



CIVISTI

Collaborative project on Blue Sky Research on Emerging Issues Affecting European S&T



Grant Agreement no. 225.165

Activity acronym: CIVISTI

Activity full name:

Citizen Visions on Science, Technology and Innovation

Activity type: Collaborative project

Deliverable reference number and title

D4.1 Analytical Model

Due date of deliverable: 25 January 2010

Actual submission date:

Start date of Activity:

1 September 2008

Duration:

30 month

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Organisation name of lead beneficiary for this deliverable: **National Consumer Research Centre Finland**

Change Records

Version	Date	Change	Author
1 (conference paper)	08/04/2009		Mikko Rask, Päivi Timonen, Ida-Elisabeth Andersen, Anders Jacobi
2 (conference paper)	29/04/2009	Comments by partners in M3 in Helsinki, April 09	Mikko Rask, Päivi Timonen, Ida-Elisabeth Andersen, Anders Jacobi
3 (conference paper)	02/09/2009	Comments in NESS conference in London and by Jennifer Harper	Mikko Rask, Päivi Timonen, Ida-Elisabeth Andersen, Anders Jacobi
4 (D4.1_ver1)	16/09/2009	Analytical model cut off from theoretical discussion context; the model tested and updated on the basis of the clustering analysis	Mikko Rask
5 (D4.1_ver2)	13/10/2009	The analytical model elaborated on the basis of clustering process and feedback by ARC fund	Mikko Rask
6	9/12/2009	A new version extending guidelines to expert-stakeholder process; comments by partners, scientific advisors, evaluator and EU officer in Malta M4 meeting incorporated	Mikko Rask
7 Final draft	12/01/2010	Final draft elaborated by the authors	Mikko Rask, Zoya Damianova, Anders Jacobi
Final version	25/01/2010		Mikko Rask, Zoya Damianova, Anders Jacobi

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Table of Contents	page
Preface	6
Background	7
The role of the analytical model	9
The structure of the analytic model	13
References	21

Preface

Increasing sensitivity of expert planning to future hopes, dreams and fears of ordinary citizens requires new approaches to be developed. Taking into account citizens' or "lay-experts" views of future promises that future, which is built through investments in science, technology and innovation, becomes more attractive, acceptable and fair to citizens in different corners of the EU. This helps to build European Research Area that is firmly rooted in society and responsive to its needs, as called for in the recent MASIS report by the EC (2009).

The integration of citizen perspective in the planning of STI policies and EU framework programmes of research is the main striving of the CIVISTI project. The approach of the project builds on the tradition of deliberative democracy, in which the relevance of citizen input is increased through expert analysis and stakeholder involvement. This report describes the model of analysis applied in CIVISTI.

Background

The CIVISTI project is a research project, supported by DG Research of the European Commission under the call **Blue Sky Research on Emerging Issues Affecting European S&T**, Socio-economic Sciences and Humanities programme of FP7. The project involves seven partner organisations¹ from smaller countries across EU, which are selected to provide a balance of geographical representation from the European area.

The CIVISTI project is based upon the idea that the process of defining research agendas relevant to the societal needs and concerns could in many respects gain from consultation with citizens. Our societies are changing rapidly as a consequence of globalisation, new technologies, multi-cultural societies, media developments, environmental and climate challenges, new energy futures, increasing welfare and consumption, etc. These developments involve an interface between science, technology and society. Linked to these developments, issues arise about societal management of the involved needs and uncertainties – for society as well as for the individual.

The common understanding of the CIVISTI partners is that citizens are the carriers of the concerns and expectations to the future, and with the right facilitating methods, such concerns and expectations can be collected and transformed into relevant research agendas.

CIVISTI has the challenging tasks to:

- Produce a list of new and emerging issues for European S&T;
- Produce a set of policy options of relevance to future European framework programmes;
- Base these products upon a novel process of citizen participation in seven member states, supported by the analytical capacity of experts and stakeholders.

