and risk and freedom-related criteria. Taking a look at the percentages and comparing the performances of all four scenarios in these criteria cluster makes disparities clearly visible.

Security/Safety

In regard to these criteria the extensive freedom scenario (S1) performs a little better than the total freedom scenario (S2). Limited freedom (S3) clearly performs better than these two scenarios, it has on average twice as much points as S1 and S2. Comparing the total ban scenario (S4) to the limited freedom scenario there is again a gap in respect to the security/safety scores, the performance of the total ban scenario is rated more than 20% higher.

Scenarios	S1	S2	S3	S4
Security/Safety-related	*63*	*77*	*136*	*168*

Table 24: Security/Safety, scenario performances, Pathogen Research MCMII

Regarding security/safety we thus see clear performance differences comparing the four scenarios. S1 and S2 make up for 140 points, S3 and S4 account for 304 points, thus are rated, strikingly expressed, 'twice as safe and secure'.

Uncertainty and Risk

Regarding uncertainty and risk the added (negative) performance of S1 and S2 is more than

scenario performance ratings.

twice as high compared to the added (negative) performance of S3 and S4.

Scenarios	S1	S2	S3	S4
Uncertainty and Risk-related	135	101	70	37

Table 25: Uncertainty and Risk, scenario performances, Pathogen Research MCMII

The differences between total freedom, extensive freedom, limited freedom and total ban are at regular intervals of approximately 30 points.

Freedom

The differences between S1 and S2 are quite small, as are the differences between S3 and S4.

Scenarios	S1	S2	S3	S4
Freedom-related	*133*	*115*	*54*	*19*

Table 26: Freedom, scenario performances, Pathogen Research MCMII

The total freedom and extensive freedom scenarios nevertheless clearly perform better than the other two. S1 and S2 account for 248 points, S3 and S4 for only 73 points. The disparities in this cluster category thus are especially large.

As 256 of 321 points in this cluster are points from the freedom of research criterion, the bad performance of the total ban scenario is easily traceable.

Progress

The cluster progress consists of only one criterion: medical progress. Due to the high scores regarding that value and due to the view that medical progress would not fit into any other cluster, it was valued as a cluster in itself.

Scenarios	S1	S2	S3	S4
Medical Progress	*86*	*88*	*52*	*20*

Table 27: Medical Progress, scenario performances, Pathogen Research MCMII

S1 and S2 perform definitely better than S3 and S4.

Most salient is that the total ban scenario is clearly identified as the scenario where medical Progress is hampered strongly.

Justice and Health

As already discussed in the chapter “Results of the Criteria Weighing MCMI Pathogen Research”, justice and health is some kind of catch-all category. To include human rights as health, human dignity and right to life in the justice cluster is explained by the inference that human rights are a dimension or interpretation of justice. The concepts of accountability, responsibility and clarified responsibilities introduce the idea that one person has to justify

his/her actions to another person and in the case of misconduct or crime has to face the consequences, for instance punishment.

Regarding the clustered performance ratings in respect to justice and health, the total ban scenario performs best. Limited freedom is closely ahead of extensive freedom, and the total freedom scenario performs worst. The top ranking of the total ban scenario is owed in large part to the ratings regarding human dignity and right to life.

Scenarios	S1	S2	S3	S4
Justice and Health	***42***	***57***	***63***	***73***

Table 28: Justice and Health, scenario performances, Pathogen Research MCMII

Economy:

Regarding economy the extensive freedom scenario performs best. The limited freedom scenario is ranked second. There is a gap of 14 points to the scenario “Total freedom” on rank three and the total ban scenario is ranked last.

Scenarios	S1	S2	S3	S4
Economy	***48***	***67***	***62***	***25***

Table 29: Economy, scenario performances, Pathogen Research MCMII

Summarising: Regarding security/safety and uncertainty and risk (negative criteria) the scenarios limiting pathogen research clearly perform better. Furthermore they perform better in respect to justice and health.

Not surprisingly the scenarios promoting freedom not only perform clearly better in respect to freedom but also in respect to progress and economy.

Overall the balanced designed scenarios and the balanced rating of the participants as well as their balanced ranking (comparing S1 and S2 with S3 and S4) does not make any increased influence regarding one of the discussed values obvious. Security/safety, uncertainty and risk, freedom and progress all seem to be quite influential.

Regarding the scenario comparison in respect to the top five criteria and considering the overall rating there might be a noticeable trend, that if the overall performance of scenarios is similar, the one with a higher security/safety rating is preferred.

3.2.3.3 Criteria Weighing, Pathogen Research II

To gain more insights into the hierarchy of values, which are relevant in the context of pathogen research we now analyse the results of the criteria weighing.

As already explained the participants allocated 100 points to the criteria they deemed relevant for assessing and deciding on pathogen research. In the following table you find the weighing results:

Criteria Weighing MCMII Pathogen Research													
Criteria	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**	**P12**	**Total**
Medical Progress	30		50	10		20	25	30	30	20	20		**235**
Freedom of Research		20	5	10	20	30	25	15	20	20	20	15	**200**
Security/Safety		20		15		30	25		20		15	15	**140**
Cost Efficiency		20				20	15	20					**75**
Human Dignity			25									45	**70**
Abuse	5	20	10					15		15			**65**
National Security			5		40			20					**65**
Societal Risks	5		5	15						20		5	**50**
Health	35			10									**45**
Attractiveness of Scenario		20		5	10					10			**45**
Freedom of Opinion	20											20	**40**
Efficiency							5		30				**35**
Accountability				15	10						10		**35**
Prosperity				5							20		**25**
State's Duty to Protect					10						15		**25**
Precaution	5									15			**20**
Probability of War				10									**10**
Food Safety					10								**10**
Foreseeability							5						**5**
Justice				5									**5**

Table 30: The results of the Criteria Weighing Pathogen Research, MCMII

Clearly medical progress ranked first and freedom of research ranked second are the criteria deemed most relevant by the participants. With a gap of sixty points the value security/safety is ranked third. These three criteria or values are the only ones with three digit numbers.

As the security/safety-related criteria are very fragmented, we will again build clusters to shed light on value relevant tendencies. The decision to integrate precaution and foreseeability into the security/safety-related cluster is based on the reasoning that precaution and foreseeability generate security and safety. Probability of war as a negative criterion fits best in the uncertainty/risk-related cluster.

Clustered Criteria, Criteria Weighing MCMII Pathogen Research													
Criteria	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**	**P12**	**Total**
Security/Safety-related criteria													**265**
Security/Safety		20		15		30	25		20		15	15	140
National Security			5		40			20					65
State's Duty to Protect					10						15		25

Precaution	5									15			20
Food Safety					10								10
Foreseeability							5						5
Freedom-related criteria													**240**
Freedom of Research		20	5	10	20	30	25	15	20	20	20	15	200
Freedom of Opinion	20											20	40
Medical Progress	30		50	10		20	25	30	30	20	20		**235**
Justice and Health-related criteria													**155**
Human Dignity			25									45	70
Health	35			10									45
Accountability				15	10						10		35
Justice				5									5
Economy-related criteria													**135**
Cost Efficiency		20				20	15	20					75
Efficiency							5		30				35
Prosperity				5							20		25
Uncertainty/Risk-related criteria													**125**
Abuse	5	20	10					15		15			65
Societal Risks	5		5	15						20		5	50
Probability of War				10									10

Table 31: The clustered criteria, Criteria Weighing Pathogen Research, MCMII

The clustered criteria show security/safety-related criteria as most relevant altogether. Freedom-related criteria and medical progress rank second and third, respectively, are also very highly rated and quite in the range of security/safety.

Freedom-, security/safety- and uncertainty/risk"[36]-related criteria account for 630 of the 1200 points, thus for over 50% of the total. This suggests that not surprisingly the trade-off between security/safety and freedom is the crucial orientation point for deciding on and assessing pathogen research.

Considering that the total freedom and extensive freedom scenarios perform on average better regarding freedom, medical progress and economy, and the limited freedom and total ban scenarios performed better in regard to security/safety, justice and health, and uncertainty/risk might suggest another comparison.

In the criteria weighing on the one hand freedom-, medical progress-, and economy-related criteria with a combined total of 610 points, and on the other hand security/safety, justice and

[36] Note: Due to the nexus of security/safety and risk we include the cluster in the attempt to make visible the significance of the trade-off between freedom and security/safety .

health and uncertainty/risk with 545 points, are equal but quite within the range to draw some kind of equilibrium.

This could possibly be interpreted as technophilia and technophobia.

3.2.3.4 Criteria Frequency, Pathogen Research II

In this chapter we analyse which criteria have been used how often to rate certain scenarios regarding their performance. Furthermore we analyse which criteria were used how often in the criteria weighing. This is done with the goal of finding distinctive features and tendencies. In the table below you find an overview over how often each criterion was used within the scope of the scenario performance rating regarding each scenario as well as overall:

Criteria Frequency Scenario Performance Rating MCMII Scenarios					
Criteria	Sc I TF	Sc 2 EF	Sc 3 LF	Sc 4 TB	Total
Freedom of Research	11	11	10	10	42
Medical Progress	10	11	10	10	41
Abuse	8	8	11	10	37
Attractiveness of the Scenario	9	8	9	8	34
Security/Safety	5	4	5	5	19
National Security	5	5	4	4	18
Cost Efficiency	4	5	3	3	15
Probability of War	4	3	3	5	15
Health		4	5	4	13
War on Drugs/Law Enforcement	3	3	3	3	12
State’s Duty to Protect	4	2	3	2	11
Societal Risks	3	3	2	3	11
Accountability	3	3	2	2	10
Realism	2	2	3	2	9
Precaution	2	2	3	1	8
Freedom of Information	2	2	1	3	8
Food Safety	2	2	2	2	8
Human Dignity	2	1	1	2	6
Right to Life	2	1	1	2	6
Prosperity	1	1	2	1	5
Freedom of Opinion	1	1	2	1	5
Risk	1	2	1	1	5
Efficiency	1	1	1	1	4
Justice	1	1	1	1	4
Foreseeability	1	1	1	1	4
Global Justice	1	1	1	1	4
Economy			1	1	2
National Interests	1				1
Social Justice		1			1

Table 32: The criteria frequency of occurrence, Scenario Performance Rating Pathogen Research, MCMII

Taking a look at the table it is quite salient that the ratings are very constantly allocated: It seems that there are no real differences according to which scenario has been rated with which criteria. The rankings of the scenarios regarding the criteria frequency of occurrence within the scope of the rating appears almost identical.

Overall freedom of research (42x), and medical progress (41x) have been used most often, these are also the criteria deemed most relevant by the participants in the criteria weighing. Abuse (37x) is ranked third regarding the overall criteria frequency of occurrence, closely followed by attractiveness of the scenario (34x). Security/safety (19x) follows in fifth place.

Taking a look at the ranking of criteria where the scenario performance ratings of all four scenarios in a category are summed up shows the same picture:

1.) freedom of research (256 points), 2.) medical progress (246 points), 3.) abuse (198 points), 4.) attractiveness of the scenario (166 points) and 5.) security/safety (124 points).

Due to the very balanced use of the criteria and due to the correlation between the ranking of the total scenario performance ratings and the ranking of the overall criteria frequency of occurrence in regard to the rating there are no indications for any distinctive tendencies in regard to certain criteria.

Criteria Frequency, Criteria Weighing:

The criteria deemed as most important in the criteria weighing by the participants namely medical progress, freedom of research and security/safety are also top three regarding the criteria frequency of occurrence within the scope of the criteria weighing. The details regarding each criterion you find in the table below. The estimated importance of each criterion evaluated in the criteria weighing tends to correspond to its frequency of occurrence within the scope of the weighing. Only human dignity is an exception; although it was used only twice in the weighing it is the fifth ranked criterion of the weighing due to the fact that participant number twelve allotted it forty-five points, which is the second highest rating of a criterion within the scope of the criteria weighing of the MCMII on pathogen research.

Criteria Frequency of Occurrence, Criteria Weighing
MCMII Pathogen Research

Criteria	MCMII
Freedom of Research	11
Medical Progress	9
Security/Safety	7
Abuse	5

Societal Risks	5
Attractiveness of Scenario	4
Cost Efficiency	4
National Security	3
Accountability	3
Health	2
Freedom of Opinion	2
Prosperity	2
Precaution	2
Human Dignity	2
State's Duty to Protect	2
Efficiency	2
Probability of War	1
Justice	1
Food Safety	1
Foreseeability	1

Table 33: The criteria frequency of occurrence, Criteria Weighing Pathogen Research, MCMII

3.2.3.5 Sideswipe-Scenario, Pathogen Research II

At the end of the MCMII on pathogen research a new scenario was presented to the participants. The goal of presenting a new scenario to the participants is to test if the participants are unsettled in their value judgments by new views and trains of thoughts. The following scenario was developed originally within the scope of WP5 and was adapted a little for the MCMII on pathogen research.

The following scenario was mainly chosen as a sideswipe-scenario, due to the fact that the relevance of global justice and possible negative effects of excluding certain countries from pathogen research with high dual use potential was not discussed by the participants in the deliberations. The discourse was more informed by the idea of preventing possibly dangerous knowledge from being published.

Sideswipe-Scenario Creating Terrorists: Dual Use Dilemma of Pathogen Research

One and the same piece of scientific research sometimes has the potential to be used for bad as well as good, whereas in individual cases it is often highly subjective, if scientific knowledge is used in the pursuit of reputable or amoral goals.

The idea of a possible use of results of pathogen research for biological warfare or bioterrorism in recent years has generated more and more attention, fear and concern. Due to these concerns researchers from countries such as Iran, Afghanistan or North Korea are increasingly excluded from research institutes in the West working with pathogens that have a dual use potential. These politics of exclusion may result in the situation that existing scientific know-how in one of those countries is not available – given the realistic case their regime does not cooperate – and an epidemic could claim many human lives. Victims of this epidemic would mainly be members of the already suppressed civilian population. Knowing that on the one hand western countries would have the knowledge and

technologies to prevent this epidemic and on the other hand and worse would have been able to unintentionally (eg by an accident) or on purpose spread the disease, could lead to a radicalisation of the civilian population as well as to the radicalisation of certain scientists.

Do your priorities regarding the scenario ranking or the criteria weighing change in the light of the societal and political developments described above? Why?/Why not?

Responses to the sideswipe scenario questions

Six of the twelve participants stated that in light of this scenario value judgments change, due to the fact that global justice, human rights and freedom of information become more important. This assessment was not backed up by any elaboration or justification. Only one participant argued that unfair dependencies and a restrictive patent law could even result in war.

As a trend the context of this new scenario may be relevant to the participants, who answered "yes", nevertheless we have no evidence for that.

The other six participants mainly advocated the position that this scenario is not relevant, they stated that basically it does not change anything, at least it does not change the criteria deemed as relevant within the scope of the criteria weighing.

In the boxes below you find the translation of the individual responses of the participants.

1.) No:

- It has no influence on the attractiveness of the scenarios. In my opinion this issue is not relevant, because the other scenarios do not refer to it.

- In scenario one every kind of research is promoted, therefore there is no discrimination. In scenario four all pathogen research is banned, therefore again there is no discrimination. However, in my opinion these considerations are exaggerated, we are living in an age of equality and therefore the places where research takes place are suitably dispersed.

-No, I did not rate criteria which are linked to this issue. The criterion linked to this issue would be global justice.

-Basically it does not change anything, except maybe the criteria global justice, human dignity, national interest and probability of war.

-No. It should be possible to do research abroad, but pathogen research should not take place in regions of crisis. This way the abuse by conflicting parties should be prevented.

-Global justice and probability of war are affected by this scenario, but I did not include them into my considerations and ratings before.

2.) Yes

- Global justice is a criterion, which has gained importance hereby. Or social/distributive justice.

- Human rights and global justice are rated/weighed higher. **(3 times)**

- Global justice becomes more important and freedom of information has to be considered too.

- Probability of war, "knowledge is power" - if knowledge and information is restricted it is possible that "power divides" and dependencies come into existence, which could easily cause war.
Global justice: possibly at the beginning it affects only one or two countries, but at least everything will be regulated by licenses and patents. Big countries will have a superiority and this results in unfair distributions and justice regimes. Freedom of information would not be existent.

3.2.4 Summary of the MCM Results on Pathogen Research: Identified Preferred Scenarios, the Underlying Driving Values and Emerging Value Dynamics.

3.2.4.1 Explaining Participants' Scenario Preferences by the Scenario Performance Ratings

In the MCMI participants decided to select three scenarios, which they deemed relevant for assessment.

Thereby they clearly preferred the scenario medical focus37 to the other two scenarios, which are ranked quite similarly. In the medical focus scenario noteworthy pathogen research takes place only in the medical field and the state plays a minor role in elaborating pathogen research regulations. The regulation of pathogen research should be achieved by independent committees which consist of experts such as natural scientists, jurists and representatives of the economy.

According to the participants the medical focus scenario performs above all regarding the criteria security/safety, progress, health, cost efficiency and prosperity. The medical focus scenario's performance is rated in four of its five top criteria categories better than the other two scenarios. Only the military focus scenario's performance is rated slightly better in respect to cost efficiency.

When taking a look at the analysis of the clustered criteria the scenario performs best in respect to security/safety, progress, economy and in respect to negative criteria[38]. In respect to the cluster freedom it was ranked last, regarding the cluster justice and health it was rated in the middle.

The military focus scenario has its highest performances in regard to cost efficiency, security/safety, progress and prosperity. Furthermore it has the highest rating regarding risk which in this case means it performs worst in this respect. Analysing the clustered criteria performances it becomes obvious that this scenario has by far the highest rate in regard to negative criteria, which implies that the participants saw it as a rather dangerous and undesirable scenario in this respect. Regarding the clusters freedom, economy and security/safety the scenario is ranked second.

The scenario embedded civil society has its highest performances in regard to progress, human rights, tolerance, security/safety and health. Regarding human rights and tolerance it even performs best compared to the other two scenarios.

Taking a look at the clustered criteria reveals that this scenario performs by far the best in respect to freedom, and health and justice. Its risk rate (negative criteria) is moderate and it is not far off in regard to medical progress. But it is rated last in regard to economy and security/safety, although only with a seven point gap to the military focus scenario.

