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Executive Summary

This document is the second draft version of the final book, which will represent a revisited collection of the outcomes of eGovRTD2020 (Task 5.6: Compilation of the project outcomes into a final publication (book), Deliverable 5.2). In order to streamline the book content, revisions of the book structure and of first inputs from the book are frequently being delivered to the EC every three months via more and more elaborated draft versions of the book. The scenario building and roadmapping exercises are iterative processes that grow from the activities per work package 1 to 4. Hence, the development of the final result (the eGovRTD2020 book) started with a first outline based on the state-of-play results in WP 1, which resulted in deliverable D 1.2. The version at hand expands the state of play results with results from the scenario building workshops. Further on, the gap analysis and the roadmapping workshop results will be added to improve the content. In this way, the results of each work package are directly fed into the overall objective: the eGovRTD2020 book.

The deliverable at hand is the second draft of the final outcome. It revises the overall structure of the final report and the book by updating content from the first draft version (D 1.2) and incrementing content in the single chapters based on the scenario building report D 2.1.

The overall structure of the book is proposed as follows:

- Introduction to the context and to the project eGovRTD2020
- Overall methodology of eGovRTD2020
- State of play in eGovernment research in Europe and worldwide
- Scenarios for eGovernments in 2020
- Results from gap analysis
- Roadmap for eGovernment research
- Recommendations and measures to take to strengthen eGovernment research
- Impact and community building
- Conclusions.

In the following chapters, draft content is included from the state of play and scenario building. Likewise, methodological aspects of the gap analysis and the roadmapping are being provided.

1. Introduction to the context and to the project eGovRTD2020

In the first chapter of the book, an introduction to the context of the project, its strategic importance and the project itself will be provided.

2. Overall methodology of eGovRTD2020

Maria Wimmer

In this chapter, the overall methodology chosen for eGovRTD2020 will be introduced. First brief draft content is provided as follows:

The methodology to investigate the roadmap design for eGovernment research started with a desk research, which resulted in a collection of information on the state of play in terms of the main research programs, research strategies and projects on eGovernment research in Europe and all around the world.

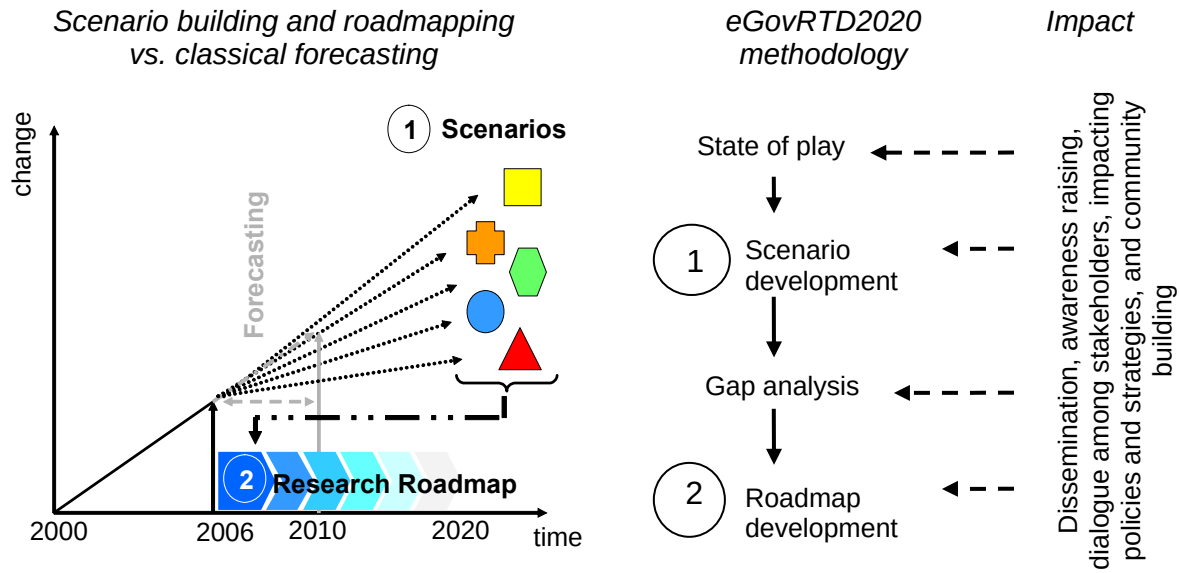

Figure 1*: eGovRTD2020 overall methodology to develop an eGovernment research roadmap for innovative Governments in 2020*