The CIVISTI process encompasses:

- a. Development and documentation (manuals) of a transnational methodology, in which the main elements are the coordinated national face-to-face citizen consultation processes, and a European expert and stakeholder involvement process. The process is based upon elements of well-tested public participation processes, of which the consortium has excellence of expertise, including the Citizen Hearing, Interview Meeting and Citizen Jury.
- b. Development of a web-based Content Coordination Tool, so as to i) deliver a common bank of information for the citizens, ii) serve as a translation interface between the national citizen panels, iii) present the answers of the national panels for comparison, iv) present the results of the expert- and stakeholder analysis, v) present the cross-national comparisons, and vi) ensure transparency of the process.

¹ **Denmark (1)**: The Danish Board of Technology; **Finland (2)**: National Consumer Research Centre; **Belgium (3)**: IST, Instituut Samenleving en Technologie; **Malta (4)**: Malta Council for Science and Technology; **Bulgaria (5)**: Applied Research and Communication Fund, ARC Fund; **Hungary (6)**: Medián Opinion and Market Research Institute; **Austria (7)**: Austrian Academy of Sciences, Institute of Technology Assessment, OeAW-ITA.

- c. European citizens in 7 geographically distributed EU member countries develop themes of relevance to European S&T activities in the future. A comparative analysis of the national contributions will be made and presented in the Content Coordination Tool.
- d. Development of an analytical model for identifying and characterising the emerging research issues from the answers of the citizens. The tool will be based upon existing methods and approaches from areas such as futures studies, innovation theory, foresight and horizon scanning.
- e. Identification and characterisation of such issues through a process involving stakeholders and experts. The process will break down the themes of the citizens into issues of relevance to European S&T in the future. The synthesis of this process will be made available to the citizens through the Content Coordination Tool.
- f. Final priority decisions, including a quality and authenticity assurance by the citizens. This will be made in a final round of citizen consultation with the same citizen panels as in the first round. The results are registered in the Content Coordination Tool.

The next sections of this report describe the emerging issues analysis model. The task of the model is to break down the visions of the citizens into new issues of importance to European S&T.

The role of the analytical model

The role of the analytic model is to help extract science, technology and policy option “components” emerging from citizens’ visions. The analysis is carried out in two main sequences. First, a content analysis of the 69 visions is carried out as desk research by independent experts in order to provide an overview of the thematic coverage and focuses of the visions. Second, an analysis of the S&T issues and elaboration of policy recommendations are carried out in an expert-stakeholder workshop. While experts and stakeholders have the responsibility to identify the issues, the analytical model instructs their work. Both the content analysis and elaboration of recommendation are highly dependent on the initial steps of the CIVISTI process, in which (certain type of) data is collected and the final step of CIVISTI process, in which citizens validate the expert recommendations.

The main steps of the CIVISTI project are illustrated in Figure 1. Since the focus of this report is on the analytical model of the project, the description of the various steps includes a consideration of how the various steps contribute to, or, are dependent on the analytical model.

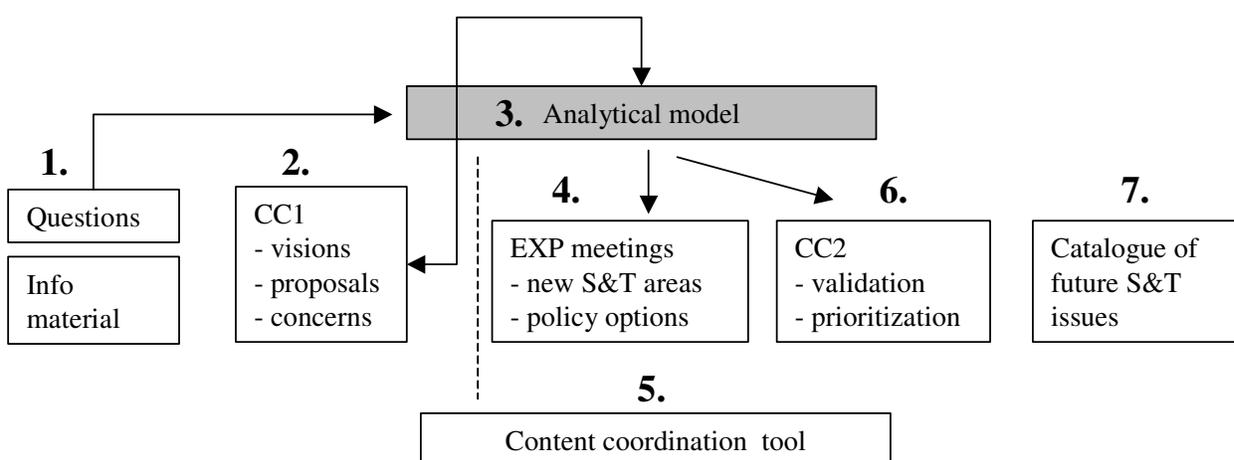


Figure 1 The main steps of the CIVISTI process (and the linkages between the analytical model and other components of the project)