Taking into consideration that in regard to the overall ranking totals the embedded civil society scenario is clearly ranked first suggests that the criteria where it performs notably well are not the criteria which the participants assessed as very relevant, and that the criteria where

[37] Note: The scenario medical focus was rated with 40 points by the participants, military focus was rated with 30 points and embedding civil society was rated with 29 points.

[38] Note: In this respect a good performance means a low rating.

it did not perform well were the crucial criteria for most participants.
This would imply that security/safety and possibly economy were crucial values for the participants when assessing the scenarios, whereas health and justice including tolerance and human rights played a subordinate role regarding participants' scenario preferences within the scope of MCMI.

Another interpretation of the participants' preferences is based on the observation that scenarios which suggested to up-value civil society and laypersons in the course of the policy cycle or to give military agencies capabilities/capacities for pathogen research were not appreciated within the scope of the scenario ranking of MCMI. Furthermore participants' preferences were mainly based on the value security/safety. The special performance of the medical focus scenario in regard to security/safety was that in it independent experts were shaping the regulation of pathogen research. Possibly the crucial angle for participants was the question, whom to trust?, and they preferred independent experts to military and to laypersons/civil society.

In MCMII four scenarios were presented to the participants. The scenarios were arranged around the value trade-off medical progress and freedom of research on the one side and security/safety on the other side. The participants clearly preferred the limited freedom and extensive freedom scenarios. Basically these two scenarios describe pathogen research as a risky endeavour which also possesses great potential. Limited freedom focused more on the first aspect, extensive freedom more on the second one. In comparison to the diametrically-opposed total ban and total freedom scenarios they are based in the middle ground.
Both scenarios define the state as a central actor in regard to regulating pathogen research. In the favoured scenario, limited freedom, the regulation and controls are rather strict.
The limited freedom scenario is probably preferred most by participants, due to its performance regarding the criteria medical progress, freedom of research and security/safety. Additionally its risk-related rating was not low, but was at least better than that of the scenarios which were ranked second and third in the scenario rankings. The scenario does not perform best in any criteria cluster category, but performs best regarding the criteria state's duty to protect, precaution, health, prosperity, realism and attractiveness of the scenario.
The fact that compared to the other scenarios it does not perform best in regard to any clusters is due to the fact that in the categories where the participants seem to see the strengths of

scenario, the total ban scenario, which is ranked last in the scenario rankings, performs even better.

The extensive freedom scenario which was ranked second in the participants' scenario ranking, performed mainly regarding the criteria freedom of research, medical progress and cost efficiency. In addition it has, equal with the total freedom scenario, the worst rating in respect to abuse. Regarding uncertainty/risk-related criteria it has the second worst performance. In respect to the economy-related cluster and the criterion medical progress this scenario performs best.
Similar to the extensive freedom scenario, the total freedom scenario mainly performs in respect to the criteria freedom of research, medical progress and cost efficiency. This scenario performs best regarding the freedom cluster and has the worst performance in regard to the uncertainty/risk cluster.
The total ban scenario performs best in regard to security/safety, justice and health (if we split it up in regard to justice alone) and in regard to risk minimisation. It has the best performance in regard to the criteria security/safety and national security. It clearly performs worst in regard to the freedom cluster. Regarding the total overall performance ratings it is ranked last.

When directly comparing the scenarios with each other, then limited freedom is probably preferred to extensive freedom due to its higher performance in regard to security/safety and risk-minimisation whereas compared to the overall performance it still performs on a competitive basis. Participants are ready to accept deductions in regard to progress and freedom in favour of the just explicated higher performance.
Extensive freedom is preferred to total freedom due to the fact that it performs better in regard to all clusters, which do not have to do with the trade-off between risk, security/safety and freedom. Furthermore compared to total freedom, extensive freedom provides more security/safety and additionally less freedom and also less risk.
Total freedom and total ban as the two poles of this scenario arrangement are antithetic in nearly every aspect of the rating. Economy-related criteria are a small exception. The most plausible reason to explain why total freedom is preferred to total ban are the total overall ratings, where the former performs better, mainly in regard to medical progress.

Freedom which, in the context of these scenarios, is mainly freedom of research is in regard to the participants' scenario preferences clearly a subordinate or instrumental value. There is no

noticeable influence. Furthermore it seems that in regard to the ratings the clusters freedom and uncertainty/risk are the inverse of each other.

Furthermore there is no noticeable impact of the cluster justice and health, no matter if you split justice and health up or not.

Thus regarding the participants' scenario preferences security/safety and uncertainty/risk seem to be most influential, and medical progress and economy may play a minor role.

3.2.4.2 Which Values Do the Participants Deem Relevant?

While security/safety was deemed as the most relevant value within the scope of the criteria weighing of the MCMI, economy-related criteria were only also-rans.

Security/safety, health, human rights, risk and medical progress were deemed as the most relevant individual criteria. Regarding four of these five criteria the most favoured scenario medical focus performs best. This coherence regarding the performance of the scenarios ranked first in the scenario ranking and the results of the criteria weighing suggests that health as the second most relevant value should perhaps not be mixed with justice in one cluster. At least when considering the subordinate role the justice and health cluster has in regard to influencing participants' scenario preferences according to the analysis in the last chapter. Changing the clustered scenario analysis in this respect creates the following table:

Modified Clusters Criteria Weighing MCMI Pathogen Research	**Total**
Security/Safety	**277**
Justice-related Criteria	**234**
Uncertainty/Risk	**169**
Health	**144**
Freedom-related Criteria	**112**
Progress	**77**
Economy and Market-related	**68**

Table 34: The clustered criteria, Criteria Weighing Pathogen Research, MCMI, modified version.

Security/safety, justice, uncertainty/risk, health and freedom are the clusters which are deemed most relevant. Progress and economy which seemed to play quite a role within the scope of the scenario performance ratings have a subordinate role here.

Integrating the uncertainty/risk cluster into the security/safety cluster shows the following picture:

Security/safety plus risk with 446 points get 40,5% of all allotted points. Justice gets 21,3%, health gets 13,1%, freedom 10,2% and progress 7%.

The values freedom and progress, which tend to promote more liberal pathogen research regulations and frontier research, are clearly subordinated to other values especially to security/safety, according to this analysis.

In the MCMII the criteria deemed most relevant by participants were medical progress (235 points), freedom of research (200 points) and security/safety (140 points). These three criteria account for 47,9% of the total allotted points. Cost efficiency is ranked fourth, human dignity is ranked fifth and abuse is ranked sixth.
In regard to clustered criteria security/safety criteria with 265 points (22,1%) Freedom-related criteria with 240 points (20%) and medical progress with 235 points (19,6%) account for 61,7%. Security/safety combined with uncertainty/risk account for 32,5%. The trade-off between progress and freedom, and security/safety and risk would even account for 72,1%.
Justice and health[39]-related criteria with 155 points accounts for 12,9% and economy-related criteria with 135 points account for 11,2%.
Following up the interpretation of the results of the scenario performance rating the dominant role of security/safety and uncertainty/risk is corroborated, furthermore we have evidence that progress has a prominent role and the analysis that freedom plays only a subordinate or instrumental role is not refuted, but seems less probable in the light of these criteria weighing results.
Health, which in this analysis was merged with justice, does not play a significant role. This could have to do with its relatedness to safety and progress in respect to pathogen research. On the one hand progress could promote health by new treatments and new drugs, on the other hand new pathogens could deliberately or accidentally emerge through pathogen research.

3.2.4.3 Comparing and Summarising the Different Results of the MCM on Pathogen Research in Regard to Value Coherence and Value Dynamics

Within the scope of the criteria weighing of the MCMI fifteen criteria have been used by the participants, within the scope of the criteria weighing during the MCMII the participants used twenty different criteria. This indicates that the input by expert hearings, deliberation and further background information supported the participants in developing a more differentiated

[39] Note: As health in the MCMII has far less importance compared to the MCMI, it does not seem necessary to modify the original analysis and split up health and justice like in the summary of the MCMI above.

view by considering more criteria as relevant. Furthermore in regard to many criteria a shift in the wording and meaning is noticeable, the term human rights was possibly replaced by human dignity and panic was probably replaced by concepts such as forseeability and precaution. Progress specifically meant medical progress.

Quite salient is the differentiation in respect to security/safety and freedom.

As in the first run of the MCM the value security/safety was the only criteria which was used to focus on security and safety issues, in the MCMII security/safety, national security, precaution, foreseeability, food safety and state's duty to protect were used in this area.

Freedom of opinion was added to freedom of research in the second run of the MCM.

In the MCMI the cluster security/safety accounted for 25,2% of all allotted points. In the MCMII it accounted for 22,1%. Combining the clusters security/safety with the cluster uncertainty/risk shows the following percentages: in the MCMI this cluster accounted for 40,5% in the MCMII it accounted for 32,5%.

This indicates that although the participants took more security and safety relevant criteria into consideration the significance of this value according to the results of the MCM declined somewhat comparing the beginning and the end of the parliament. Nevertheless security/safety remained the value deemed most relevant by the participants.

Regarding freedom, to this value 10,2% of all points were allotted in the MCMI and 20% of all points were allotted to it in the MCMII. This could indicate that the value freedom gained significance in course of the parliament.

Progress accounted for 7% of all points in the MCMI and medical progress in the MCMII accounted for 19,6%. This suggests that also the value progress gained relevance for the participants during the parliament.

Summing up the clusters security/safety, uncertainty/risk, freedom and progress in the MCMI and in the MCMII shows the following development: in the MCMI this group of criteria accounted for 57,7%, in the MCMII for 72,1%.

This suggests that the trade-off progress/freedom versus security/safety gained significance during the parliament and that regarding this trade-off progress and freedom have been up-valued by the participants and that the significance of security/safety for value-based decisions stayed the nearly the same.

3.2.5 The Interim Statements in the Course of the Parliament

3.2.5.1 Policy Discussion Pathogen Research

In the course of the parliament the participants also discussed the goals, measures and expressed values of the "FP7 Work Programme 2010 Cooperation" theme "Health". For this purpose a three-page text which summarised the goals, values and in respect to pathogen research relevant measures, was prepared. The prepared text also included questions, which should initiate discussion.

With the policy discussion itself we intended on the one hand to document the participants' view of the goals, measures and promoted values of the programme and on the other hand we intended to give participants orientation regarding the approach of policy-makers in respect to pathogen research. Furthermore this should lift the quality of the final document.

In the box below you find the views which the participants elaborated consensually in respect to the stated measures, goals and values of the health theme. The summary of the health document, which was used as a basis for this discussion you find in the Chapter IV.2 of the Appendix.

Regarding some of the basic presumptions underlying the health theme:

We agree that causes, manifestations, implications and treatments of diseases differ in respect to children, adolescent and elderly people as well as in respect to men and women.

Regarding the main goals presented in the health theme:

We support the goals to focus on elderly people (due to the ageing of the population) and to promote the health-related industry (due to a lack of commodities in Europe).

We deem it especially important to improve the health of European citizens. Furthermore we deem it especially important to increase the competitiveness of small and medium-sized health-related enterprises and to boost their innovative capacity in the field of biotechnology and medical technology.

We partially oppose replacing animal use in research and testing.

We support the integration of ethicists into biomedical research projects, but we are opposed to an increased integration of lawyers and social scientists into these research projects.

Regarding the measures presented in the health theme:

We support measures, which promote free access to research results and encourage publishing in regard to public funded research projects. We support the increase of the number of clinical

studies focussing on elderly people and the funding of research projects which deal with HIV, malaria, influenza and tuberculosis. Furthermore we support the development of vaccines especially for children, the enhancement of standards in regard to vaccine development and the intensified consideration of gender aspects.

We support the development of new strategies aiming at the prevention, the containment and the control of infectious diseases (especially in regard to antimicrobial and drug-resistant pathogens).

Furthermore we support research projects exploring the interdependency of host and pathogen and the development of new therapies in order to treat patients who suffer from high grade pathogenic influenza viruses.

Regarding the dual use dilemma in pathogen research:

We tend not to consider the dual use dilemma in pathogen research in the context of these goals and measures as relevant.

Regarding the values which were expressed in the health theme:

Relevant values are safety, effectiveness (both in regard to drugs and treatments) and knowledge (foundation and application)

Independence is least important, due to the fact that it is hard to realise.

3.2.5.2 Project Discussion Pathogen Research

For project discussion two projects were selected which have been funded within the scope of former “Calls” of the health theme. The projects were presented and explained to the participants but did not lead to a fruitful and ongoing discussion.

Predicting Antibiotic Resistance (PAR)

The aim of this proposal is to describe and predict the dynamics of antibiotic resistance development at the level of the drug target, the microbe and the host. That is, we want to generate the knowledge required to be able to connect resistance mechanism --> bacterial physiology and fitness --> bacterial survival within a host --> bacterial spread between hosts. To achieve this goal we will develop quantitative models that can capture these complex dynamics, obtain relevant parameter values and validate the models by testing them in suitable in vitro, animal models and in clinical settings. We will address three main areas (A-C) in 11 different work packages.

A. Formation and emergence of resistant bacteria (WPs1-5). The rate of formation of resistant mutants is one major determinant that influences how rapidly resistant mutants will appear in response to antibiotic use. Depending on the type of resistance mechanism factors such as rates of mutation, recombination and transfer of plasmids will be important. In WPs 1-5 we will experimentally determine these rates for different combinations of bacterial species and resistance mechanisms.

B. Survival and persistence of resistant strains (WPs 6-8). A key factor that affects the survival and persistence of resistant strains is the impact the particular resistance mechanism has on bacterial physiology, including bacterial growth rate and virulence. We want to determine the effect of various drug resistance mechanisms on cellular physiology and fitness to establish a link between the molecular alteration and potential effects at the cellular level.

C. Transmission of resistant strains (WPs 9-11). Finally we want to understand and predict how resistance mechanisms (by their effect on bacterial physiology) influence the ability of the bacteria to be transmitted between hosts. Thus, we aim to generate both animal and clinical determinations of how resistance affects transmissibility and testable mathematical models.

http://cordis.europa.eu/fetch?CALLER=FP7_PROJ_EN&ACTION=D&DOC=26&CAT=PROJ&QUERY=01308a71110d:738d:7301aadb&RCN=94177

Regarding the project PAR the participants stated that exploring resistance mechanisms is the right focus, because it works against the undoing of current progress. A possible dual use dilemma exists, but is not very probable.

The participants would fund this project.

Genetic Analysis of the Host-Pathogen Interaction in Tuberculosis (TB-EURO-GEN)

We propose to extend an existing collection of DNA extracts from TB patients and their corresponding TB DNA to establish the world's largest resource of extracts from a population of TB patients and 5000 ethnically matched healthy controls. The bank will comprise 5000 DNA host DNA extracts paired the DNA and cultures of the strain of Mycobacterium tuberculosis causing their disease. We will perform a genome-wide scan to discover human genes with a predisposition to cause TB. We will then localise causal variants and study their role in a case-control population TB sample from another high incidence country in Africa, Ghana.

We will extensively characterise TB strains from a population in Russia using spoligotyping, minisatellite analysis, and SNP analysis of genes putatively associated with virulence and analyse the host-pathogen interaction identifying mycobacterial genes affecting the course of TB, the innate response to TB and outcome at a genetic level. Based on the existing collection of matched host-pathogen DNA we will perform functional experiments of the role of identified mycobacterial factors such as PE variants and the effect of this variation on aspects of innate immunity as influenced by newly-identified TB-associated genes.

http://cordis.europa.eu/fetch?CALLER=FP7_PROJ_EN&ACTION=D&DOC=18&CAT=PROJ&QUERY=01308a71110d:738d:7301aadb&RCN=88186

Regarding the project TB-EURO GEN the participants stated, that they deem the research regarding host-pathogen interaction important and that they would fund this project due to the fact, that they do not realise any risks.

Conclusion regarding the discussion of pathogen research projects:

Although the participants had a biotechnical background and to some extent interest and insights in that field and although they were supported by a PhD student of biology the discussion was not very productive. Reasons could be that the participants were quite exhausted after nearly two days of deliberations and that the content of the project discussion was rather complex. Furthermore the project did not offer any obvious polarising issues for these participants.

3.2.6 The Resolution

As the closure document regarding the "Dual Use Dilemma in Pathogen Research" the participants developed the resolution presented below. This resolution was elaborated over the whole process of the parliament and reflects the concerns and views which were shared by the participants. It expresses the recommendations and demands based thereon.

The resolution was presented in the plenum of the parliament and it was approved.

Resolution Regarding the Dual Use Dilemma in Pathogen Research, Value Dialogue Science Parliament Vienna 2011:

Regarding the Dual Use Dilemma in Pathogen Research the science parliament states:

A.) Pathogen research is a subarea of medical research and is used for the prevention and control of diseases regarding these areas:

i) Development of vaccines

ii) Control of resistance of pathogens

iii) Development of new drugs and treatments

iv) Gene therapy

B.) Yet the possibility to use pathogen research in a military context exists: artificial viruses

and bacteria could be developed and used as bioweapons.

C.) These diametrically-opposed possibilities of use devise the dual use dilemma.

D.) The complete publishing of research results, especially the availability of pathogen genome sequences could have the following consequences:
i) Accelerated data exchange facilitates scientific co-operations.
ii) The gained scientific insights could be used for the development of bioweapons, which could be (ab)used by military agencies or terrorists.

E.) The release of pathogens due to a neglect of safety restrictions could have devastating results.

F.) By signing the 'UN Biological Weapon Convention'(BWC) 164 states have obliged themselves to prohibit the development, production and stockpiling of biological and toxic weapons.

The Science Parliament Vienna 2011 demands and recommends:

1. Increased financial funding of medical pathogen research on national and European levels, eg in connection with research competitions which are effective for the public.

2. The foundation of an "International Pathogen Research Agency" (IPRA), which should be modelled on the IAEA and should be under the political control of the UN, which preventively counteracts abuse of pathogen research for military purposes with the following measures:
a) Constraints of public access to research results due to an assessment of their risk potential.
b) The control of production, dissemination and use of amplicons.
c) The enforcement of the complete adherence of the already existing UN-BWC.