Next step was a scenario building process partly bases on the results derived from the state of play report. The different visions of the future were built up during a series of regional workshops in Europe, the US and Australia. Experts from those regions came together and developed scenarios about governments interacting with society and market, and among each others, through innovative ICT and thereby creating a certain public value. The outcome was a set of future scenarios. Both the state of play and the chosen scenarios were

the main input for the gap analysis, which assessed the differences between today and possible future activities in eGovernment research. Thereby, the problems and weaknesses of current research were investigated. The future scenarios were also the basis to discover the needs for future research. Furthermore the gap analysis focused risks and potential threats that could come up if research and governments themselves will not react properly and investigate the research needs to face the expected change till 2020. Next step was similar to the scenario building process: the roadmap for future eGovernment research was developed at several workshops with experts taking place worldwide.

During the whole duration of the project, dissemination of project results and especially awareness about the need for focused eGovernment research took place. The workshops with regional experts were such measures for community discussion and community building as well.

Figure 1 demonstrates the overall methodology used in eGovRTD2020.

3. State of play in eGovernment research in Europe and worldwide

Melanie Bicking and Maria Wimmer

This chapter will reflect the results from Deliverable D 1.1 of workpackage 1. The objectives of the state of play analysis were to collect information about the main eGovernment research programs and policies as well as about existing relevant eGovernment research projects in Europe and all around the world. The chapter will describe the eGovernment strategies and policies of the EU and its member states, as well as of America, Australia and Asia as collected in the course of workpackage 1. Thereby, technical organisational and social aspects of eGovernment were investigated as the framework shows in Figure 2.

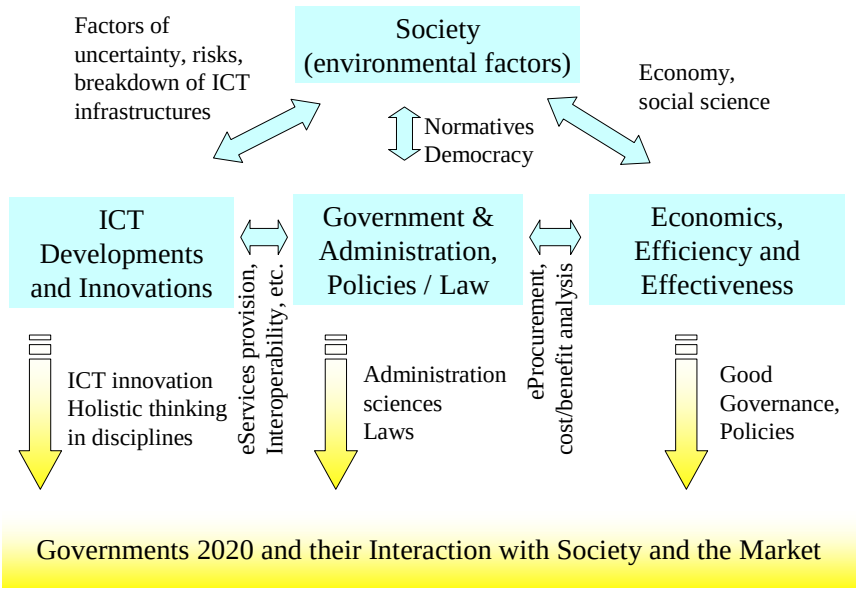

Figure 2: Aspects to consider regarding eGovernment research

The state of play chapter will describe the EU priorities for eGovernment research till 2010, which are compared with the eGovernment strategies and research programs of the single European member states. Furthermore, an overview about the eGovernment research focus of the National Science Foundation (NSF) and the Asia-pacific region will be provided to get an insight in the global eGovernment research area and other research institutes.