The CIVISTI project is organised as follows:

First, citizen consultations (**Box 2.** in Figure 1) are organized by involving c. 25 citizens (in seven European Union member states) for one and half day workshops. The participants are selected from random (or quasi random) samples of citizens that are collected through different media, e.g. from person registers or through newspaper announcements. From these samples, target individuals are selected according to particular social criteria: sex, age, education, occupation and residence. The intent is to provide highly heterogeneous panels that to a large extent correspond with national population structures. It should be noticed, however, that the size of the citizen panels is not enough to provide proportional representation of the populations but enough to engage in common sense or “lay-expert” view of future conceptions (for different models of participation in deliberation exercises, see Renn 2008, p. 303).

Second, the citizens participating in the first round of citizen consultations (CC1) are provided background information (**Box 1.** in Figure 1) through an info magazine that presents the work of futurists and other issues related to visioning. The purpose of the info material is to prompt citizens to consider different aspects of the needs, concerns and visions of the future with a 30-40 year perspective. The engagement of citizens is aimed at encouraging them to express their views of the future, which are new or not generally recognised as policy issues. The visioning exercise is structured according to a question catalogue (**Box 1.** in Figure 1) that guides panellists to discuss and think about visions from different points of view. A particular aspect of the questions is that they are kept open ended in order to evade expert steering of the visioning and also allow below-the-radar issues to emerge (this aspect has important implications on the resulting data and its analysis, as we shall later see). Examples of questions are: What people were dreaming in the past some 30-40 years ago? How do you think your life will be at 30-40 from now on? What is your dream for Europe of the Future? And finally: What is the vision? Citizens are encouraged to think creatively and also take into consideration both personal, national, European and global level issues.

The visioning exercise is supported by 4-5 professional facilitators, who are available in each national CC1 consultation; their role is to help citizens formulate and write down their visions of the future. The objective is that each national panel produces a catalogue of 10 visions. The visions are given a name, concise description (1-2 pages of A4) and assessment of what benefits are associated with it (to whom), what negative repercussions it has, and what (knowledge, policies, resources, skills etc.) is necessary to fulfil the vision.

In total, 69 visions were gathered through the visioning exercises. The visions in themselves are considered a result (and not only for policy makers thinking about next priority areas of S&T, but more generally), since they

depict the worldviews and generally hold values and concerns of average citizens in contemporary Europe. On the other hand, the visions thus gathered provide a starting point for the further steps of the CIVISTI project.

Third, in order to transform the insights of the citizens into operational recommendations for S&T policies and agendas, a filtering mechanism is developed for transforming the citizens' visions, wishes and concerns into future research agendas. An analytic model (**Box 3**. in Figure 1) is therefore established for the extraction of both (a) the S&T 'component' of the issues identified and (b) the component of policy option of relevance to S&T. The analytical model provides guidelines for the content analysis of the visions and to the expert-stakeholder process.

Fourth, the identification and characterisation of new and emerging issues for S&T will be made in a two-day expert- and stakeholder workshop (**Box 4**. in Figure 1). The results of the content analysis and guidelines provided in the analytical model will instruct the experts-stakeholder process. The S&T issues at the focus will relate to scientific disciplines and technological development and complex trans-disciplinary challenges. The expert and stakeholder analysis will result in a catalogue of potential new areas for S&T, including an overview of related policy options.

Fifth, an important element of the process is a web-based content coordination tool (**Box 5**. in Figure 1), which binds the activities together across nations and project phases and facilitates the dissemination of the results. The synthesis of the expert-stakeholder process will be made available as an input to the second round of citizen panels (CC2) via the content coordination tool. The web tool will also ensure transparency of the process by making all data publicly available on the CIVISTI webpage (<http://www.civisti.org/>).