3. The launch of an international information campaign by the IPRA, which by means of a public accessible Internet portal promotes the following goals:
i) Clarification of progress, modern comforts, and perspectives of civil pathogen research.
ii) Presentation of the function and goals of the IPRA
iii) Objectification of public discourses that could be aroused by scientifically unsound media

coverage on applications and risks of the pathogen research.

Interpreting the Resolution in Regard to its Value Dimension.

Only one value is expressed directly in this resolution, namely safety in point E. Nevertheless the following interpretation of the text unravels the underlying values health, security, freedom of research, freedom of information, progress, accountability, transparency, truth, public education or dissemination of knowledge, and perhaps observance of laws/regulations.

Point A cites functions/areas of pathogen research to prevent and control diseases and is clearly underlied by the value health. The focus of bioweapons in point B is related to security. Point D sketches the relation of freedom of information/research to progress and security. Point E explicitly names safety. Point F is in respect to values a little ill-defined. Possible interpretations are accountability (states are accountable to stick to the treaty and implement it) or the German word "Pakttreue"[40], which could be translated with "observance of bilateral treaties" but also works in respect to international laws and regulations.

Regarding the demands and recommendations of the resolution recommendation 1 clearly promotes the value (medical) progress, which is instrumental for the value health and to some degree public education or dissemination of knowledge.

Education of the public in regard to science and scientific developments within the scope of this resolution seems to have the instrumental function to prevent obstacles for research and progress by an uninformed and afraid public. This is also an interpretation, which might be suggested in regard to point 3.iii, where the media is identified as generators of disinformation. The value (scientific) truth, however, clearly underlies point 3.iii.

Back to point 2 where participants demanded the foundation of an organisation to ensure security and safety ("use of amplicons") in regard to pathogen research by restricting the freedom of information (a), the freedom of research (b) and by enforcing states to exercise their responsibility/accountability.

The previously mentioned third point of the resolution focuses on transparency and public education. The new organisation IPRA has to be transparent in respect to its goals and functions and has the duty to inform the public about progress and applications of the civil pathogen research. By addressing unsound media coverage in respect to science, the

[40] Note: The concept of "*pacta sunt servanda*", a State has to stick to its treaties.

previously discussed final point (3.iii), is underlied by truth.

Provided that the interpretation of this value analysis is shared, we can summarise that security (2x), safety (1x), freedom of research/information (1x), progress (1x) and accountability (1x) are the values underlying the fact-finding part of the resolution.

Regarding the demands the values progress (1x), health (1x), public education (2x), security, safety (1x), freedom of research/information (2x) transparency (1x), truth (1x) and perhaps observance to laws and regulations, which seems to be an instrumental value for security, could be identified.

This account of course gives no indication of the hierarchy of the values although for some relations plausible assumptions could be generated (eg the relationship between progress and health.)

3.2.7 The Background and Context of the Resolution

The significance of health is expressed quite clearly within the resolution: the main function of pathogen research is identified as its potential to enhance and safeguard people's health by the control and prevention of diseases. Furthermore participants stated in the value discussion regarding pathogen research that they perceive pathogen research as a means that might potentially, but not necessarily, protect against diseases and prevent pandemics. Furthermore within the scope of the project discussion participants stated that exploring pathogen resistance mechanisms is the right focus to ensure that current progress is not undone. This suggests a close connection between health and (medical) progress in the context of pathogen research.

In the value discussion a majority of participants stated that freedom of research has among other things the function to promote progress, and progress was associated with technological advancement, new and innovative technologies, the development of new technologies and new devices which make daily life easier. Within the scope of the policy discussion participants selected the safety and effectiveness of drugs and treatments as the most relevant values and strongly supported research which aimed at the development of new and more adequate treatments and drugs. Simultaneously participants stated that to enhance the health of European citizens is one of the two most important goals in the context of the named policy goals[41]. This suggests that progress was perceived by participants as an instrumental value to

[41] Note: The second goal was boosting the competitiveness of SMEs and to increase their innovation capacity in the area of biotechnology and medical technology. Nevertheless participants did not select innovation as one of the most relevant values regarding the health theme.

promote health. When analysing the MCM in this respect, health was clearly rated better than progress in the MCMI (144 to 77 points), together they accounted for 20% of all allotted points. In the MCMII (medical) progress was clearly rated better than health (235 to 45 points) and together they accounted for 23% of all allotted points. This is no conclusive evidence for the subordinate character of medical progress to health but their relatedness is highly plausible. Another possible way of putting it might be that at least medical progress seems to be a concept which is to a greater extent underlied by the value health than it is by the value progress.

In regard to the results of the MCM this could mean that the possibility of instrumental values to be in the focus of the MCM results is quite existent and careful analysis in regard to the text and records is necessary to unravel the value landscape of the participants' deliberation and questionnaire outputs. Security, safety, progress, and freedom of research could all be defined as instrumental values for health and justice, although justice (moreover human dignity is not directly traceable in the resolution) plays neither a role in the results of the MCM or in the resolution.

Summarising the bottom line of the pathogen resolution's value-specific background:
participants perceived pathogen research mainly as a means to enhance treatments and drugs and thus to promote health. They identified security and safety as the most relevant values: They detected the relevance of security mainly in the context of the military and terrorism, and the relevance of safety mainly in respect to precaution regarding laboratories and in respect to drugs and treatments. In the context of pathogen research freedom of research and progress are deemed very important and are subordinate to health. Also security and safety are subordinate to health, given that health has no opposite value for a trade-off, as long as progress and freedom of research are subordinate to health.

Comparing the values traced in the interpretation of the resolution and comparing them with the criteria of the second criteria weighing shows that reasoning based on economical values (prosperity, efficiency and cost efficiency) and goals related to them have not been integrated into the resolution. As economy also according to the results of the MCMII plays a subordinate role and economy-related values were also not selected as relevant within the scope of the policy discussion this is no real surprise.

5.) Conclusion

In work package three we developed a new value-sensitive participative method called Value Dialogue Science Parliament (VDSP). VDSP is based on anthropological and deliberative participation concepts (see Renn, 2008) and has three main features:

1.) It is adequate for evaluating S&T policies regarding inherent values and the degree to which these values are in harmony with social values.
2.) With its focus on values VDSP increases the value reflection of the participants' deliberations and hence the value groundedness of VDSP outputs.
3.) The identified technology perceptions, desirable scenarios and underlying values as well as their dynamics are valuable contextualization cues in regard to the direct outputs of the VDSP that is mainly the resolution which the participants elaborate throughout the parliament.

The VDSP was tested twice. The first time a pre-test with over sixty participants took place in Wiener Neustadt in September 2010 and the second time the further developed version with nearly fifty participants took place in Vienna in June 2011.

In the VDSP 2011 we managed to achieve the set goals to identify participants' underlying values and preferred scenarios in regard to biometrics and pathogen research as well as the relevant value dynamics within the scope of the VDSP. Based on these identifications we reconstructed the participants' perception of biometrics and pathogen research and the views and expectations related to it

The identification of relevant values, ongoing value dynamics within the scope of the VDSP deliberations and attractive scenarios was mainly achieved with the instrument multi-criteria mapping and the discussion format “Value Discussion” which integrates a qualitative questionnaire as a basis and starting point for further deliberation.

The MCM proved itself as a suitable tool to kick-off the parliament deliberations. It urges the participants to frame the issue and to clarify their priorities and criteria regarding the selected technology. This way the attention is also shifted to relevant values, since some of the criteria are straight values and some of the criteria are closely related to a specific value.

Although MCM is thus a fruitful instrument to promote value-informed deliberations there are nevertheless shortcomings in regard to its analytical dimension in respect to values: the depiction of complex and multi-dimensional value space, mainly by ranking and rating, is an

oversimplification of the value hierarchies and value relations which underlie participants' preferences and attitudes. Nevertheless, they are up to now the best heuristics we have to cope with the ambiguity, fuzziness, conditionality and context-relatedness of values and thus the potential of MCM to make probable trends and tendencies regarding values clearly visible is a very useful feature as long as the impact of possible simplifications is taken into consideration during the interpretation and within the scope of drawing conclusions. For example in regard to the fact that participants in the MCM sometimes focus on instrumental values, due to the fact that an intrinsic value is for them as a matter of course not part of any trade-off. There is also the possibility that logics and attitudes intervene that are not included in the expressed criteria and value collection of the MCM. But more to that later.

The value discussion proved itself as a very suitable and fruitful part of the VDSP. It was integrated into the VDSP due to the insights gained within the scope of the evaluation interviews after the pre-test in September 2010 and was designed to make different understandings of relevant values visible for the participants themselves as well as for us and in this way also provides essential information on certain value relations which could not be depicted by the MCM.

To some degree this is also achieved by the outputs of the policy and the project discussion as well as by the resolution.

With the value-informed policy and the project discussions we have developed governance tools - disregarding their educational component in respect to the VDSP - which are also directly applicable for political bodies in order to increase the citizen proximity of their S&T policies. These tools are suitable for upstream and downstream engagement, thus people could have a say in regard to technology in the making.

In these formats the participants focus on inscribed values, measures and goals of policies, policy drafts or funding practices, respectively and provide feedback in regard to the policy's/project's accommodation for European citizens' values.

So the special feature of the VDSP policy discussion is to let participants assess S&T policies by explicitly using values as an analysis category. In this respect VDSP and its elements policy discussion and project discussion as an institutionalised public engagement would promote the legitimisation and credibility of S&T policies in regard to frontier technologies by improving governance to value-based governance. Furthermore VDSP would serve as a platform of communication between science and the public and in this function raise the awareness regarding commonly shared values and expectations.

Due to the fact that in this exploratory pilot study we were not able to work with representative samples, the main conclusions of this study are less the specific content-related results and outputs of the newly designed instrument regarding value hierarchies and technology perceptions, than the illustration of what kinds of results and outputs this method is capable of producing.
So in order to make visible the potential of the VDSP we summarised the outline of the two case studies “Biometrics - Security- or Surveillance Technology” and “Dual Use Dilemma in Pathogen Research” in the following paragraphs.

The case study on the perception of biometrics and the underlying values shows the context-relatedness of (at least) expressed values even if the basic hierarchies of the participants’ sets of values stay the same. In this case information, deliberation and reflection did not change the values perceived as crucial for assessing biometrics and its implications: security/safety and freedom remained the dominant intrinsic values, whereas security/safety has the priority and all other values in the context of the biometric technology assessment had instrumental or subordinate significance. The changed context, however, in which participants got a more differentiated view of biometrics and its possible implications by deliberating and by information, lead to an up-valuing of criteria and criteria clusters which had not been spotted as important in the immediate assessment or have not even been considered at all.
The results of the criteria weighing and the scenario performance ratings in relation to the scenario ranking are quite coherent regarding the participants' sets of values in both runs of the MCM. Security/Safety and freedom were prioritised in all of these assessment steps. Dynamics became obvious regarding the consideration of more criteria and in respect to a slight change towards a more balanced proportion scoring (although the hierarchies did not change) due to information, reflection and deliberation.
In the case study on biometrics the results of the MCM and the value discussion questionnaire also provide valuable and coherent contextualisation cues to the resolution which the participants have elaborated during the parliament and which is the communicative centrepiece of the participative exercise. According to the results the participants perceived biometrics as a technology with great potential. It could enhance security standards and promote justice but nevertheless is not adequate to prevent crime. Furthermore the participants perceived that new security and safety issues could be generated by the application of biometrics, partly due to the fact that the technology is not fully advanced. The potential of biometrics to generate new security and safety issues was also a focus of the

resolution. In this respect it was very important for the participants that precautions are taken to safeguard privacy and to prevent abuse.

This is also reflected in the participants' scenario preferences. Throughout the VSDP, the participants favoured scenarios regarding biometric regulations which emphasized citizen's rights and safeguarded citizens' privacy and individual freedom. Data security, freedom of opinion, freedom in general, security/safety and contentment were the criteria deemed most relevant for decision-making and scenario assessment at the beginning of the parliament. Criteria which are related to the values security/safety were attributed with most relevance. Freedom-related criteria were perceived as nearly as important. Since criteria related to other values (economy, lifestyle or political regime) had no impact on the participants' scenario preferences the crucial value trade-off at the beginning of the parliament was clearly security/safety versus freedom, where freedom was less relevant in comparison. This also corresponds to the participants' problem perception, which is depicted in the scenarios developed by the participants: a citizen rights-oriented society, a surveillance society and a mixed model between them.

At the end of the parliament, security/safety-related criteria had the highest influence in regard to the scenario preferences. Freedom-related criteria in this regard were again ranked second. Values such as economy, justice or quality of life did not have an obvious impact. The summed up security/safety and freedom-related criteria rankings correlated most strongly to the participants' scenario preferences.

Although security/safety and freedom is clearly the crucial value trade-off influencing the parliament deliberations on biometrics there are some noticeable shifts and developments:

The participants took more different criteria and values into consideration during the MCMII criteria weighing compared to that of MCMI (21 in MCMII, 15 in MCMI). There was a trend that the hegemonic trade-off between security/safety and freedom lost importance during the VSDP where freedom was clearly deemed less important in the MCMII than in the MCMI. This goes hand in hand with an up-valuing of justice and economy.

Not only the number of criteria deemed relevant but also the wording and the focus changed during the VSDP: for instance the concepts security/safety, system stability, detection rate, protection (against crime) and law enforcement were more or less replaced by the concepts national, individual and institutional security as well as by safety, danger, risk and abuse.

The results of the case study on pathogen research are less straightforward. Overall, in this study it became obvious that a contextualisation of the output documents by the results of the

MCM and the results of the value discussion is no one-way street, furthermore it is also important to contextualise the results of these exercises by the output of the other exercises. So the interpretation of the VDSP becomes a hermeneutic circle.

At the beginning of the parliament the participants favoured a scenario which has its assets regarding security/safety, health and progress and promoted the civil use of this technology. Economy, justice, tolerance and human rights played a subordinate role and did not seem to have an impact on scenario preferences. It is quite possible, however, that the scenario preferences were based more on the perception of certain actors (the government, the military, independent experts, laypeople and civil society) than on the values directly expressed in the MCM. Of course, the decision to have faith in an actor is related to the values which this actor represents, nevertheless this is not necessarily reflected in the MCM results as the values which are connoted with the actors of the scenarios have not been explored in the MCMI. Not referring to the developed scenarios directly the participants stated that criteria related to security/safety, justice, health and freedom of research were most relevant for decision-making and scenario assessment in regard to pathogen research. Of these security/safety clearly was most important.

In the MCMII at the end of the parliament, the participants favoured a scenario which regulated pathogen research in a relatively strict manner and had its assets mainly in regard to medical progress, security/safety and freedom of research. In this scenario the government was in charge of regulating pathogen research. Due to the design of the scenarios in the MCMII a possible actor bias like regarding the MCMI is negligible here. Taking a glimpse at the scenario ranking of MCMII as a whole it seems that participants are ready to accept small deductions in regard to progress and freedom in favour of security and safety as long as the overall performance of the scenarios is similar. The crucial value-trade off seemed to be security/safety versus medical progress/freedom of research where security/safety was prioritised. Health, justice and economy did not play an obvious role.

According to the responses to the value discussion questionnaire and in regard to the interim statements and the resolution the participants perceived pathogen research mainly as a means to enhance treatments and drugs and thus to promote health. They identified security and safety as the most relevant values. They detected the relevance of security mainly in the context of the military and terrorism, and the relevance of safety mainly in respect to precaution regarding laboratories and in respect to drugs and treatments. Freedom of research and progress were deemed very important in the context of pathogen research and were subordinate to health, since freedom of research tended to be perceived as a condition for

medical progress and medical progress was equated with having new, safe and more effective treatments and drugs, so as a means to promote citizens' health. Research and progress were not equated by the participants who on the one hand saw the potential of pathogen research to prevent infections and pandemics or at least to better protect against them, but also stated that pathogen research does not necessarily improve health, security and safety standards.

Considering the relation of the values freedom of research and progress to health, it furthermore suggests that also security and safety were possibly subordinate to health, given that health in this case has no opposite value for a trade-off, as long as progress and freedom of research are subordinate to it.

Thus, although the participants focussed on security/safety versus progress/freedom of research as the crucial value-trade-off within the scope of the MCM, all these values are quite probably instrumental and subordinate to health.

As in the case study on biometrics the participants deemed more criteria relevant for assessing pathogen research at the end of the parliament than at the beginning.

Fifteen criteria have been used by the participants in the MCMI. During the criteria weighing in the MCMII, the participants used twenty different criteria. This could indicate that the input of the expert hearings, deliberation and further background information supported the participants in developing a more differentiated view by considering more criteria as relevant.

Furthermore, a shift in the wording and meaning of many criteria is noticeable. The term human rights was probably replaced by human dignity and panic was probably replaced by concepts such as forseeability, predictability and precaution. Progress specifically implied medical progress.

The differentiations in respect to security/safety as well as freedom are quite salient. Whereas in the first round of the MCM the security/safety value was the only criteria used for safety and security issues, in MCMII, security/safety, national security, precaution, foreseeability, food safety and the state’s duty to protect were used in this value cluster.

Freedom of opinion was added to freedom of research in the second run of the MCM.

Although the participants took more security and safety relevant criteria into consideration the significance of this value according to the results of the MCM declined a little comparing the beginning and the end of the parliament. Nevertheless, security/safety remained the value deemed most relevant by the participants. Freedom of research and (medical) progress in contrast gained relevance according to the participants’ criteria weighing.

Overall, the crucial trade-off progress/freedom versus security/safety gained significance during the parliament and within this trade-off the significance of security/safety decreased a

little whilst freedom and progress were up-valued. The value deemed most relevant nevertheless remained security/safety.

Summarising, in both case studies we were able to characterise the participants' scenario preferences as well as the demands and recommendations in regard to underlying values, relevant value trade-offs and probable value hierarchies. The analysis of biometrics and pathogens research revealed that during the VDSP the participants adapt the criteria they deem relevant for decision-making in regard to wording and focus and that they take more different criteria into consideration. In this respect the development of a new participative and value-sensitive method has been a success.

Nevertheless, the case study on pathogen research raises some relevant questions: First, the results of the MCMs and their contextualisation indicate that we can never be sure if a tracked down value is the driving value or if it is an instrumental value and as such a placeholder for another underlying value. To grapple with expressed values only may be an approach to that, nevertheless, also the relations between expressed values are ambiguous.