A reflection about the work and research priorities of these non-governmental research institutes shall support an enlarged and cross-domain understanding of how eGovernment research will be investigated by the multiple governments and institutes.

But this is not enough to get a deeper insight of current eGovernment research preferences for the near future. It is very important to also consider the forecast studies, which reflect the challenges and needs of future eGovernment research. They also give some advice on what topics eGovernment research shall focus on in future.

Taking all these different views into account and comparing them with each other means to develop a well founded state of play report as basis for scenario building.

Deliverable D 1.1 provides the full report of the state of play analysis.

4. Scenarios for eGovernments in 2020

Marijn Janssen (editor), Patrick van Duin, Melanie Bicking, Maria Wimmer

4.1 Introduction

Scenario building is a technique to stimulate different perspectives and images on the future. This technique allows to better predict the evolution of a certain domain beyond short-term forecasting based on the scenarios developed. The scenarios developed in the first workpackage one concern only the next couple of years, as these are derived based on extrapolation of current developments. This approach is called *trend analysis*. A trend has already started and can therefore be identified. The scenarios derived thereby investigate the type(s) of future(s) to which these trends may lead. We stress that these scenarios do not reach out till 2020, as schematically depicted in Figure 3. Even scenarios that may reach out till 2020 are not completely independent: They are biased and might not even capture the future, since every expert participating in such scenario building exercises reflects on his or her past and current knowledge of actual developments and from there extrapolates his or her view on potential futures. When building scenarios, one must be aware of the fact that this implicit bias can never be turned off fully. However, it is important that during the scenario building exercises the environment is relieved and neutralized from past and current states that could then be just projected to the future.

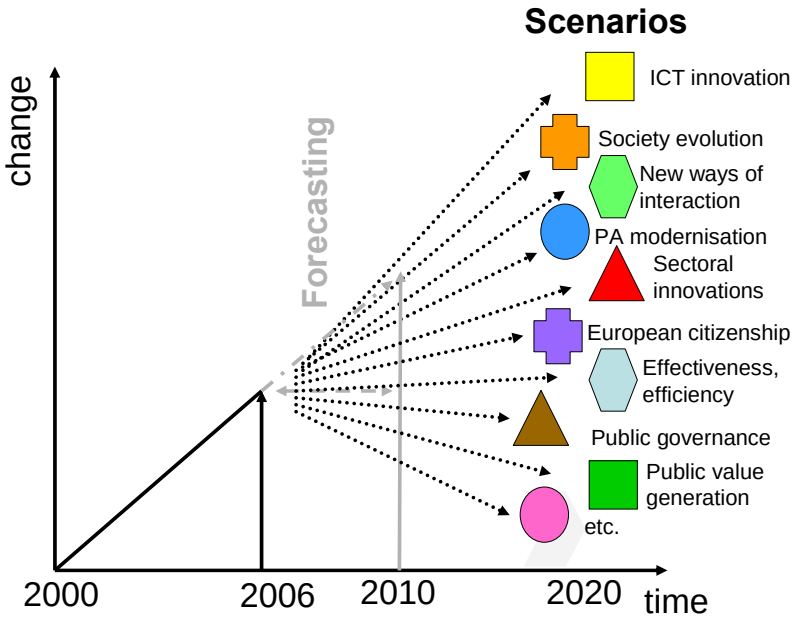

Figure 3: Scenario building process (based on [4])

During the scenario building phase, the interaction with the constituency of eGovernment is being prepared and organized to generate high quality ideas, receive feedback on the scenarios for eGovernment research and shape eGovernments in 2020. The specific objectives of the scenario building includes the development of a thorough methodology, which allows high quality interaction and feedback across regionally distributed workshops and the conduction and evaluation of regional workshops for developing potential research and implementation scenarios for eGovernment RTD 2020.