Sixth, the citizens will be consulted again (CC2 in **Box 6**. in Figure 1) to validate and prioritise the new S&T agendas and policy options. In the second round of consultation, the citizens consolidate the results by adding their comments, and accepting or rejecting the suggested policies, priorities and processes. The final result will be a set of S&T issues and recommendations, which citizens find most important for their future (**Box 7**. in Figure 1), and which can directly be fed into the processes of defining Framework Programme 8.

Other elements in the CIVISTI process include business-as-usual type supportive elements such as the coordination and management teams, scientific advisory panel, process plans and schedules, and a "cook book" or a methodology manual that is updated and agreed upon regularly among the project partners during

the process. A policy workshop will also be organised at the end of the project to disseminate and discuss the results with relevant EU and S&T policy makers.

The next section turns to the presentation of the analytical model in its two main sequences: 1) model for the **content analysis** of the visions and 2) model for the **expert-stakeholder workshop**, in which citizens' visions are analysed and recommendations elaborated.

The structure of the analytic model

In this section the analytical model is presented in its two main roles: as the guideline and justification of the content analysis of the citizens' visions and as the guideline and criteria for the expert-stakeholder process.

Content analysis

The aim of the content analysis is to help experts and stakeholders to find new issues and approaches for science, technology, innovation (STI) and policy making (in relevant policy sectors). The content analysis does this, firstly, by sensitizing experts and stakeholders to **how ordinary citizens conceive future** (see **Box 1**). Secondly, the content analysis provides an overview of the themes discussed, and thus indicates **what issues citizens find important in their futures**. The content report lists 37 themes (or "topics") that were identified in the visions by two independent research groups. The report also indicates seven thematic areas that were most extensively discussed² and levels of impact that were most frequently considered³. Finally, the content report provides examples of "weak signals" (i.e., ideas that at first glance may look like oddities or irrelevant issues in a particular context but may prove to be helpful in anticipating future changes; see e.g., Hiltunen, 2008) that can be discovered through a closer reading of the visions.

Box 1 How citizens depict future

The way in which citizens discuss future in their visions can best be characterized as holistic and "interdisciplinary". Citizens' visions in CIVISTI contain multiple (approximately 8.8) themes at different levels of impact (individual, local, national, European and global levels). The format and time schedule (1.5 days) of citizen consultations encouraged shorter, 1-2 pages narratives of what the future can or should look like in 30-40 years from now.

The full list of 37 themes and the most extensively discussed topics with examples are presented in the preliminary content report (Rask & Damianova, 2009). The method of content analysis is described in **Box 2** below.

Box 2 The method of content analysis

The content analysis of the CIVISTI visions was carried out in the following way. Experts in two independent research groups (ARC Fund in Bulgaria & Consumer Research Centre in Finland) read through the visions and coded the themes (or as called in this report, "topics") that they found emerging from the visions. After a first round of analysis the first group identified 28 topics and the second group identified 41 topics. Some 70% of the topics proved overlapping, and after mutual consultations the two research

² The most discussed themes were: healthcare and medical services; education and learning; ICT, automation and artificial intelligence; legislation; quality of life and life style; employment and new modes of work; energy.

³ Global and individual/family levels as well as European, national and local level issues were discussed.

groups revised and verified both the final number (37) and names of the topics.

During the content analysis, the research groups analysed what themes were covered, what kind of problems, needs and desires were expressed, and what measures (both S&T based and other) were proposed by the citizens for the realisation of their visions.

In the preliminary content report, findings concerning the following aspects of the visions are presented:

- how, in general, citizens depict future through their visions (i.e. what does a "typical" vision look like, and how is it narrated?)
- what is the thematic scope of the visions (i.e. what are the "topics" that they cover)
- on what structural scale the visions of the future are envisioned (i.e. the "level of impact", see terminology)

The content analysis was based on a **grounded theory approach** that is generally applied in sociological analysis of qualitative data (see e.g. Glaser & Strauss, 1980; Seale et al., 2004). The key idea of such analysis is that any kind of qualitative data can be understood only through some form of conceptualisations (or categories), and that such conceptualisations should have some kind of grounding in the data to which they refer to. The idea of the grounded approach is, in other words, to maximally base the analysis on the data rather than apply any predefined concepts/categories to the analysis.