Furthermore, intervening variables or unnoticed layers such as for example that actors and the faith put in them are more influential than directly expressed values are always a threat. Of course, if the potential issue with the intervening influence of actors due to their particular significance for the participants, is identified in time, it can be dealt with by eliciting the values which are connoted with these actors, nevertheless often this kind of issue will be realised too late.

This case study of driving values in respect to pathogen research shows that the identification of values and the interpretation of results is a highly sophisticated endeavour. Values, their ambiguity, their fuzziness, their overlaps as well as their inter- and context-relatedness allow only a hermeneutic approach which is always indirect and mediated.

A heuristic method like the MCM in this endeavour could be a useful tool, disregarding its important function within the scope of the parliament to promote discussions and to structure and frame discourse, nevertheless its results regarding value hierarchies and possibly driving values have to be scrutinized and could serve only as the starting point for further iterative research on the social values driving common perceptions of a particular technology. Understanding other peoples' understanding of values in theory is an infinite process, which could always be more refined and which at any moment could reveal unexpected misunderstandings and presuppositions.

In the case of “Dual Use Dilemma in Pathogen Research” the probable significance of health would not have been revealed by the MCM alone, not until other sources have been set in relation to its results.

Sources like qualitative questionnaires with openly posed questions as well as a time frame allowing for minute deliberations on values and their meaning within the scope of the participative exercise cannot be overemphasised. As well an extended interpretative analysis of all gathered data.

This seems to be the most reasonable way to track down values and their meaning and to shed light on how people within the scope of a participative format make sense of a highly complex S&T issue.

In spite of these theoretical and subject-related challenges, practically it is an enhancement to integrate value focussing heuristics and analysis into a participative exercise as this promotes understanding in respect to its outputs and it, not necessarily but in many cases, will succeed in unravelling significant presuppositions and eminent value relations (absolute values, instrumental values, subordinate and superordinate values, etc.). Additionally it will succeed in shedding light on relevant perceptions of certain technologies as well as on the conditionality of social acceptance of these technologies. In this case it will accomplish a theoretical saturation which facilitates the integration of the general public’ values in S&T policies to a greater extent and thus generates policies which are more in harmony with the non-science part of society.

Nevertheless, since the development of the VDSP took place in an exploratory pilot study there is much work to do to fully evaluate its potential to fulfil the set expectations stated in this chapter. Further research needs exist above all in respect to:

- The suitability of the participation method as well as the validity and reliability of its analytical tools have to be checked with larger and representative samples.

- One feature of the VDSP is to initiate a more value-informed deliberation than other participative methods do. It will be necessary to analyse if there are indications that the direct output of the parliament (the resolution and the policy discussion document) is more value-informed in respect to the values which are identified as crucial/most relevant in comparison to the output of other methods and how the focus on values changes the character of this output.

- An analysis of the effects of the output documents of the VDSP compared to the outputs of other participative methods could be illuminative. Do participants feel more committed to the content of the resolution if it is elaborated in a more value-informed deliberation process? Does this output match peoples' views and perceptions to a greater extent?

- The VSDP has to be tested in different techno-political cultures to explore which adaptations might be necessary in different contexts.

- The VDSP's suitability for different kinds of technological issues should be explored. Is it equally suitable for polarising hot topics as it is for socio-technological issues which are not (yet) in the public spotlight and harbour more subtle dilemmas/issues (These kind of issues have been dealt within the scope of the VDSP development.)

- It could be fruitful to do a comparative study with VDSPs in different European countries on the same technologies. Thus, its potential for sketching a European value landscape could be explored.

- Further investigation has to be made on how and to what extent policy-makers use new insights on the general public's social values in regard to a technology to improve governance. The further development of the VDSP should cooperate closely with institutions which are qualified for a European-wide implementation of this approach.

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Appendix

VALUE DIALOGUE SCIENCE PARLIAMENT

I.)Manual

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The participative method “Value Dialogue Science Parliament” has been developed and tested in the project “The Landscape and Isobars of European Values in Relation to Science and New Technology” (ValueIsobars) funded by the European Commission in the 7th framework programme, research area: SiS-2008-1.1.2.1 Ethics and new and emerging fields of science and technology.

Introduction

“Value Dialogue Science Parliament” (VDSP) is an outcome and consensus oriented consultation exercise on objectives and value hierarchies regarding European science and technology (S&T) policies. It is a tool with which it is possible to shed light on how people perceive new technologies, to identify attractive scenarios in regard to new technologies, to lay open the driving values which underlie these perceptions, attitudes and preferences and last but not least to sketch probable public consensus in regard to informed laypersons.

Overview of the VDSP

The VDSP is a participative method where 16 to 60 randomly-selected citizens discuss scientific or technical issues. The citizens are divided into groups of 8 to 10 people and build parliament committees for one particular issue. The main event takes three to five days. In the VDSP participants work in groups toward a consensus. This consensus becomes manifest in a closure document consisting of (a) facts, (b) justification, and (c) recommendations and demands. Furthermore, the development of the consensus is traceable in the interim statements on certain policies and research projects.

The closure document is put to the vote in the “VDSP Plenum” and in the case of approval is presented to policy-makers, the media and the general public. The participants are supported by experts – there is an expert hearing regarding each topic - and moderators. Furthermore, an exercise called multi-criteria mapping (MCM) is a crucial part of the process. MCM is a decision-making method and in the course of the parliament fulfils the function to frame the deliberation and to foster consensus by increasing reflectivity in regard to relevant values and criteria.

Strengths and weaknesses of the VSDP

One of the strengths of the VDSP is its educational component. The participants benefit from group discussions and expert hearings. This also increases the quality of the process output. Further strengths are that in the course of a parliament different topics can be treated. The participants represent all citizens and not only a special interest group and the process output produced by them is made public. This basically makes decision-makers more accountable as they have to legitimise the official policies in light of the outputs of the participative method.

The crucial asset of the VDSP is its usefulness and suitability for obtaining informed and value-based

opinions from laypersons; moreover it provides insights into how participants arrive at decisions and identifies the driving values in this respect.

Possible weaknesses of the VDSP are that the participation agenda is not determined by the participants, that the recruitment of panels of representative participants may be expensive, and that recommendations and demands of the participative process may not be considered by public bodies, which would result in disenchantment with politics and participation.

Recommended Use of the VDSP

The recommended use of the VDSP is in regard to S&T issues in general with a strong ethical dimension, that is still neglected by the general public and people who in future will be affected by it. In this respect the VDSP's output gives policy-makers and scientists an orientation about needs, attractive visions and moral issues perceived by the public regarding a specific future technology and its societal impacts. It is the appropriate method if the interest lies in exploring the consensus potential of informed laypeople in regard to an ambiguous technology.

Presentation of the Method

Preparation

In the first step a first assessment of the technology has to be done. That means research on the technological issue and its possible societal impacts is necessary. Within the scope of this research answers to the following questions have to be found:

What is the state of the art regarding the selected technology?

What opportunities are salient in regard to the technology?

What potential does the technology have according to experts?

What are the most probable expected developments and advancements?

Which arguments do critics and sceptics cite in regard to the technology?

What are “the usual suspects” in reference to values in regard to this technology? That means which values are relevant to analyse in the context of the selected technology and which value trade-offs are probably crucial?

In the next step it is recommended to conduct pre-test interviews based on this analysis. As an initial approach the interviews are conducted with laypeople and aim to explore how the technology is perceived by them. The pre-test interviews should shed light on the amount and character of information which is necessary for an ongoing and vivid discussion and should give information on the probable directions discourse will take in the course of the VDSP. Furthermore popular misinterpretations might be identified.

As in the VDSP participants are asked to make meaningful and competent decisions, the pre-test interviews aim to identify in which respect participants will probably need support to feel competent enough to contribute during the process.

Based on the insights of these first analyses information material in regard to the technology is elaborated. The depth and amount of detail to which the information material is elaborated upon depends on the complexity of the issue, the expected previous knowledge and degree of motivation of the participants and the time frame of the event. A tight time frame during the VDSP possibly necessitates more extensive information material.

The information material is handed out to the participants up to one or two weeks before the main event. Its function is to spark interest and deliver basic information on the technology.

It should also include a description of the VDSP including the overall goals as well as a description of the course of action and a timetable.

Pre-event

If the possibility exists the information material should be handed out within the scope of a pre-event. In this pre-event the participants are briefed about the participative exercise and its presuppositions regarding deliberative democracy and the significance of civil society. Additionally the pre-event can be used to spark off interest regarding the topics of the event and encourage people to carry out research on their own.

Another important point within the scope of the preparation is the choice of the experts for the expert hearing. In addition to their scientific expertise the experts should have experience or talent in regard to communicating science to the public. They need have the ability to explain and summarize scientific issues in an understandable and interesting way.

It is recommended to invite at least two experts to the hearing. They should cover the issue and its different aspects as completely as possible, e.g. through complementary expertise. They need not to be neutral in their presentation but the presented opinions should reflect the spectrum of different positions or viewpoints on the topic.

Multi-Criteria Mapping

Multi-criteria mapping (MCM) is a crucial part of the VDSP. This decision-making method is very useful in respect to depicting a problem-area by making visible the spectrum of options, relevant criteria, chances and risks, which the participants perceive. As the opening exercise within the scope of the parliament MCM (MCMI) generates a higher level of value reference and value reflection amongst the participants. It frames and structures further deliberations and thus fosters consensus. Furthermore, with MCM the relevant values and crucial value trade-offs which are perceived by the participants can be identified and the hierarchies in the participants' sets of values can be sketched out. By conducting a second MCM (MCMII) at the end of the parliament it is possible to shed light on value dynamics and possible shifts in the participants' value hierarchies provoked by deliberation and information.

The MCM applied within the scope of the VDSP consists of 7 steps. It includes phases of discussion/deliberation as well as sequences in which the participants analyse on their own or fill out questionnaires.

1	Development of possible scenarios
2	Selection of scenarios deemed as relevant
3	Deliberation on criteria possibly relevant for scenario assessment
4	Scenario assessment using individually selected criteria
5	Scenario ranking
6	Criteria weighing
7	Sideswipe-scenario discussion

Table 1: The seven Steps of the MCM applied in the VDSP.

7. Development of possible scenarios

In the first step participants in groups of two or three people develop scenarios which are deemed somehow relevant in the context of the S&T issue selected. There are no restrictions regarding the nature of the scenarios. They could focus on concrete issues and situations or large-scale societal and political developments in the context of the selected technology. They could be utopic, dystopic or realistic and they can pertain to the immediate or distant future, to places nearby or on the other side of the world.
Depending on the depth and depending on the number of the scenarios aimed at, this step takes at least twenty-five minutes. Questions which support the participants in developing scenarios could be: What desirable visions do you have in regard to technology “xy”, what are probable developments in regard to daily routines and the technology “xy”, how should this technology be regulated to generate a desirable future, etc.
In regard to the MCM-session at the end of the VDSP (MCMII) it is possible to prepare scenarios for the participants beforehand. In this case the prepared scenarios are presented to the participants within this

step and they are free to make adaptions to these scenarios.

8. Selection of scenarios deemed as relevant

In the second step the participants present their elaborated scenarios. A deliberation takes place regarding which scenarios are most relevant and which additional aspects could and should be integrated into them in order to enhance their relevance. At the end of the deliberation three to five scenarios are selected for further assessment. This step takes at least twenty-five minutes.
In the case that scenarios are prepared for the participants within the scope of MCMII participants are free to cancel scenarios which they do not deem relevant.

9. Deliberation on criteria possibly relevant for scenario assessment

In step three participants discuss which criteria may be relevant to assess the scenarios. This step takes at least ten minutes. The selected criteria in many cases are straight values and in most cases can directly and with high plausibility be linked to values. This might be personal values as well as social or cultural values. Questions to support the participants in finding relevant criteria are for example: What do you think a scenario should perform for society or individual citizens? What is important to you in respect to the selected technology and your daily routines? How is that reflected in the scenarios, and how could you appraise it? What are the advantages of the particular scenarios?
In the scope of MCMII there is the possibility to support the participants by handing out a list of possibly relevant criteria which they may consider.

10. Scenario assessment using individually selected criteria

In the scenario assessment the participants rate the scenario performance of each scenario in regard to the criteria which they deem relevant. They participants can use the criteria selected within the scope of step three, but they are also free to use alternative criteria. Each of the participants completes a rating form. The rating goes from zero up to ten points, “ten points” means very high performance of the scenario pertaining to the criterion, “zero points” means no performance in regard to the criterion. Depending on the number and the depth of the selected scenarios as well as depending on the motivation level of the participants, this step takes between ten and thirty minutes.

11. Scenario ranking

In step five the participants rank the scenarios according to their preferences. Independent of the previous scenario assessment they complete a form ranking the most favoured scenario to the least favoured. This step takes approximately ten minutes.

12. Criteria weighing

In step six the participants weigh the criteria they deem most relevant for assessing scenarios in the context of the discussed field in general. They weigh them by allotting 100 points to them. The participants are free to decide how many criteria they select and how they allocate the points. This step takes

approximately ten minutes.

13. Sideswipe-scenario discussion

The last step of the MCM is the sideswipe-scenario discussion. In this discussion a new scenario is presented to the participants which has been previously prepared by the organisers. The presented scenario should include alternative stances and aspects compared to the scenarios elaborated by the participants and this way should introduce alternative criteria to the participants or at least outline the significance of the criteria which up to that point had been mainly neglected. As it is not clear in which direction deliberation within the scope of the MCM will go and which scenarios, criteria and priorities are in the spotlight of the assessment, different sideswipe-scenarios have to be prepared. The sideswipe-scenario which is then introduced to the participants should have the biggest potential to unsettle the developed views, scenario preferences and value hierarchies.

Possible Conclusions Based on the MCM Results

The output of the MCM is a collective scenario ranking based on the individual rankings, a criteria ranking based on the individual criteria weighing and a scenario characterisation based on the summed up performance ratings. With these results an identification of the most important values in regard to decision-making is possible, the preferences according the scenarios can be traced back to the salient scenario performances, and tendencies pertaining to value hierarchies are representable.

Value Discussion

Participants might use certain values intuitively and in an often vague and unreflected way. They might have heterogeneous and sometimes even diametrically-opposed understanding of certain values. In this case values might be used as placeholders. Their vague and blurred use on the one hand could constrain consensus-directed discussion, due to participants talking at cross-purposes; on the other hand it could also lead to the elaboration of a putative consensus, which does not stand its ground when scrutinized again by the participants with a focus on wording, meaning and presumptions.

Therefore it is a necessity for the elaboration of well-reflected and sustainable consensus to which the participants feel committed, as well as for the interpretation of the MCM results, that participants discuss and question the value concepts used in deliberation and assessment of a technology. To explore how exactly participants understand criteria and values when creating and assessing scenarios and weighing criteria is also a necessity for the interpretation of the MCM. For these purposes the value discussion was designed and integrated in the VDSP. It makes visible for the participants, how other participants understand certain values and kick-starts a value reflection that also makes clear for the participants, how they understand certain values themselves. In this way it has the function to increase value consciousness

and reflection and to decrease the chances of misunderstandings as well as ambiguity and fuzziness of values by verbalising these understandings and by making visible shared and oppositional standpoints. This eases decision-making as well as the selection of what decisions are to be made, but it is important to consider that even if a shared meaning is developed in discussion nonetheless values are used and understood differently in different contexts.

Certainly it is not possible to discuss all values and criteria which are relevant for participants or which become relevant during the deliberation, but at least the usual suspects and the criteria with a high potential of diametrically opposite interpretations should be discussed in the value discussion.

The Structure of the Value Discussion

In the first step participants complete a questionnaire on values. They should answer in note form what a certain value means to them, how they would explain it, in what respect it is important in relation to the discussed technology, and where they realise issues in respect to this value. (For example, Is it a value which should be protected?, Where are problems visible in respect to this value?, etc.) This should take about five minutes.

In the second step each participant introduces his/her responses to the group. After that a group discussion takes place regarding any differences in respect to the understanding of the value which exist. If participants feel that they agree on a certain definition of the value, which considers all relevant aspects, they can write a short statement of clarification.

In the ideal case this procedure is repeated with all the values, which are selected as relevant in the preparation research (four - eight values) and furthermore with all the criteria used by the participants in MCMI. Furthermore it makes sense to hold a second value discussion at the end of the parliament, In this discussion the understanding of the values and the criteria which newly emerged within the scope of the MCMII should be discussed. A value discussion takes at least an hour.

Expert Hearing

The expert hearing has the function to provide the participants with crucial information regarding the topic and to abolish any lack of clarity perceived by the participants. The expert's input gives participants information that should empower them to make meaningful decisions on highly complex subjects and increase the participants' feeling of competence, so that they are capable of tapping into the full potential of the value-informed knowledge that they provide.

The expert hearing is divided into two parts, in the first part the experts give an introduction on the issue and the crucial points perceived by experts. In the second part participants are free to pose questions. Depending on the issue it makes sense to invite a different number of experts, as well as experts in

different fields. The expert hearing should be scheduled for one hour at least.

Policy Discussion

In this part of the VDSP participants engage themselves with real policies or policy drafts and give feedback about these documents. The function of this discussion is to give participants orientation as to how the subject is framed by policy-makers and experts. It also gives orientation towards what kind of policies and endeavours already exist, what goals and values are promoted and what measures are planned. Depending on the timetable of the VDSP there is the possibility to present a summary of a policy document to the participants as a basis for their discussion. Another possibility is letting them work on an original policy document. In this case the participants would analyse the document regarding goals, measures, and the expressed values.

The policy discussion is an output-oriented discussion. At the end, the participants write a short statement on if and how far they share the priorities and values to which the policy document refers, and if they deem the proposed measures as reasonable and worthy of support. Furthermore, the participants state which values, goals and measures have not been granted due significance.

The policy discussion in the case of a prepared summary of the policy document should be scheduled for one hour at least. In the case of an analysis of the selected policy document done by the participants on their own it takes significantly longer, depending on length and complexity of the selected document. In the second case pre-tests are necessary to assess to which degree and in what time frame the task is manageable for lay people.