Following **terminology** was used in the content analysis:

- **Vision**, as defined in the CIVISTI project, is a picture or an imagination of a desirable future. A vision can be based upon hopes and dreams - but also upon concerns and fears in relation to problems or imagined threats, which we do not want to become future reality. In CIVISTI, the time span of the vision is 30-40 years from now. The visions of the CIVISTI project result from the deliberations of citizen panels (c. 25 members each). Each vision has been structured according to a common template even though different styles and narrative formats have been used in the writing of the visions.
- **Topic** refers to a single thematic unit identifiable in the data. "Aging" or "family values" are examples of topics.
- The **scope of visions** refers to the number of different topics included in them. The scope can be defined either at the general aggregate level or per a vision.
- **Level of impact** refers to the structural unit, under which the vision and its impacts can be located. We have distinguished between five impact levels: individual and family level (L1), local level (L2), national level (L3), European level (L4) and global level (L5).

To conclude, the content analysis provides a scientifically robust analysis of the thematic coverage of the visions and an illustration of the ways that ordinary citizens conceive future. While the content analysis is an "orientation map", the 69 visions authored by more than 150 citizens in 7 EU countries are an authentic sample and unique access point to the future concerns of contemporary European citizenry.

Expert-stakeholder workshop

A script explaining the procedural details of the expert-stakeholder process will be prepared in another document. Only the main analytical and creative role of the expert-stakeholder workshop is presented in this report. The presentation covers the following aspects: task definition; resources; expected product; boundary conditions; process guidelines and criteria.

Task definition

- The task of the expert-stakeholder workshop is to identify and characterise new and emerging issues for science, technology and innovation (both technological and social), based on citizens' visions of the future. The new and emerging issues should be characterised and elaborated in the form of recommendations. The recommendations should be prioritized by weighting them with the help of a predefined set of criteria.

Resources

Following human and practical resources are required for the organising of the workshop:

- 25-30 experts having competences in the fields of strategic research, EU research policy, futures studies and foresight;
- c. 10 organisers (including 6 facilitators and assisting personnel);
- data: citizen visions from CC1 + preliminary content analysis providing an overview of the visions
- internet-based tool for co-operative elaboration and prioritizing (including templates for recommendations)
- business-as-usual facilities for a two days seminar (including ICT access)

Expected product

A catalogue of policy options for science, technology and innovation (both technological and social).

- The recommendations should be relevant for providing insights of new and emerging issues to be taken into account in the planning of the EU 8th framework programme, indicating e.g. needs for new interdisciplinary programmes or sub-programmes of research, or proposing ways to support technological or social innovations (including issues of S&T governance and participation).
- The recommendations should be prioritized (scored) by the experts and stakeholders, and elaborated in the direction of more operational aspects.

Boundary conditions

Since it is the main intention of the CIVISTI project to enhance dialogue between (STI policy) experts and ordinary citizens, and since citizens will finally validate all expert contributions (through their own prioritization and commenting in CC2), the recommendations formulated by the expert-stakeholder workshop should be

- written in a manner understandable to both ordinary citizens and policy-makers;
- should contain a clear linkage between the original vision(s) and the recommendations.

Process guidelines and criteria

The expert-stakeholder workshop will be organised as a two-day process, in which the **first day consists of structured group discussions**, in which experts and stakeholders elaborate recommendations in 5-6 persons groups led by professional facilitators. The **second day is an open space process**, in which experts and stakeholders choose some key recommendations which they elaborate further and prioritize them against given criteria.

As an orientation to the process, following materials will be delivered to the experts and stakeholders: citizens' visions embedded in recommendation templates; preliminary content analysis; workshop agenda. They will be asked to study this material as a preparation to the workshop.

Workshop day 1:

Experts and stakeholders (25-30), who have read all 69 visions, are divided in **6 groups**. Each group is provided with a set of **6-7 topics**.⁴ Then in principle each expert group looks at all 69 visions from the standpoint of several topics. In this way the topics are used as spectacles or perspectives that provide a multi-dimensional view of the visions (see **Box 3**).