Within the scope of the VDSP the policy discussion is a building block of the committee work which, by its educational component as well as by the emancipatory potential of deliberation, increases the quality and sustainability of the closure document and the participants' commitment to it.

In regard to the analysis of the VDSP output and the driving values which underlie the deliberatively elaborated consensus, the interim document of the policy discussion is used to document the deliberation process and to deliver additional information in respect to plausible interpretations of the closure document.

Regarding the large-scale potential of the VDSP, it is a tool which could be used in the policy-making process as a consultation instrument regarding the value hierarchies incorporated in policy drafts. It is suitable and probably fruitful as an additional feedback loop to improve policy drafts in respect to their compatibility with commonly shared values.

Project Discussion

The project discussion can be an amendment to the policy discussion, if the policy discussion is focussed on already implemented policies. On the other hand it can be a discussion which links an abstract, general and speculative political or strategic discussion to practice and the ethical and social implications of real research projects of the field.

If the project discussion is designed as an amendment to the policy discussion, then its focus lies on assessing representative research projects which are funded in the framework of the policy document. Participants in this case elaborate a statement, which deals with the compatibility of goals, measures and values of the policy document and the research project and which expresses the group's view in regard to if the project should be funded by public financial means, if it serves the public interest and if regulations or restrictions are necessary in regard to the project. In this case researchers of the discussed projects could take part in the expert hearing and face the participants' questions.

If the policy discussion deals with a policy draft, then projects which were funded by previous or similar programmes are discussed in the project discussion.

In both cases it fulfils the function to sharpen participants' awareness of current set-ups and targets in regard to the discussed research area and to elicit shared views and values in regard to the issue. Similar to the policy discussion, the project discussion is a building block of the committee work and with its educational component as well as its emancipatory potential due to deliberation, it should increase the quality of the closure document and the participants' commitment to it.

The scheduled time for the project discussion depends on the number as well as on the complexity of the discussed projects. In the VDSP pilot study each of the selected research project abstracts were discussed on average for 30 minutes.

Committee Work

The committee work is designed as an open deliberation on the issue. Participants are free to discuss all aspects of the issue in the committee work. Within the scope of the committee work possible questions for the expert hearings are elaborated, the expert hearing and possible take-home messages are discussed and finally in the committee work the participants elaborate the closure document regarding the selected topic. Participants have to be well aware, that they elaborate the closure document for consultation of specific policy-makers.

The results of the MCM as well as the interim statements could be used for this elaboration and possibly frame the discussion. The moderation of the committee work is crucial for a successful parliament. On the one hand moderators should encourage participants to contribute and stimulate an open and eclectic discussion, on the other hand they have to remind participants to stay focused and issue-related in the

discussion and to keep the closure document in mind. Sometimes it will also be necessary to allude to the desire for politeness and a positive engagement in conversation.

Overall it is essential that moderators are not only quite experienced in formats similar to the science parliament, but are also well-informed regarding the issue and capable of steering the discussion at some points, if necessary. Moderating committee work here presents itself as walking a fine line, as the moderator's influence within the deliberation process should be as small as possible. Due to these challenges it is recommended that two moderators share duties and alternate during the committee work of one group. Furthermore, each group should be accompanied by an observer who takes notes regarding possible moderator influence as well as in regard to group dynamics in deliberation and possible contingencies in the course of the deliberation.

Basically participants are free to decide how to structure their closure document. For example in the cases were no consensus is possible, there is the possibility to write a statement which explains in which regard different positions constrained any collective recommendation.

If the participants elaborate a consensus one possibility for the closure document is a tripartite structure with (a) facts, (b) justification (clarifying goals, thesis and rationale) and (c) demands and recommendations.

Plenum

As the highlight at the end of the VDSP participants present their resolution in the parliament plenum. After the presentation of a resolution other participants have the possibility to pose questions of clarification. These questions could be in regard to content, wording and presuppositions of the resolution. The questions are collected and one or two representatives of the group try to answer them as well as possible. Subsequently participants have the possibility to declare objections in regard to the suggested resolution.

In response to possible objections the proposing group has the opportunity to defend its resolution against the presented objections. Finally the plenum votes on whether to reject or approve the resolution.

The plenum is chaired by three of the moderators, who take the responsibility for counting the votes, admitting the speakers to the floor and restricting their time due to the schedule. In addition they moderate the collecting of questions in regard to each resolution.

The plenum as the arena where participants have to defend and explain their resolution has the function to let participants put themselves in others' shoes and keep in mind that their resolution is not necessarily self-explanatory and that it is not enough to be convinced of having found the right solutions, but it is also necessary to sell these solutions in a convincing way to other people who have not been engaged for days in a deliberative process focussing on that topic. The challenge to be clear to others and convince

them with strong arguments should prevent participants from working out heedlessly maximum demands – perhaps conditioned by discussion dynamics - which are not comprehensible for others. And the challenge to be clear to others in most cases also carries with it being clear to oneself, due to a more accurate checking-up of the argued position and its possible weaknesses.

A plenum, apart from considerations regarding the quality and communicability of the resolutions, also has other benefits. First it motivates the participants who from experience of the held VDSP enjoy presenting and discussing their resolution. Furthermore, it also strengthens the legitimization of the recommendations and demands, which have been worked out by a committee of eight to ten participants, if the participants of the entire VDSP back it up, in the case of approval.
In addition it should be considered that the higher the public visibility of the plenum is the more participants' motivation will increase. Apart from that the plenum is the step of the VDSP which is most effective to public perception and most suitable for potential media coverage.

Regarding the timetable, discussing a resolution and putting it to the vote will take at least 30 minutes per resolution.

Plenum Preparation

The plenum preparation is actually part of the committee work. The preparation consists of preparing the presentation of the group's resolution, as well as considering which questions may be posed by the other participants. Furthermore, the resolutions of the other committees have to be studied and some participants have to prepare objections in regard to other groups' resolutions.

The preparation should be scheduled for two hours at least, however, depending on how many resolutions have been worked out within the scope of the parliament and depending on how much time the organisers want to allocate to the plenum one or two hours more may need to be scheduled.

Schedule

The main event takes three to five days depending on the available resources and the availability of the participants. Depending on the main goals of the planned VDSP different steps can be extended or shortened. If the focus lies on the participants' understanding of values the value discussion can be emphasised (e.g. through an extended session or a second value discussion at the end of the VDSP). If the main goal is feedback on policy documents an extended policy discussion is recommended. Another aim could be the identification of positive future scenarios which would make an extension of the MCM necessary. For an exemplary timetable see table 2.

Step	Approximate time duration	Day
MCM, first run	2 hours	1
Value discussion	1 hour	1
Expert hearing	1.5 hours	1
Committee work on the resolutions	4 hours	1+2
Policy discussion	2 hours	2
MCM, second run	2 hours	2
Project discussion	1-3 hours	2
Plenum preparation and resolution adjustments	2 hours	3
Plenum	3 hours	3

Table 2: Timeframe for a three day VDSP.

Day one	
8:30-9:00	Opening
9:00-9:30	Team building
9:30-12:00	Multi-criteria mapping, first run (short breaks included)
12:00-13:00	Lunchbreak
13:00-14:00	Value discussion
14:00-14:15	Coffee break
14:15-15:45	Expert hearing
15:45-16:00	Coffee break
16:00-17:30	Committee work
Day two	
8:30-11:00	Committee work (short breaks included)
11:00-11:15	Coffee break
11:15-12:30	Policy discussion
12:30-13:30	Lunchbreak
13:30-14:00	Policy discussion
14:00-16:00	Project discussion (short breaks included)

Day three	
8:30-10:30	Multi-Criteria mapping, second run
10:30-10:45	Coffee break
10:45-12:45	Plenum preparation
12:45-13:45	Lunch break
13:45-16:00	Plenum topics I and II

Table 3: Exemplary timetable for a VDSP with two scientific topics. In the beginning of the first day there is time for team building exercises.

Conclusion

VDSP has been designed as a method for a value based civic dialogue that can provide policy makers with information about value informed attitudes of lay people and which can serve as an arena for a promoted discourse between science and public. Furthermore, it is a governance tool suitable for democratising science.

Depending on the purposes of the deliberation process the VDSP has to be adapted: The different steps of the VDSP are not to be seen as a rigid framing, but as a toolkit which can be arranged according to the particular main goals. In addition organisers of a VDSP have to consider the techno-political culture in which the participants are embedded and they will have to tailor the VDSP according to the specifics of the selected technology. For example, the standing of experts within a social sphere, the participants' experience with the selected technology or similar technologies, and many other factors will have to be taken into consideration. Therefore pre-test interviews have a crucial role in the implementation of a VDSP.

A particular concern of such a deliberation process is the fact that participants might change their opinion in response to the information imparted to them during the exercise. However, there is evidence that additional information about and deeper understanding of science and technology not necessarily produce acceptance. It is therefore legitimate to suppose that lay people who take part in participative exercises and therefore enter into a learning and deliberation process produce outputs that correspond to social values of the general public despite their privileged situation. A discrepancy between these outcomes and the results of expert-commissions and specialized administrators would reflect the perceived gap between policy decisions and public opinion responsible for the eroding trust in policy decisions with regard to science and technology.

II.) Value Discussion of Biometrics and Pathogens

II.1) Value Discussion on "Biometrics - Security- or Surveillance Technology"

Questionnaire Questions:

Werte und Biometrie :

1.) Sicherheit

Was bedeutet **Sicherheit** für dich?

Wie würdest du Sicherheit erklären? Was verstehst du darunter?

Vor welchen spezifischen Bedrohungen ist Sicherheit notwendig?

Wo denkst du, dass es Sicherheitsprobleme gibt?

Wer gefährdet Sicherheit?

Welchem der folgenden Sicherheits-Prinzipien sollte Biometrieimplementierung deiner Meinung nach gehorchen? [42]

0 Größtmögliche Vorsicht,

0 Größtmöglicher Nutzen,

0 Größter wahrscheinlicher Nutzen

0 Größter wahrscheinlicher Schaden

Wird die Welt durch Technologien wie Biometrie immer sicherer? Warum?

Inwiefern könnte unser Leben durch Biometrie unsicherer werden?

Muss die Welt sicherer werden? Warum?

Inwiefern wird die Welt unsicherer?

2.) Privatsphäre:

Was bedeutet Privatsphäre für dich?

Wo würdest du die Grenze ziehen bezüglich dich betreffender Informationen, die für niemanden

[42] Note: Due to a mistake this question was not posed in this way in the questionnaire in VDSPII. Although the ill formulated question was explained by the moderators, we took this question out of the analysis.

verfügbar sein sollten?

Wo würdest du Vorrichtungen Überwachung durch Identifikation nicht akzeptieren?

Muss Privatsphäre sichergestellt werden?

Wer bedroht Privatsphäre?

Wie soll/kann Privatsphäre geschützt werden?

3.) Freiheit:

Was bedeutet Freiheit für dich, was verstehst du darunter? Wie würdest du es erklären?

Was bedeutet Freiheit in Bezug auf Biometrie?

4.) Gerechtigkeit:

Wie verstehst du unter Gerechtigkeit?

5.) Lebensqualität:

Was bedeutet für dich Lebensqualität?

Was hängen Lebensqualität und Biometrie möglicherweise zusammen?

Responses:

Werte und Biometrie:
Sicherheit:
Was bedeutet Sicherheit für dich?
- Finanzielle Sicherheit, Schutz vor Kriminalität.
- Wenn man geschützt ist vor fremden, ungewollten Eingriffen(Bedrohungen), dann kann man sich sicher fühlen.
- Schutz vor äußeren Gefahren
- Das ich mich jederzeit sicher fühle.
- In der Nacht keine Angst haben zu müssen vor dem Flex abgestochen zu werden.
- Keine Angst, wenn man in der Nacht auf die Straße geht.
- Alle möglichen Maßnahmen, die erfüllt werden, damit nichts schief gehen kann. Kann auf alle möglichen Aktivitäten bezogen werden.
- Am Abend auf die Straße gehen zu müssen ohne Angst haben zu müssen.
- Sich mit bestimmten Vorkehrungen schützen.

Wie würdest du Sicherheit erklären, was verstehst du darunter?
- Schutz vor Gefahren, Krankheiten und dergleichen.

- Siehe Frage 1
-Das Vertrauen vor Gefahren beschützt zu sein.
-Das Gefühl überall sein zu können ohne Probleme
-Maximale Sicherheit wäre wahrscheinlich (in Wien) am Gürtel auf einer Parkbank schlafen zu können ohne Opfer eines Raubüberfalls zu werden.
-Wenn man unter Schutz steht, sich sicher fühlt.
-Sicherheit ist ein Gefühl, das nichts schief gehen kann. Alle erdenklichen Maßnahmen wurden getroffen um ein reibungsloses Funktionieren spezifischer Aktivitäten zu gewährleisten.
-Sicherheit ist ein Maß für die Wahrscheinlichkeit Opfer von Kriminalität zu werden.
-Jemanden oder etwas schützen mit bestimmten Vorkehrungen

Vor welchen spezifischen Bedrohungen ist Sicherheit notwendig?
- Epidemien, Naturkatastrophen, Kriminalität.
- Diebstahl, Betrug, Mord
- Terror, Krieg, einkommen, Freiheitsberaubung.
- Kriminelle
- Aggressivität, Waffen, Habgier.
- Kriminelle
- Terror, Kriminalität.
- Kriminalität, Einbruch, Mord, etc.
- Bestimmte Laborbesucher, Flugzeuge, Autos, Motorräder, Internet

Wo denkst du dass es Sicherheitsprobleme gibt?
- Hackerangriffe gegen Netzwerke.
- Bei Einbrüchen und Diebstählen.
- Datenschutz, Personenschutz
- In Problemgebieten
- In öffentlichen Verkehrsmitteln, in Brennpunkten
- In herunter gekommenen Gegenden.
- In öffentlichen Gebäuden (Einkaufszentren, Schulen, evtl. Krankenhäuser, Flughäfen)
- Überall mehr oder weniger stark ausgeprägt (PSN, IWP - Hackerangriffe).
- Dritte Weltländer

Wer gefährdet Sicherheit?
- Waffenbesitzer
- Menschen, die wenig bis gar kein. Einkommen bzw. keinen Lebensunterhalt haben, und deshalb kriminell werden (müssen)
- Die Menschen
- Kriminelle
- Kriminelle, potentiell Aggressive,
- Kriminelle
- Kriminelle, Terroristen
- Hacker, Diebe, Mörder
- Verbrecher, Hacker, Psychopathen

Welchem der folgenden Prinzipien sollte Sicherheit deiner Meinung nach gehorchen?
0 Größtmögliche Vorsicht (14 points)
0 Größtmöglicher Nutzen (4 points)

0 Größtmöglicher wahrscheinlicher Nutzen
0 Größtmöglicher wahrscheinlicher Schaden

(Each participant allotted two points)

Wird die Welt durch Technologien wie Biometrie immer sicherer, warum?
- Kommt auf die Verwendung an.
- Kriminalität wird nicht stark sinken, Aufklärungsrate aber Biometrie wird zur Identifikation von Toten benutzt, nicht um kriminelle Handlungen vorzubeugen.
- Ja und nein, alles hat Vor- und Nachteile; Vorteil Verbrechensbekämpfung, Nachteil Kontrolle.
- Ja, weil die Überwachung besser wird und dadurch sicherer.
- Nein, jedoch können Täter gefasst werden: Vergeltung
- Da die Aufklärungsrate größer werden wird möglicherweise. Aber Amokläufer kann man nicht vorher ausfindig machen.
- Theoretisch ja. Die Technologien sind aber noch nicht so ausgereift um sie sicher einzusetzen.
- Nein, da die Daten auch in falsche Hände geraten können.
- Ja durch bestimmte Vorkehrungen könnte z.B. die Kriminalitätsrate gesenkt werden.

Inwiefern könnte unser Leben durch Biometrie unsicherer werden?
- Es könnte ein Überwachungsstaat gebildet werden.
- Dass es zuwenig Datenschutz gibt und Kriminelle (oder auch Firmen) auf die Daten zugreifen können.
- Daten werden geklaut, Medizin -> der perfekte Mensch
- Datenschutz
- Unsicherer nicht, nur überwachter.
- Datenschutz.
-
- Siehe oben
- Fehlfunktion der biometrischen Verfahren

Muss die Welt sicherer werden? Warum?
- Ja, weil noch immer viele Menschen in Industrienationen ermordet werden.
- Wichtig ist es die Armut zu bekämpfen, damit wird die Kriminalität auch sinken.
- Ja, weil es viele Menschen gibt, die unter Gefahren leiden.
- Ja damit wir uns sicherer fühlen können.
- Ja weil ich mich unsicher fühle, wenn ich nachts alleine auf der strasse bin.
- Sie darf nur im Rahmen der eigenen Freiheit sicher werden.
- Ja um sich sicherer zu fühlen.
- Ist unmöglich, da alle Sicherheitsvorkehrungen auch negativ wirken können
- Ein bisschen sicherer wäre nicht schlecht da z.B. Taschendiebe unterwegs sind.

Inwiefern wird die Welt unsicherer?
- Hohe Kriminalität.
- Indem es immer mehr große Betrugsfälle gibt (Versicherungen, Patienten)
- Neue Waffen, neue Probleme (Klima, Rohstoffmangel)
- Datenschutz

Mehr Kriminalität, vor allem durch Armut.
- Große Datenmengen sind online und könntne durch Hacker in falsche Hände gelangen.

- Terror, Epidemien.
- Ausgereifte Technologien, die in falsche Hände geraten.
- Verschiedene Arten von Verbrechen

Privatsphäre:
Was bedeutet Privatsphäre für dich?
- Privatsphäre ist ein Raum/Bereich in dem man alleine sein kann und ungestört ist.
- Der nicht öffentliche (vom Staat bzw. außenstehenden Institutionen nicht beeinträchtigte) Teil des Lebens.
-Wenn die unsichtbare Grenze nicht überschritten wird, ab der es unangenehm wird.
- Das ich mich ungestört fühlen kann.
- Nicht auf Schritt und Tritt verfolgt zu werden.
- Sich unbeobachtet fühlen, keiner sieht einem über die Schulter.
- In den eigenen vier Wänden alles zu machen, ohne das Gefühl zu haben beobachtet zu werden.
- Das nicht jeder nachvollziehen kann, was ich wann tue.
- Informationen über mich die niemanden etwas angehen.

Wo würdest du die Grenzen ziehen bezüglich dich betreffender Information, die für niemanden verfügbar sein sollten?
-Beziehungsstatus, Sexualität, -> Informationen, die ich nur an ausgewählte Personen weitergebe.
- Gedanken
- Ich will dass gar keine Informationen über mich bekannt sind, die ich nicht selbst erzähle(nur den Menschen, die ich will).
-Wohnadressen, familienangehörige, Kennwörter.
-Meine nat. Gewohnheiten
-???
-
-Fotos
-Pin-Code für Handys oder Kundenkarte

Wo würdest du Vorrichtungen bzw. Überwachung durch Identifikation nicht akzeptieren:
- Hotelzimmer, WC, Bad
- In Privaten Wohnungen.
- In meiner Wohnung, auf Toiletten
- Nirgends
- In meiner Wohnung bzw. Haus.
- Toiletten, Privaträume
- Zuhause, an öffentlichen WCs
- Öffis, öffentliche Plätze
- Umkleidekabinen, Dusche, WCs

Muss Privatsphäre sichergestellt werden?
- Ja
- Ja es sollen eingriffe beschränkt werden
- Ja, -> Menschenrecht
- Ja
- Ja
- Ja

- Ja
- Ja
- Ja

Wer bedroht Privatsphäre?
- (Eltern), Überwachungskameras
- Staat Unternehmen.
- Kontrollorgane
- Hacker, teilweise fremde Personen
- Staat durch gesetzliche Regelungen.
- Konzerne
- Hacker, Stalker
- Leute die unsachgemäß mit Daten umgehen
- Aufdringliche Menschen

Wie soll Privatsphäre geschützt werden?
- Schlösser die man selbst auf/abschließen kann.
- Eingriffe reduzieren
- Gesetze
- Besserer Datenschutz
- Einführen einer Ethikkommission
- Codes, ??? ohne Behörden
- Überwachung von öffentlichen Gebäuden/Plätzen durch Polizeipatrouillen
- Datenschutz
- Pin-Code

Freiheit:
Was bedeutet Freiheit für dich, was verstehst du darunter, wie würdest du sie erklären?
- Denken, was ich will, handeln wie ich will.
- Freiheit ist die Autonomie des Menschen, und endet dort wo sie die Freiheit eines anderen einschränkt.
- Wahre Freiheit ist, wenn man nichts mehr zu verlieren hat -> Selbstbestimmung
- Man kann jede nicht kriminelle Tätigkeit ausüben, die man will.
- Zu jeder Zeit das zu tun was ich möchte ohne meiner Umwelt zu schaden.
- Das ich die Dinge tun kann, die die Freiheit von anderen nicht einschränkt.
- Keine Grenzen Einschränkungen in den Handlungen.
- Bewegungsfreiraum ohne das jemand diese Tat festhält
- Keine Leibeigenschaft (Sklaverei), eigene Besitztümer

Was bedeutet Freiheit in Bezug auf Biometrie?
-
- Die Freiheit seine eigenen biometrischen Daten geschützt zu wissen.
- Keine Kontrolle durch den Staat
- Das man sich frei bewegen kann
- Niemand sollte wissen, wie und wo ich mich befinde, was ich zu welcher Zeit mache.
- Das Informationen nicht in Hände gelangen, wo nur Schaden zugefügt wird.
- Sich nicht ständig beobachtet zu fühlen.
- Nichts Gutes

Gerechtigkeit:
Was verstehst du unter Gerechtigkeit?
-
- Gleiches Recht für alle Menschen, unabhängig von Herkunft, Tätigkeit, etc.
- Das richtige tun/bekommen.
- Das jeder bekommt was er verdient.
- Jeder sollte dieselben Möglichkeiten im Leben wahrnehmen können.
- Wenn jemand gleichwertiges Leid/Glück erfährt wie alle anderen.
- Harte Durchsetzung gegen Kriminalität z.B. Stadionausschreitungen führen zu Stadionverbot. Verbrechern droht Gefängnis unter Ausschluss der Öffentlichkeit.
- Jeder soll seine Strafe bekommen.
- Jemanden zu bestrafen, der es verdient hat

Lebensqualität
Was bedeutet für dich Lebensqualität?
- Haben was man braucht und mehr.
- Ist die Bewertung des Lebens an einem Ort, Land, bzw. Gegenstand und der Umstände die dort vorherrschen.
- Freude am Leben, Komfort
- Alles tun zu können, ohne eine ungewisse Zukunft zu haben.
- Ohne Sorgen durchs Leben zu gehen.
- Meine Freiheit nutzen zu können.
- Wunschlos glücklich zu sein, wenn nichts im Leben fehlt, sich sicher zu fühlen.
- Sachen zu besitzen die mehr als ein Bedürfnis abdecken.
- Sicher leben

Wie hängen Lebensqualität und Biometrie möglicherweise zusammen?
-
- Durch Biometrie kann Lebensqualität verbessert (höhere Sicherheit, höherer Komfort) und verschlechtert (Datenveröffentlichung, schlechterer Datenschutz, Eingriffe in Privatsphäre) werden.
- Medizin, Komfort
- Über die Sicherheit.
- Erhöhung der Sicherheit, Erhöhung der Lebensqualität.
- Biometrie hinsichtlich Überwachung kann die Lebensqualität senken.
- Sicherheit gewährleisten.
- Biometrie könnte den Komfort erhöhen.
- Je besser die biometrischen Verfahren, desto sicherer das Leben, möglicherweise.

II.2 Value Discussion on „Dual Use Dilemma in Pathogen Research“

Questionnaire Questions:

Werte und Pathogene

1.) Sicherheit

Was bedeutet **Sicherheit** für dich?

Wie würdest du Sicherheit erklären? Was verstehst du darunter?

Vor welchen spezifischen Bedrohungen ist Sicherheit notwendig?

Wo denkst du dass es Sicherheitsprobleme gibt?

Wer gefährdet Sicherheit?

Was bedeutet Sicherheit in Bezug auf Pathogenforschung?

Welchem der folgenden Sicherheits-Prinzipien sollte Pathogenforschung deiner Meinung nach gehorchen?[43]

0 Größtmögliche Vorsicht,

0 Größtmöglicher Nutzen,

0 Größter wahrscheinlicher Nutzen

0 Größter wahrscheinlicher Schaden

Wird die Welt durch Technologien wie Pathogenforschung sicherer? Warum?

Fühlst du dich sicher vor Pathogenen?

Wenn ja, - warum fühlst du dich sicher und wo/inwiefern würdest du dich bezüglich Pathogenen unsicher fühlen?

Wenn nicht – warum fühlst du dich gefährdet?

Freiheit der Forschung:

Was heißt Freiheit der Forschung?

Welchen Nutzen hat diese?

Kannst du dir vorstellen warum es diese gibt?

Ist die Freiheit der Forschung gefährdet?

Wo sollte diese beschützt werden?

Wo ist die Freiheit der Forschung unakzeptabel?

[43] Note: Note: Due to a mistake this question was not posed in this way in the questionnaire in VDSPII. Although the ill formulated question was explained by the moderators, we took this question out of the analysis.

Fortschritt:

Was bedeutet Fortschritt für dich?

Was bringt technologischer Fortschritt mit sich?

Kommt Fortschritt nicht automatisch/sowieso?

Gibt es moralischen oder ethischen Fortschritt der Menschheit?

Ist Fortschritt Mittel oder Zweck? Warum?

Kann Fortschritt gefährlich sein?

Responses:

Was bedeutet Sicherheit für dich?
- Wohliges Gefühl in gewohnter Umgebung, Schutz vor jedweder Gefahr (äußerlicher Einfluss)
- Abschirmung gegen (Probleme) Bedrohungen
- Die generelle Absicherung gegen Bedrohungen
- Sehr viel, es ist wichtig sich sicher zu fühlen. Keine Gefahr -> alles gut, keine Bedrohung.
- Keine Gefahr für die Öffentlichkeit
- Geborgenheit, frei sein ohne Gefahren
- Ein Gefühl das ich nicht besorgt sein muss über grundlegende Bedürfnisse/Zustände/Menschenrechte
- Kontrollierte Verfahren, wo nichts unkontrolliertes/schädliches passieren kann
- Keine Angst haben zu müssen.
- Keine Gefährdung der zivilen Bevölkerung
- Keine Gefährdung für Forscher und Außenstehende

Wie würdest du Sicherheit erklären? Was verstehst du darunter?
-Beruhigendes, beschützendes Gefühl, jegliches Unwohlsein verfliegt.
- s.o.
-Die generelle Absicherung gegen Bedrohungen.
-s..o.
- Gefahren ausschalten, Gesundheit bewahren
- Sicherheit ist für mich, geschützt sein vor allen möglichen Gefahren.
- Vor einer Bedrohung beschützt zu sein (Bedrohung, grundlegende Bedürfnisse werden gefährdet)
- Dass die Gesundheit des Menschen im Vordergrund bleibt.
- Schutz vor Gefahren
- Siehe oben
- Siehe oben

Vor welchen spezifischen Bedrohungen ist Sicherheit notwendig?
- Vor Krankheiten die durch Keime, Bakterien, Viren, etc ausgelöst werden,
vor Menschen mit bösen Absichten
vor Tieren die ihren primitiven Instinkten folgen und uns schaden bzw. töten.
- Verbrechen aller Art, Terrorismus, Infektionen, Pandemien,…
- Terrorismus, gesundheitliche Bedrohungen, Meinungsfärbungen

- Vor vielen
- Atombombe, Kriminalität, Umwelt/Naturkatastrophen
- Vor Kriminellen, vor Atomunfällen, vor Naturkatastrophen
- Verlust von Haus/Leben/Nahrung/Familie/Freiheit
- Terrorismus, kriminalistische Handlungen, Unfälle, Angriffe (ABC)
- Gefährliche Substanzen, Mutanten
- Vor Gefährdungen der zivilen Bevölkerung
- Austreten von pathogenen Keimen aus dem Untersuchungslabors

Wo denkst du dass es Sicherheitsprobleme gibt?
- Bei manchen sanitären Anlagen, Krankenhäuser, Labors, etc.
- Überall
- Fast überall
- Keine Ahnung, gibt genug.
- Atomkraftwerke
- Arabische Welt, Fußballstadien
- Vor allem bei Freiheit (Meinungsfreiheit, etc.) und beim Leben (Anschläge, etc.)
- Bei undurchdachten Projekten
- Geldhungrige Menschen
- Im Labor
-

Wer gefährdet Sicherheit?
- Unvorsichtige Menschen
- Terroristen, Verbrecher aller Art, Saboteure
- Jeder der ernstzunehmende Sicherheitsvorkehrungen missachtet
- Verbrecher ?!?
- Respektlose, sorglose und überängstliche Menschen.
- Kriminelle Leute die aus dem Vertrauensgrundsatz fallen (zum Bsp. ältere Leute am Steuer)
- Der Staat, Terroristen, korrupte Staatsmänner, andere wichtige Leute, Naturkatastrophen
- Leute die sich nicht an die Regeln halten
- Gedankenlose Menschen
- Pathogene
- (was statt wer) Unsachgemäßes Arbeiten als Pathogenforscher

Was bedeutet Sicherheit in Bezug auf Pathogenforschung?
- Sterile Haltung im Labor, nichts was mit Keimen in Berührung gekommen ist soll angefasst werden -> sterilisiert.
- Dass hinsichtlich der Forschung keinerlei Probleme auftreten, die zu Bedrohungen ausarten
- Maßnahmen damit pathogene Keime in gesicherter Atmosphäre bleiben.
- Wichtig: -> Pathogene sind nicht ungefährlich, Arbeit damit auch nicht, sollten nicht in Umwelt gelangen
- Keine Verbreitung, sicheres Arbeiten (Schutzräume usw.)
- Sicherheit bedeutet in Bezug auf Pathogenforschung, die Pathogene jederzeit unter Kontrolle zu haben.
- Die Forschung in einem sicher abgeschlossenen bereich durchführen.
- Richtiger Umgang im Labor
- Überwachung des Systems

- Keine Gefährdung für Forscher und Außenstehende

Welchem der folgenden Prinzipien sollte Sicherheit deiner Meinung nach gehorchen?

0 Größtmögliche Vorsicht	(9points)
0 Größtmöglicher Nutzen	(7 points)
0 Größtmöglicher wahrscheinlicher Nutzen	(4 points)
0 Größtmöglicher wahrscheinlicher Schaden	(2 points)
	(Each participant allotted two points)

Wird die Welt durch Technologien wie Pathogenforschung sicherer? Warum?
- Mehr Schutz vor Krankheiten durch Medikamente aber auch weniger Resistenz vom eigenen Körper gegen neue Pathogene.
- Ja, tw.: weil dadurch Infektionen, Pandemien, …unterbunden werden könnten (tw.) und Bedrohungen generell besser gehandhabt werden könnte.
- Vielleicht, alles hat 2 Seiten
- Ja und nein, ja im medizinischen Sektor, nein militärisch genutzt
- Nein
- Nein, da gefährliche neue Pathogene entdeckt werden könntenn, die für kriminelle Zwecke genutzt werden könnten.
- Das Keime welche die Menschheit ausrotten könnten nicht frei kommen.
- Bei sinnvoller/friedlicher Nutzung, ja. Bei Nutzung auf kriegerischer Basis nicht.
- Nein Pathogene werden bloß aggressiver
- Nicht zwangsläufig
- falls sicher in diesem Zusammenhang geschützt vor Krankheiten bedeutet dann ja.

Fühlst du dich sicher vor Pathogenen?
- Nein
- Nein
- Nein
- Ja
- Ja
- Ja
- Ich fühle mich nicht bedroht
- Ja
- Ja
- Ja
- Ja

Wenn ja - warum fühlst du dich sicher und wo/inwiefern würdest du dich bezüglich Pathogenen unsicher fühlen?
- Hab nicht wirklich viel Kontakt mit ihnen gehabt, wenn Biowaffen wirklich eingesetzt werden.
- Eigentlich ja, aber ich sehe einige Gefahren (Waffen, Krankheiten)
- Weil ich drauf vertraue, dass die Forscher vernünftig sind
- Weil ich nicht denke, daßgeheim und unkontrolliert an einem speziellen Pathogen gearbeitet wird, welches in die Umwelt gelangen könnte.
- Gutes Immunsystem als Baby gebildet
- Ja, aber ich versuche mein Immunsystem zu schützen ohne mich von Medikamenten abhängig zu machen.

- Österreich besitzt sehr große Sicherheitsstandards bei forschungen und ist gut in Bekämpfung pathogener Stoffe (Herstellung von Impfstoffen etc.). Und ich hab ein gutes Immunsystem.

Wenn nicht, warum fühlst du dich gefährdet?
- Sie sind überall! Man kann nicht verhindern sie ganz „auszulöschen“ man riskiert immer sich anzustecken.
- weil Menschen unberechenbar sind, Immunsystem lückenhaft
- Absicherung dass Keime nicht nach außen dringen nicht besonders groß.
- Ich fühle mich sicher, da ich noch nicht wirklich mit Pathogenen in Kontakt gekommen bin.
.

Freiheit der Forschung:
Was heißt Freiheit der Forschung?
- Alles erforschen wozu man Lust hat, ohne ethische Gründe.
- Forschen nach Herzenslust ohne Einschränkung.
- Unter Berücksichtigung moralisch/ethischer Werte, ungehindert Forschen und Testen zu können.
- Das zu erforschen was man will
- Arbeit ohne Grenzen (moralisch, politisch)
- In alle Richtungen, alle Ideen dürfen verfolgt werden.
- Jeder darf forschen was er will
- Dass ein gewisses Themengebiet durchgesetzt wird, mit all seinen Facetten
- Forschen ohne Zeitverschwendung durch Bürokratie, Außer acht lassen können von ethischen Diskussionen
- Keine Einschränkungen.
- Sich nicht mit Ethikproblemen auseinandersetzen zu müssen.

Welchen Nutzen hat diese?
-Freies Forschen in spezifischen Bereichen
-schnellerer Fortschritt
-möglichst großer Fortschritt
-Technischer Fortschritt bei großer Freiheit ist schneller
- schnelles Fortschreiten
- Sie bringt Fortschritt, da man den Geist nicht einschränkt.
- viele verschiedenen Entwicklungen
- breites Spektrum an verschiedenem technischen Fortschritt
- Erkenntnisse in bereichen, die sonst nicht möglich gewesen wären.
- Keine Einschränkungen
- Es bietet sich ein breites Spektrum an Forschungsmöglichkeiten.

Kannst du dir vorstellen warum es diese gibt?
-damit ohne Einschränkungen geforscht wird, wodurch keine z.B Zeitverluste, Probleme auf einfachsten Weg umgangen bzw. gelöst werden können.
-Ja
-
- Nein
- Ja
- Damit viel neues entwickelt wird

- Um Fortschritt zu erreichen
- Um schneller forschen zu können.
- Missbrauch
- Weil Forschung sonst nicht vorkommen würde.

Ist die Freiheit der Forschung gefährdet?
- Ja
- Teilweise
- Keine Ahnung in Österreich denk ich mir nicht
- Ja
- Ja
- Ja
- Ja durch Ethik und Moral
- Ja
- Ja
- Ja

Wo sollte diese beschützt werden?
- Z.B. Einschränkung der auf Profit konzentrierten Personen -> Einfluss
- Wenn Religion eingreift -> Forschung sollte darüber stehen.
- Gar nicht
- Nein
- Im Bereich der Medien
- Überall
- Muss sie das?
-

Wo ist die Freiheit der Forschung unakzeptabel?
- Bei moralischen und ethischen Grundsätze überschreiten.
- Beim Militär
- Über die Menschenrechte hinaus
- Gewisse Grenzen sollten eingehalten werden, Arbeit sollte vertretbar sein.
- Überall
- Im Bereich der Vernichtung der Menschheit, wenn es nicht mehr ethnisch richtig ist.
- Im Bereich des Ausselektieren von nachkommen (-> Supermenschen)
- Folter
- Wenn moralische Aspekte übergangen werden.
- Noch nirgends unakzeptabel, aber schon oft beeinträchtigt.