Box 3 List of 37 topics or “pairs of spectacles” to the visions		
Ageing	Agrifood technologies, organic production	Animals and ecosystems
Citizens' role and democracy	Climate and global warming	Creativity and innovation
Demography	Developing countries	Disasters (natural and tech.)
Education and learning	Employment and new modes of work	Energy
Environmental awareness	Equality - gender, minorities, disabled, ethnic	Family values
Genetics	Healthcare and medical services	ICT, automation and artificial intelligence
Identity (national and EU)	Infrastructure and urban design	Legislation
Linguistic technologies	Local and regional development	Multi-cultural and multi-lingual society
Pension policy	Quality of life and life style	R&D policy
Reducing bureaucracy	Religion	Role of media
Smart materials	Social care and services	Space technology
Transport	War and peace	Waste management
Water management		

⁴ Optionally, R&D policy could be a horizontal topic to be dealt with by each group; the final allocation of the topics can later be decided.

To support effective working with the visions, however, and to ensure an authentic connection between expert recommendations and the original visions, **key visions** are nominated for each topic⁵. In practice, the key visions pertaining to each topics are delivered in specific **templates for recommendations** (see **Box 4**), which also organise further working. All 69 visions will be send to the experts in this template before the workshop, so that they will be informed both about the content of visions and the assignments of the workshop.

The task of each expert group is to extract the S&T input from the visions. This takes place by using templates (Box 4), which have to be filled in for each key vision under a topic. In the template there is a long and a short

description of the visions and description of the main topic and other related topics. The experts start their work by identifying new and emerging issues pertaining to visions and topics under analysis, and by filling in the templates. First, they will be informed to identify **issues for STI**. Such issues can include e.g., societal concerns, problems or visions that can be approached through science, technology and innovation; or citizens' proposals for new areas of research and development. Second, the experts will be informed to brainstorm and develop **policy options** related to STI policies

Box 4 Template for recommendation	
Key vision (title)	Main topic
Short description of the vision	Other relevant topics
Long description of the vision	Recommendations <ul style="list-style-type: none"> • Issues for STI • Policy Options • Other recommendations

and institutions. Such options can include e.g., new transdisciplinary research areas or sub-programmes of research; grants from EU, national or regional funds; mobility schemes; investments in R&D infrastructure. Third, the experts are asked to make any **other recommendations** for developing policies in other sectors or, more horizontally, develop new institutions, governance structures and approaches. Even though the development of the policy options should be done in a "brainstorming mode", the final versions of the recommendations should be clearly formulated (since in the next day they will be assessed and elaborated by other experts). The recommendation should preferably also indicate how they help tackling with the STI issues identified.

⁵ For some topics there will be more than one key vision, since the aim is that all 69 visions will be used as "key visions" in the first stage of the process.

The idea of working with the original visions (described in the templates) is that otherwise there is the risk that important information is lost (the analysis of the topics, e.g., is based on generalizing categories). The templates also help link original visions to recommendations and will make it transparent and explicit, how some visions create more questions or proposals for S&T than others.

In order to treat all 6-7 topics, the expert groups will have about one hour per topic, during the first day, to develop their recommendations per topic/template. The work during the first day is well facilitated and each group will need at least one **IT notebook** to document its work. The work will be done in an on-line web tool.

The outcome of the workshop day 1 is supposed to be some **100 draft recommendations** for science, technology and innovation policies, or recommendations for policies in other sectors or more general recommendations for developing governance institutions and approaches.

Workshop day 2

The objective of day 2 is to prioritize and further elaborate selected recommendations. Experts are free to work with recommendations that they find most interesting and worth further elaboration. The **final recommendations** should be formulated in a way that they can be used as an input to CC2 and therefore comply with the following quality criteria:

- Citizens and policy makers can understand them without trouble
- Citizens can recognize how they relate to visions
- Citizens can assess and prioritize them – and send the final result to EU

Specific criteria will be used both as an aid in the elaboration and commentary of the recommendations and as yardsticks for prioritizing them.

The day 2 of the E/S workshop will be organized as an **open space process**⁶. As preparation, each of the c. 100 recommendations have been written into yellow post-its and put on wall boards. At this stage, the organisers will cluster similar recommendations to help the selection process.