Fortschritt
Was bedeutet Fortschritt für dich?
- Neue Technologien -> weniger Arbeit (für den Menschen), schnellere Ergebnisse.
- Neue Technologien
- Entwicklung neuer Technologien.
- Neue Sache, immer
- sinnvolle Weiterentwicklung
-
- Technisches Voranschreiten

- Innovative und neue Technologien
- Entwicklung neuer Technologien
- Weiterentwicklung von Methoden und Erlangen von wissenschaftlichen Erkenntnissen

Was bringt technologischer Fortschritt mit sich?
-Weniger Arbeitsplätze
- Problemlösungen
- Probleme
- Veränderung, Weiterentwicklung
- Gefahren, Lebensqualität
- Gefahr des Missbrauchs
- Neue Möglichkeiten -> Hilfe im Alltag
- Faulheit
- Müll, Verantwortung
-

Kommt Fortschritt nicht automatisch/sowieso?
- Doch Bsp. sieht man in der Vergangenheit Bsp.: Genetik, DNA-Untersuchung, etc.
- Nein von nichts kommt nichts
- Nein
- Nein, ohne Forschung/Entwicklung nicht
- Doch
- Nicht immer
- Nein
- Doch
- Er kommt automatisch, da Konzerne im Wettstreit immer bessere Produkte als ihre Konkurrenz haben wollen

Gibt es moralischen oder ethischen Fortschritt der Menschheit?
-Wie man es nimmt, überall werden Regeln gebrochen.
-
-Ja
-Vorstellungen ändern sich, also auch die Moral
- moralisch ja, ethisch nein
- Ja
- Entwicklung schon, ob es ein fortschritt ist, ist subjektiv.
- Manchmal
- Es gibt immer mehr ethische Bedenken

Ist Fortschritt Mittel oder Zweck? Warum?
- Beides je nach Einsatzgebiet und Ziel (was damit erreicht werden möchte)
- Mittel
- Mittel zur Weiterentwicklung
- Er stellt beides dar.
- Zweck da er genutzt wird um einen neuen technischen Standard zu erreichen
- Mittel zum besseren Leben
- Beides

- Ja (er kommt automatisch, da Konzerne im Wettstreit immer bessere Produkte als ihre Konkurrenz haben wollen)

Kann Fortschritt gefährlich sein?
- Sehr gefährlich bspw. ABC-Waffen.
- Ja
- Ja
- Sicherlich, vor allem wenn man nicht weiß, wie es wirkt bzw. noch wenig darüber weiß.
- Ja
- Ja
- Ja, z.B. neue Waffen.
- Ja
- Ja aber nur bei Vernachlässigung der Sicherheit.

III.) *MCM*

III.1) Scenarios “Biometrics – Security- or Surveillance Technology“:

Szenarios:

Vision 1: Präventionsstaat als der sichere Staat der Zukunft

Argumentation/Einschätzung Biometrie als Sicherheitstechnik:
Die biometrische Identifikation von Personen und die weitgehende Implementierung dieser Technik im Alltag bietet vielversprechende Möglichkeiten die Sicherheit im Zusammenleben zum Wohle der Gesellschaft zu erhöhen und Gerechtigkeit zu gewährleisten.

Mögliche Konsequenzen dieser Einschätzung:
Option-Legislative:
Die Befugnisse der Exekutive werden stark ausgeweitet.

Option-Exekutive:
Der Schwerpunkt der Tätigkeit der Sicherheitsbehörden ist biometrischen gestützt, umfangreiche Kontrollen an allen öffentlichen Orten und besonders an Hotspots wie Flughäfen, Bahnhöfen, Regierungsgebäuden, etc. sind implementiert. Umfangreiche Mittel werden für die Umsetzung und die Verbesserung biometrischer Systeme, sowie für die Schulung von qualifiziertem Personal bereitgestellt.

Option-Judikative:
Sämtliches verfügbares biometrisches Beweismaterial wird zugelassen. Auch kleinere Delikte, die durch Biometrik aufklärbar sind, werden mittels dieser Technik verfolgt.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Argumentation/Einschätzung Biometrie als Sicherheitstechnik
Biometrische Identifikation ist eine Technologie, die Sicherheit in gewissen Bereichen erhöhen kann, die aber als global bzw. allgegenwärtig angewandte Überwachungstechnik abzulehnen ist.

Mögliche Konsequenzen dieser Einschätzung:

Option-Legislative:
Biometrie wird als Sicherheitstechnik zum punktuellen und zielorientierten Einsatz für Ermittlungsbehörden gesetzlich gedeckt.

Option-Exekutive:
Ermittlungsbehörden kommen ihrer Verpflichtung nach in ihren Erhebungen transparent zu sein und Eingriffe in Persönlichkeitsrechte zu rechtfertigen. Jegliche Amtshandlung geschieht juristisch gedeckt und erfordert bei personenbezogenen Ermittlungen richterliche Verfügungen. Bei „hinreichendem Verdacht“ und bei „Gefahr im Verzug“ haben Behörden diesbezüglich allerdings Spielräume.
Mittel zur Investition in diese Technologie werden dem Staatsapparat begrenzt freigegeben.

Option-Judikative:
Biometrisches Beweismaterial wird nur unter bestimmten Auflagen und mit fundierter Begründung zugelassen.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Argumentation Einschätzung Biometrie als Überwachungstechnik
Biometrische Identifikation ist eine Technologie, die Gerechtigkeit in einem höheren Ausmaß gewährleisten kann, dies darf aber nur unter starker Berücksichtigung der individuellen Bürgerrechte erfolgen, d.h. die Verhältnismäßigkeit muss genauestens und von Fall zu Fall abgewogen werden.

Mögliche Konsequenzen dieser Einschätzung:

Option Legislative
Biometrie wird als Sicherheitstechnik zum punktuellen und zielorientierten Einsatz unter sorgsamer Berücksichtigung der Bürgerrechte (Datenschutz, Privatsphäre, etc.) für Ermittlungsbehörden freigegeben/gesetzlich gedeckt.

Option Exekutive:
Nur gewisse Ermittlungsbehörden dürfen Biometrische Verfahren unter strengen Auflagen einsetzen. Jeder Einsatz muss beantragt, stichhaltig gerechtfertigt und richterlich verfügt werden. Unabhängige Verwaltungsorgane überwachen und kontrollieren den Biometrieeinsatz, der transparent und genauestens dokumentiert werden muss. Die Entwicklung von biometrischer Technik wird nicht gefördert

Option-Judikative:
Biometrisches Beweismaterial wird nur unter strengen Auflagen und umfangreicher, nachvollziehbarer und stichhaltiger Begründung zugelassen.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Vision 4 Nachtwächterstaat:

Argumentation Einschätzung Biometrie als Überwachungstechnik:

Die Biometrie ist eine existentielle Gefahr für die freie und offene Gesellschaft und ein Schritt hin zum Totalitarismus.

Mögliche Konsequenzen dieser Einschätzung:

Option-Legislative:
Die (weitere) Implementierung der Biometrik als Sicherheits- bzw. Überwachungstechnik im Alltagsleben wird vom Gesetzgeber aufgrund ihres Missbrauchpotentials und unter Bezug auf Freiheits- und Bürgerrechte unterbunden.

Option-Exekutive:
Biometrik wird nicht als Überwachungs-, als Ermittlungs-, als nachrichtendienstliche, oder als Sicherheitstechnik verwendet. Privatunternehmen ist biometrische Technik nur zur Verifizierung von Identitäten in zertifizierten Hochsicherheitsgebäuden erlaubt.

Option-Judikative:
Unerlaubter Einsatz von biometrischer Technik wird strengstens bestraft, sowohl mittels Amtshaftung als auch durch persönliche strafrechtliche Verfolgung der Verantwortlichen.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Version 5 „ Neoliberale“ Staat

Argumentation/Einschätzung: Biometrie als Wirtschaftsfaktor.
Biometrie ist eine Technologie, die neue Dienstleistungen ermöglicht. Durch Biometrie kann der privilegierte Zugang zu Luxusgütern bzw. der gestaffelte Zugang zu diversen Dienstleistungen in Ämtern oder Geschäften geregelt werden. Diese kundenorientierte Marktsegmentierung schafft Arbeitsplätze, einerseits da Nachfrage nach neuen personalisierten Dienstleistungen geschaffen wird und andererseits, da die breite Implementierung der Biometrie als dienstleistungsregulierende Technik auch geschultes Wartungspersonal erfordert.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Version 6 Klassenstaat, die segmentierte Gesellschaft:

Argumentation/Einschätzung: Biometrie als sozialer Zugangs/Segmentierungsmechanismus

Die Inanspruchnahme von öffentlichen und privaten Dienstleistungen sowie der Zugang zu diversen Ressourcen benötigt eine biometrische Identität (bzw. einen in allen/den meisten Datenbanken gespeicherten „biometrischen Pass“). Aufgrund der technischen Entwicklungen (Innovation/Fälschungsproblematik) muss dieser Pass regelmäßig erneuert werden. Dies ist kostspielig und nicht jeder kann sich das leisten. Des Weiteren ist es oft auch notwendig sich in spezielle biometrische Datenbanken einzukaufen um Zugang zu Dienstleistungen und Institutionen zu haben.
Dies führt dazu, dass das Leben der Wenigverdienenden massiv von sozialem Ausschluss aufgrund mangelnder „biometrischer Identität“ geprägt ist.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Argumentation/Einschätzung: Biometrie als nationale Zuwanderungssteuerung.
Jede/r BürgerIn eines Landes verfügt über eine „biometrische Identiät“, ohne die Teilnahme an sozialem Leben nicht möglich ist, da sie für beinahe jede Tätigkeit notwendig ist (Lebensmitteleinkauf, Theaterbesuch, Autofahren). Biometrische Identität heißt diesbezüglich, dass man in einer zentralen Datenbank gespeichert ist, auf die ständig und von überall zugegriffen werden kann.
Diese biometrische Identität ist prinzipiell für BürgerInnen (EU, USA, Japan, Kanada, Australien) kostenlos, ausländische Reisende und Zuwanderungswillige können diese käuflich erwerben. Bei qualifizierten Zuwanderungswilligen wird nach Bedarf der Nationalökonomie von Beamten über die kostenlose oder mit geringen Kosten verbundene Erteilung einer biometrischen Identität entschieden.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Biometrische Technologie ist weit verbreitet. Biometrische Datenbanken wird vor allem von der Wirtschaft genutzt um sich über Angestellte, BewerbungskandidatInnen oder auch KundInnen zu informieren und um so die Produktivität und die strategische Ausgerichtetheit des Unternehmens zu optimieren.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Szenario-Ranking

Die Szenarien werden geordnet, das attraktivste oder ansprechendste Szenario als Nr.1, etc.:

	Nr.1
	Nr.2
	Nr.3
	Nr.4
	Nr.5
	Nr.6
	Nr.7
	Nr.8
	Nr.9

Kriteriengewichtung

100 Punkte werden insgesamt vergeben, alle Kriterien die in der persönlichen Bewertung der Szenarios eingesetzt wurden, können dabei gewichtet werden.

III.2) Scenarios „Dual Use Dilemma in Pathogen Research“:

Szenarien:

Szenario 1 Totale Pathogenforschungsfreiheit, geringe Sicherheit:

Argumentation und Einschätzung: Pathogenforschung als große Chance für die Menschheit, die genutzt werden muss. Auch potentielle Risikoforschung ist als „business as usual“ zu betrachten:
-Bei Pathogenforschung gibt es wie bei jeder Forschung ein Restrisiko, das man in Kauf nehmen kann/muss.
- Wissenschaftlicher Fortschritt durch Pathogenforschung ist vielversprechend und fruchtbar um zum Wohle der Menschheit beizutragen.
- Staatliche Kontrolle im biotechnologischen Bereich ist kostenintensiv, nutzlos, ineffizient und keinesfalls notwendig.
- Die Selbstkontrolle der WissenschaftlerInnen reicht als Vorsichtsmaßnahme aus.
- Eigene/zusätzliche Strafbestände zum herkömmlichen Strafrecht und juristische Sanktionsmittel sind nicht notwendig.

Option-Legislative: (Größtmögliche) Liberalisierung der Forschungsrichtlinien und Gesetzgebung im Pathogenforschungsbereich.

Option-Exekutive: Keine Kontrollen.

Option-Judikative: Keinerlei Sanktionen.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Szenario 2 Weitgehende Pathogenforschungsfreiheit, eingeschränkte Sicherheit:

Argumentation/Einschätzung: Pathogenforschung als Chance mir überschaubaren Risiken für die Menschheit: reglementierte Pathogenforschung mit großen Spielräumen:

- Zwar bietet Pathogenforschung großes Potential zum Wohle der Menschheit, nichtsdestotrotz gibt es auch ein nicht völlig zu vernachlässigendes Restrisiko.
- Grundlegende ethische Richtlinien und grundsätzliche verfahrenstechnische Richtlinien sollen vom Gesetzgeber im biotechnologischen Bereich vorgeschrieben werden, ohne jedoch Forschung zu behindern oder einzuschränken.
- ForscherInnen verfügen über das notwendige Know-How und über das notwendige Verantwortungsgefühl und treffen so die besten Entscheidungen im Sinne der Gesellschaft.
- Flächendeckende staatliche Kontrolle ist im biotechnologischen Bereich prinzipiell nicht notwendig, vereinzelte Stichproben reichen aus um allgemeine Sicherheit bzw. sorgsamen Umgang mit potentiellen Risiken zu gewährleisten. Kurze Rechenschaftsberichte seitens der ForscherInnen tun der Sicherheit genüge.
- Nichtbefolgung der allgemeinen ethischen Richtlinien oder allgemeinen verfahrenstechnischen Auflagen wird, wenn nachgewiesen, mit Verwaltungsstrafen hinlänglich sanktioniert.

Option-Legislative: *Grundsätzliche und allgemeine ethische und verfahrenstechnische Richtlinienvorgabe ohne den Forschungsbetrieb zu behindern*. Zusätzlich kann noch ein auf freiwilliger Basis zu befolgender Branchen-Kodex zur Sicherheit beitragen.

Option-Exekutive: *Vereinzelte Kontrollen und Rechenschaftsberichte schaffen genügend Sicherheit.*

Option-Judikative: Verwaltungsstrafen bei Verstößen.

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Szenario 3: Weitgehend gewährleistete Sicherheit, eingeschränkte Forschungsfreiheit:

Argumentation/Einschätzung: Pathogenforschung als Gefahr:
-Forschung im Pathogenbereich ist riskant und eröffnet zahlreiche gefährliche Möglichkeiten. Die Folgen und mögliche Konsequenzen von Forschung im biotechnologischen Bereich Pathogene müssen deshalb jeweils fallspezifisch sowohl vom Staat als auch von den ForscherInnen bedacht werden.
- Sorgfältige Reglementierung ist notwendig, Reglementierungen greifen nur mit gleichzeitigen Kontrollen, da sie sonst in der Praxis als zahnlose Papiertiger gelten.

Option-Legislative: *Strenge Reglementierung durch den Gesetzgeber mithilfe fachlicher Beratung durch Experten (Praxisnähe) als Notwendigkeit*

Option-Exekutive: *Flächendeckende und strenge Kontrollen durch hochqualifiziertes Personal sind notwendig.*

Option-Judikative: *Verstöße werden schwer bestraft, hohe Geldstrafen der Unternehmen, Lizenzentzug, „Approbationsentzug“.*

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Szenario 4, Völlige Sicherheit totales Forschungsverbot:

Argumentation, Einschätzung: Pathogenforschung als existentielle Bedrohung für die Menschheit:
- Die Forschung bezüglich Pathogenen findet in einem Hochrisikobereich statt und muss so weitgehend wie möglich – im besten Fall total – unterbunden werden, da diese Forschung eine unabschätzbare Gefahr für die Menschheit darstellt.
- Der mögliche gesellschaftliche Nutzen der Forschung im Pathogen-Bereich kann auch durch andere und weniger riskante Forschungsbereiche erzielt werden.
- Ein Verbot ist nur mit effizienten und weitreichenden Kontrollen durchsetzbar.

Option-Legislative: *Völliges Forschungsverbot in diesem Bereich.*

***Option*-Exekutive:** *Flächendeckende und strenge Kontrollen sind ständig notwendig.*

Option-Judikative: Verstöße werden nicht nur strafrechtlich verfolgt sondern auch schwer bestraft (mehrjährige Haftstrafen für alle Beteiligten, Existenz bedrohende Geldstrafen für beteiligte Unternehmen).

Szenario-Bewertung:

Kriterien	Wahrscheinliche Szenario-Performance (0-10)	Performance-Spanne (0-10)	
		Minimale Performance	Maximale Performance

Szenario-Ranking

Die Szenarien werden geordnet, das attraktivste oder ansprechendste Szenario als Nr.1, etc.:

	Nr.1
	Nr.2
	Nr.3
	Nr.4
	Nr.5
	Nr.6
	Nr.7
	Nr.8
	Nr.9

Kriteriengewichtung

100 Punkte werden insgesamt vergeben, alle Kriterien die in der persönlichen Bewertung der Szenarios eingesetzt wurden, können dabei gewichtet werden.

IV.) The Policy Summaries used in the Policy Discussions:

IV.1 Policy Discussion on “Biometrics – Security- or Surveillance Technology:

Policy Discussion Biometrics

Das 7te Rahmenprogramm für Forschung und technologische Entwicklung (FP7) der Europäischen Kommission ist der Versuch Politik/politische Ideen (Absichtserklärungen, Vorschläge und Schlussfolgerungen aufbauend auf Problemanalysen) aktiv umzusetzen bzw. in die Tat umzusetzen indem Forschung gefördert und gesteuert wird.
Dies geschieht indem Ausschreibungen zu bestimmten Themen veröffentlicht werden, die WissenschaftlerInnen und Institutionen auffordern spezifische Projekte einzureichen, die gefördert werden, wenn einerseits die Qualität stimmt und andererseits das Projekt den Kriterien des Calls/ der Ausschreibung entspricht.

Im Folgenden findet sich eine kurzer Abriss (Werte, Zielsetzungen und Grundannahmen) des Work Programme „Cooperation - Theme Security“, das viele Projekte, die biometrische Techniken erforschen/entwickeln fördert.