The first part of day 2 is devoted to the open space process, in which open time slots (e.g., ½ hour each) are provided for the elaboration of the recommendations that the participants choose to work with. The number of

⁶ Open space is a method used e.g. by organisational consultants and community developers to stimulate creative, hierarchy- and agenda free discussion on topics in which there is a shared interest by the participants (see e.g., Involve 2008, p. 20; <http://www.co-intelligence.org/P-Openspace.html>). Open space processes are impossible to control in detail; some structuring is therefore needed in order to secure that enough recommendations will be elaborated and that creative transformations of the working groups can be coordinated.

working groups will depend on the number of people working with the same recommendation. There will be internet based templates to guide this work, for which reason the results of the open space process will also be documented. After ½ hour – or alternatively when the experts in a particular group decide to move on – it is time to change group and go work with another recommendation. The number of elaborated recommendations will depend on with how many of them the experts can work with in the given time schedule, which can be approximately 4-5 hours.

The elaboration of the recommendation takes place by using specific **templates for elaboration and scoring**, in which there is a space for a short description of the recommendation(s) to be completed as the final description (**Box 5**). Three criteria⁷ – novelty, essentiality and timing – are provided to help elaborate with the recommendations e.g., by

focusing on the most original aspects of the recommendation or specifying the policy context in which actions can be taken. The participants can also choose to give their qualitative comment on the prevalence of the criteria in regard to the recommendation.

Once all groups have finalised their recommendations, it will be the objective of the latter part of day 2 to give quantitative scoring

Box 5 Template for elaboration and scoring	
TITLE: Short/ final description of the recommendation	Score 2= very original/essential/relevant 1= quite original/essential/relevant 0= don't know/ do not wish to answer -1= not very original/essential/relevant -2= not at all original/essential/relevant
Criteria 1: Novelty How original do you see it in delineating new ways for developing science, technology, innovations, or, other societal challenges?	Score: ____ Comments (elaborate why):
Criteria 2: Essentiality How essential do you see it in tackling with relevant STI issues, or, solving important societal problems and challenges?	Score: ____ Comments (elaborate why):
Criteria 3: Timing How relevant do you see it for the next EU framework programme planning, or, for other urgent EU policies?	Score: ____ Comments (elaborate why):

⁷ The three criteria have been chosen among the ones used often in various technology assessment projects. A more general framework for speculating new S&T policy options emerging from citizen visions can be build on Kingdon's (1995) *streams model* (of policy agenda setting), which is a widely applied approach in policy analysis (see Pralle 2006; Kingdon 1995). The model assumes that a successful design of policies relates to the bringing together of three kinds of elements: problems, solutions and political contexts. The streams model, translated into the vocabulary of the CIVISTI, proposes that policy design should consider how new and innovative solutions can be matched with essential problems/concerns raised by citizens in relevant EU policy and framework programme contexts. The distinctive character of the streams model is captured by the following citation: "In the policy stream, proposals, alternatives, and solutions float about, being discussed, revised, and discussed again. In contrast to a problem-solving model, in which people become aware of a problem and consider alternative solutions, solutions float around in and near government, searching for problems to which to become attached or political events that increase their likelihood of adoption. These proposals are constantly in the policy stream, but then suddenly they become elevated on the governmental agenda because they can be seen as solutions to a pressing problem or because politicians find their sponsorship expedient." (Kingdon 1995, p. 172.)

to all proposed final recommendations. Depending on existing IT tools, this can either be done in an internet based process or by using more traditional means of scoring/ polling. As a result the outcome of day 2 will be: a prioritized list of recommended S&T issues and policy options, which will serve as input for CC2.

Citizens validating expert contributions

According to the CIVISTI method, it will finally be the task of citizens to validate and prioritise the new S&T agendas and options. This will be organised in another round of citizen consultations (CC2 in **Box 6. in Figure 1**). In the second round of citizen consultations the citizens consolidate the results by adding their comments, and accepting or rejecting the suggested policies, priorities and processes. The final result will be a set of S&T issues and recommendations, which citizens find most important for their future (see **Box 7. in Figure 1**), and which can provide input into the processes of defining the Framework Programme 8 and future EU policies more generally.⁸

⁸ The second round of citizen consultation (CC2) will take place some 15 months after CC1. The structure of this consultation will be later specified on the basis of CC1 and expert –stakeholder workshop results.

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