1.) Grundannahmen:

Sicherheit ist eine (Vor-)Bedingung für
- Wohlstand,
- Freiheit,
- Gerechtigkeit und
- Transparenz bezüglich Wissens.

Diskussionsfrage:
Ist diese These in ihren einzelnen Punkten richtig? Wie würdet ihr argumentieren, dass dem so ist, oder dass dem nicht so ist?

2.) Zielsetzungen:

-> Die Erhöhung der Sicherheit in Europa. (vor Terrorismus, Kriminalität und Naturkatastrophen).

-> Die Verbesserung der Effizienz von Forschung und Entwicklung im Bereich Sicherheit.

-> Die Verbesserung der Effektivität von Forschung und Entwicklung im Bereich Sicherheit

-> Die Stärkung der Konkurrenzfähigkeit der europäischen Sicherheitsindustrie

Diskussionsfrage:
Welche Zielsetzungen teilt Ihr? Warum teilt ihr diese?
Welche Zielsetzungen seht ihr kritisch? Warum seht ihr diese kritisch?
Welche Zielsetzungen seht ihr als besonders notwendig bzw. als besonders unwichtig an?

3.) Maßnahmen:
Die Sicherheit der BürgerInnen soll dabei durch folgende Maßnahmenpakete erhöht werden:

- Die Erhöhung der Sicherheit der Infrastruktureinrichtungen und anderer wichtiger Einrichtungen

- Die Entwicklung von intelligenten Überwachungssystemen und die Erhöhung der Sicherheit an den Grenzen

- Erhöhung der Kapazitäten zur Wiederherstellung von Sicherheit (security) und “safety” in

Krisenfällen.

- Die Verbesserung des Integrationsgrades, der Interkonnektivität und der Kompatibilität von Sicherheitssystemen.

> *Diskussionsfrage:*
> *Wie beurteilt ihr die Maßnahmen im Einzelnen? Sind Sie hinsichtlich der Zielsetzungen und hinsichtlich der Grundannahme stimmig und sinnvoll? Welche Maßnahme würdet ihr als besonders wichtig bzw. unwichtig hervorheben?*

4.)Im Dokument formulierte Einschränkungen:
Die fundamentalen Menschenrechte und Privatsphäre sollen respektiert werden, Privatsphäre und andere BürgerInnenrechte sollen abgesichert werden.
Ethische Prinzipien müssen in Betracht gezogen werden und die Integrität von Informationen und Personen muss gewahrt bleiben.

Kommentar:
Im Gegensatz zu den konkret formulierten Zielsetzungen und Maßnahmenpaketen bleiben die Aussagen zu Menschen- und BürgerInnenrechten allgemein. Die Frage warum dies so ist könnte zu folgenden Hypothesen führen:

- Weil die diesbezüglichen Definitionen und Richtlinien selbstverständlich sind?

- Weil von Fall zu Fall über die Grenzziehungen entschieden wird, bspw. ab wann Privatsphäre geschützt werden muss?

- Weil es unter den EU-Mitgliedsländer bezüglich der Auslegung von Bürgerrechten und -freiheiten Unterschiede gibt?

- Weil der Verweis auf die EMRK und die Grundrechte/freiheiten ausreichend ist?

> *Diskussionsfragen:*
> *Sollte expliziter ausformuliert und definiert werden, inwieweit Bürgerrechte und Grundfreiheiten im Rahmen der Sicherheitsforschung abgesichert werden sollen?*
>
> *Wie könnte das geschehen? Welche Vorteile und Nachteile würde das mit sich bringen?*

5.) Werte, die das Dokument nennt:

- Sozio-ökonomischer Fortschritt
- Wohlstand
- Schutz der Umwelt
- Freiheit
- Gerechtigkeit
- Gesundheit
- Anwendbares Wissen
- Datenschutz

- Soziale Kohäsion
- Marktgeeignetheit
- Effizienz
- Effektivität
- Wettbewerbsfähigkeit

Diskussionsfragen:
Könnt ihr euch auf die 5 wichtigsten Werte und die drei unwichtigsten Werte einigen?

Wie würdet ihr die Werte auf die ihr Euch einigt definieren/erklären?

Wie begründet ihr Eure Wahl?

(Bspw. Wir konnten uns darauf einigen, dass für uns Gerechtigkeit, Wohlstand und Schutz der Umwelt die wichtigsten Werte sind. Gerechtigkeit bedeutet für uns…, Wohlstand bedeutet für uns…)

IV.2 Policy Discussion on "Dual Use Dilemma in Pathogen Research"

Policy Discussion Pathogene:
Das 7te Rahmenprogramm für Forschung und technologische Entwicklung (FP7) der Europäischen Kommission ist der Versuch Politik/politische Ideen (Absichtserklärungen, Vorschläge und Schlussfolgerungen aufbauend auf Problemanalysen) aktiv umzusetzen bzw. in die Tat umzusetzen indem Forschung gefördert und gesteuert wird.
Dies geschieht indem Ausschreibungen zu bestimmten Themen veröffentlicht werden, die WissenschaftlerInnen und Institutionen auffordern spezifische Projekte einzureichen, die gefördert werden, wenn einerseits die Qualität stimmt und andererseits das Projekt den Kriterien des Calls/ der Ausschreibung entspricht.

Pathogenprojekte werden unter anderem im Rahmen verschiedener ERC Grants (FP7, Themen „People" und „Ideas") gefördert und im Rahmen des FP7 Themas „Health". Im Folgenden findet sich eine kurzer Abriss (Werte, Zielsetzungen und Grundannahmen) des Arbeitsprogramms „Health" hinsichtlich Pathogenforschung.

1.) „Health"-Grundannahmen:
Ursachen, Erscheinungsformen, Konsequenzen und die Behandlung von Krankheiten unterscheiden sich oft zwischen Älteren, Kindern, Männern und Frauen.

Diskussionsfrage:
Ist diese These in ihren einzelnen Punkten richtig? Wenn nein warum nicht?

2.) „Health" -Zielsetzungen:

- Die Gesundheit der europäischen BürgerInnen verbessern

- Schwerpunktförderungen im Bereich Gesundheit der Jugend und der Kinder („Kindergerechte“ Medizin, „kindergerechte“ Medikamente und Medikationen)

- Steigerung der Unabhängigkeit, Mobilität und der Lebensqualität der älter werdenden Bevölkerung. Bspw. durch Forschungsschwerpunkt „Wiederaufbau des Immunsystems bei älteren Menschen.“

- Die Wettbewerbsfähigkeit und die Innovationskapazitäten von europäischer Industrie und Wirtschaft (Klein- und Mittelbetriebe) im Feld Gesundheit (Biotechnologie, Medizintechnik, etc.) stärken.

- Vertiefung der Kooperation mit Entwicklungsländern um Forschungskapazitäten aufzubauen.

- Verbesserung der Präventionsmaßnahmen bezüglich auftretender Epidemien.(Influenza, z.B SARS, etc.)

- Verbesserungen bei der Entwicklung von Medikamenten.

- Therapien evaluieren, neue Therapien entwickeln.

-Verbessern des Entdeckens, Diagnostizierens und Überwachens von Krankheiten und Krankheitsverläufen.

- Experten in Recht, Ethik oder Sozialwissenschaften sollen ermutigt werden an Forschungsprojekten teilzunehmen, wenn dieses angebracht ist.

- Das Entwickeln bzw. Anwenden von Alternativen zu Tierversuchen

Diskussionsfrage:
Welche Zielsetzungen teilt Ihr? Warum teilt ihr diese?
Welche Zielsetzungen seht ihr kritisch? Warum seht ihr diese kritisch?
Welche Zielsetzungen seht ihr als besonders notwendig bzw. als besonders unwichtig an?
Sind die Maßnahmen ausreichend?

3.) „Health“- Maßnahmen:

- Die Förderung von freiem Zugang zu Forschungsergebnissen und Ermutigung zu möglichst breitenwirksamer Veröffentlichung zu Forschungsprojekten, die gefördert werden.

- Mehr klinische Studien mit älteren Menschen.

-Förderung von Forschungsprojekten, die sich mit HIV, Tuberkulose, Malaria oder Influenza auseinandersetzen.

- Entwicklung von neuen Impfstoffen speziell für Jugendliche.

- Entwicklung von neuen Impfstoffen zur breiten Anwendung gegen Influenza.

- Verbesserungen (bspw. weitere Standardisierung) bei der Entwicklung von Impfstoffen.

- Stärkere Berücksichtigung von ‚Gender Medicine'

- Entwicklung neuer Strategien zur Prävention, Eindämmung und Kontrolle von Infektionskrankheiten, vor allem in Bezug auf antimikrobielle arzneimittelresistente Pathogene.

- Förderung von Projekten, die die Wechselwirkungen zwischen „Wirt und Pathogen" erforschen.

- Entwicklung neuer zusätzlicher Therapien zur Behandlung von unter hochgradig pathogenen Influenzaviren leidenden PatientInnen.

Diskussionsfragen:
Sind die Maßnahmen im einzelnen sinnvoll? Sind die Maßnahme folgerichtig hinsichtlich der Grundannahme und hinsichtlich der Zielsetzungen? Welche Maßnahmen unterstützt ihr, welche Maßnahmen seht ihr kritisch? Warum?

4.) „Health" -„Blinde Flecken?"

Diskussionsfragen:
Auf das Dual Use Dilemma in der Pathogenforschung geht das „Theme Health" von FP7 nicht explizit ein. Müsste es auch auf Standards, Richtlinien und Sicherheitsbedingungen der zu fördernden Forschungsprojekte etc. - obwohl nationale Regelungen diesbezüglich bestehen - eingehen? Müssten Überlegungen zu - aufgrund ihres Anwendungspotentials - gefährlichem Wissen im Dokument vorkommen? Warum?

5.) „Health" - Werte:

Sicherheit/safety	(von Medikamenten und Therapien)
Wirksamkeit	(von Medikamenten und Therapien)
Angemessenheit	(von Therapien)
Unabhängigkeit	
Lebensqualität	
Mobilität	
Konkurrenzfähigkeit	
Wirtschaftliche Integration[44]	
Innovation	
Internationale Kooperation	
Wissen	
europäische Exzellenz	(Führerschaft Europas in Wissenschaft und Forschung)

Diskussionsfragen:
Könnt ihr euch auf die 5 wichtigsten Werte und die drei unwichtigsten Werte einigen?

Wie würdet ihr die Werte auf die ihr Euch einigt definieren/erklären?

Wie begründet ihr Eure Wahl?

44 Anm.: Vernetzung von verschieden Wirtschaftssektoren, sowie Vernetzung und Stärkung der Rolle von Klein- und Mittelbetrieben

(Bspw. Wir konnten uns darauf einigen, dass für uns Innovation, Wissen und Kooperation die wichtigsten Werte sind. Innovation bedeutet für uns…, Wissen bedeutet für uns…)

V.) Schedule VDSP Vienna June 2011:

Below you find the official schedule of the VDSPII held in Vienna. Admittedly it was not possible to stay on schedule in respect to all the sessions.

WISSENSCHAFTSPARLAMENT – 15. bis 17. Juni 2011

BIOMETRIE

MITTWOCH, 15.JUNI 2011

ZEIT	PROGRAMM	ORT
08:00	Eröffnung	Hörsaal 1, FH Marx Box
08:30	Teambuilding	Seminarraum 1, FH Marx Box
09:30	Multi-Criteria-Mapping I	Seminarraum 1, FH Marx Box
12:15	Mittagessen	IMBA Cafeteria
13:10	Wertediskussion	Seminarraum 1, FH Marx Box
14:00	Kaffeepause	FH Marxbox
14:15	Expertenhearing	Seminarraum 1, FH Marx Box
15:30	Komiteearbeit	Seminarraum 1, FH Marx Box
16:00	ENDE	

DONNERSTAG, 16. JUNI 2011

ZEIT	PROGRAMM	ORT
08:30	Komiteearbeit	EDV Saal, FH Marx Box
11:00	Kaffeepause	FH Marxbox
11:15	Policy Diskussion	EDV Saal, FH Marx Box
12:30	Mittagessen	IMBA Cafeteria
13:30	Projektdiskussion	EDV Saal, FH Marx Box
15:00	Kaffeepause	EDV Saal, FH Marx Box
15:10	Komiteearbeit	EDV Saal, FH Marx Box
16:00	ENDE	

FREITAG, 17. JUNI 2011

ZEIT	PROGRAMM	ORT
08:00	Komiteearbeit	Seminarraum 1, FH Marx Box
10:30	Kaffeepause	FH Marxbox
10:45	Vorbereitung Plenum	Seminarraum 1, FH Marx Box
11:30	Mittagessen	IMBA Cafeteria
12:15	Abfahrt von FH Marx Box Richtung Uni-Campus Altes AKH	
13:00	Plenum inkl. Pause	Aula, Uni-Campus Altes AKH
16:30	ENDE	

WISSENSCHAFTSPARLAMENT – 15. bis 17. Juni 2011

DUAL-USE

MITTWOCH, 15.JUNI 2011

ZEIT	PROGRAMM	ORT
08:00	Eröffnung	Hörsaal 1, FH Marx Box
08:30	Teambuilding	Seminarraum 3, FH Marx Box
09:30	Multi-Criteria-Mapping I	Seminarraum 3, FH Marx Box
12:15	Mittagessen	IMBA Cafeteria
13:10	Wertediskussion	Seminarraum 3, FH Marx Box
14:00	Kaffeepause	FH Marxbox
14:15	Expertenhearing	Seminarraum 3, FH Marx Box
15:30	Komiteearbeit	Seminarraum 3, FH Marx Box
16:00	ENDE	

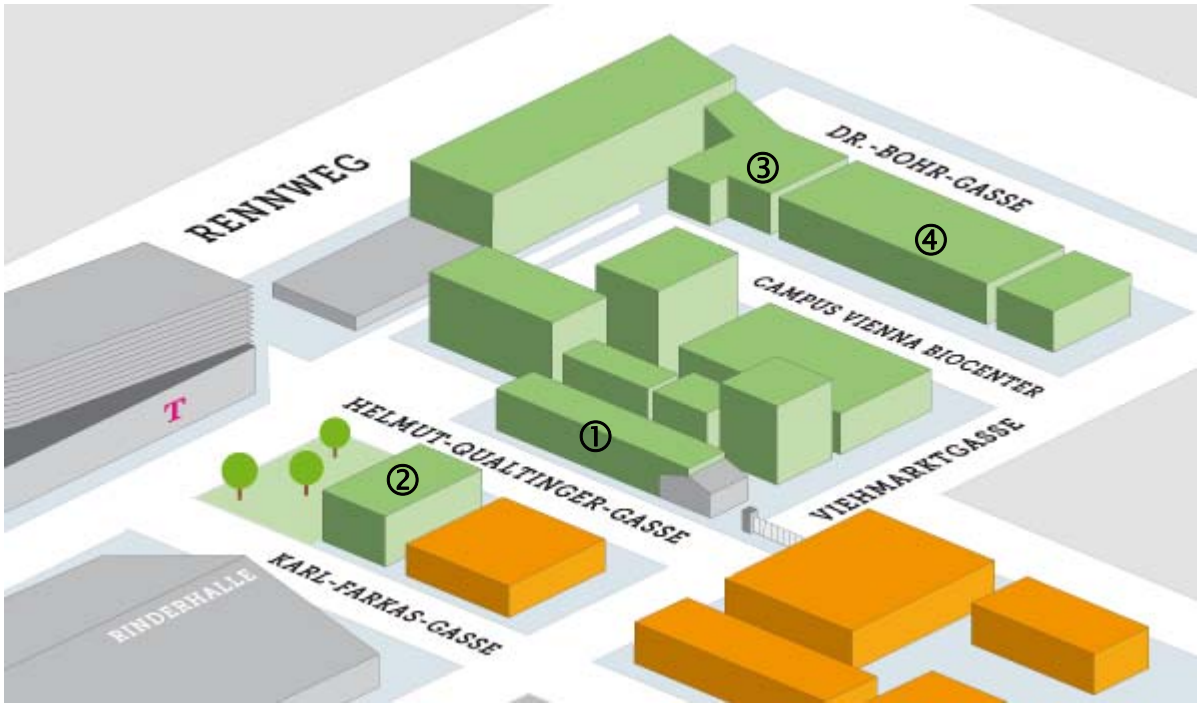
DONNERSTAG, 16. JUNI 2011

ZEIT	PROGRAMM	ORT
08:30	Komiteearbeit	Seminarraum 3, FH Marx Box
11:00	Kaffeepause	FH Marxbox
11:15	Policy Diskussion	Seminarraum 3, FH Marx Box
12:30	Mittagessen	IMBA Cafeteria
13:30	Projektdiskussion	Seminarraum 3, FH Marx Box
15:00	Kaffeepause	Seminarraum 3, FH Marx Box
15:10	Komiteearbeit	Seminarraum 3, FH Marx Box
16:00	ENDE	

FREITAG, 17. JUNI 2011

ZEIT	PROGRAMM	ORT
08:00	Komiteearbeit	Seminarraum 3, FH Marx Box
10:30	Kaffeepause	FH Marxbox
10:45	Vorbereitung Plenum	Seminarraum 3, FH Marx Box
11:30	Mittagessen	IMBA Cafeteria
12:15	Abfahrt von FH Marx Box Richtung Uni-Campus Altes AKH	
13:00	Plenum inkl. Pause	Aula, Uni-Campus Altes AKH
16:30	ENDE	

ORTE



① Hörsaal 1, FH Marxbox
Erdgeschoss, Helmut-Qualtinger-Gasse 2, 1030 Wien

① Seminarraum 1-3 und EDV Saal FH Marxbox
Erdgeschoss, Helmut-Qualtinger-Gasse 2, 1030 Wien

② DGT Besprechungsraum, Solarisgebäude
1. Stock, Karl-Farkas-Gasse 22, 1030 Wien

③ IMBA Cafeteria
4. Stock, Dr. Bohrgasse 7, 1030 Wien

④ IMBA Artrium
Plaza Geschoss, Dr. Bohrgasse 3, 1030 Wien

⑤ Aula, Uni-Campus Altes AKH
Spitalgasse 2, 1090 Wien