The objective of the scenario building is to draw plausible and internally consistent scenarios of how the future will look in 2020. For the overall scenario methodology of this research we used a structure, which is commonly used in futures research [23][28] including the following activities.

1. *Develop scenario methodology*: in the first step an interactive and thorough methodology is developed to derive scenarios using workshops;
2. *Conduct regional workshops*: Expertise, political visions and circumstances vary among countries. To capture typical elements and to ensure diversity, a number of regional workshops are being conducted (several in Europe, one in North-America) to produce a diverse set of scenarios;
3. *Validate and Aggregate workshop*: The set of scenarios is validated and grouped into clusters of developments, and visionary sketches. The result is a consolidated set of views on the future eGovernments in 2020. These consolidated scenarios provide the input to develop the research roadmap in a later stage

In several EU member states and in the USA scenario building workshops have taken place to draw potential futures of Governments in 2020. The workshops are a cornerstone in order to generate high quality ideas, elicit feedback from key players in public administrations, government and research, and assemble a constituency for later research. During the workshops, exercises go beyond forecasting to create images of governments, society and markets, and how these will interact in 2020 by using innovative technologies to provide and consume public services. Stakeholders from Governments, academic, and other experts

shall participate. eGovRTD2020 deals with high uncertainties in these future scenarios for 2020 and therefore investigates both positive and negative environmental influences. The results are aggregated and validated in a group-supported validation workshop. All participants had a computer-terminal at their disposal and could enter data.

4.2 Scenario building methodology

Scenario building does not pretend to fully predict the future. The technique facilitates the development of images of the unpredictable future by identifying complementary and/or contrasting alternatives. In our context, a scenario describes a coherent set of visions and archetypal images on a possible future. Scenarios are neutral: they are neither good nor bad futures. Consensus about developments or visions is neither necessary nor wanted. Scenarios may differ one from the other: even extreme opposite scenarios can – and should – be developed. In case of extremely opposing ideas or contradicting visions, scenario axes should be determined to bring the extremes into relation.

4.2.1 Regional workshop design

The workshops began with presentations of the background and scenario building approach. Thereafter the participants were split up in smaller groups of three to six participants. Each subgroup was asked to develop one scenario for eGovernment in 2020 using a template that will be described in the following subsection. A moderator helped each group in getting started with the visionary discussions, facilitated the process and secured conformity to the rules described above.

All participants then came together to present their scenarios and to discuss them with the others. After the scenario discussion in the plenum, a final round of identifying and categorizing scenario dimensions was carried out. In this activity the dimensions were assessed for both impact on eGovernment in 2020 and likelihood to happen in 2020 using the matrix depicted in Table 1. The rationale is that dimensions having a high uncertainty and high impact result in contradictory and alternative futures and thus feed into different scenarios. Dimensions having a high impact and low uncertainty result in one type of future. Dimensions having a low impact (independently of the level of uncertainty) do not influence the future of eGovernment in 2020.

Table 1 Impact/uncertainty matrix

High ▶ **impact**		
Low		
	Low	High ▶ **uncertainty**

4.2.2 Scenario support

Wimmer [34] [36] developed a holistic reference model for eGovernment capturing the main elements of eGovernment. Based on this model, a supportive instrument capturing the essential elements to guide the scenario description of the future was developed. It is aimed at guiding the scenario building process and it helps to discuss and develop the scenario(s) along the elements eGovRTD2020 wants to investigate the future of governments and society in their usage of ICT. Figure 2 shows the framework guiding the scenario development. The core of the concept is the following four aspects (cf. inner circle):

- Society, environment and culture
- Governments and Administration,
- ICT developments and innovation
- Economics, efficiency and effectiveness.

When deriving scenario descriptions, moderators had to secure that each of the aspects was described in the scenario(s) developed. Apart from the single aspects, the relations (arrows) were most interesting: how will governments use ICT to serve citizens (society) and what economic values will be important thereby? This is just one of many questions, moderators posed to the experts in the group discussions during scenario development.

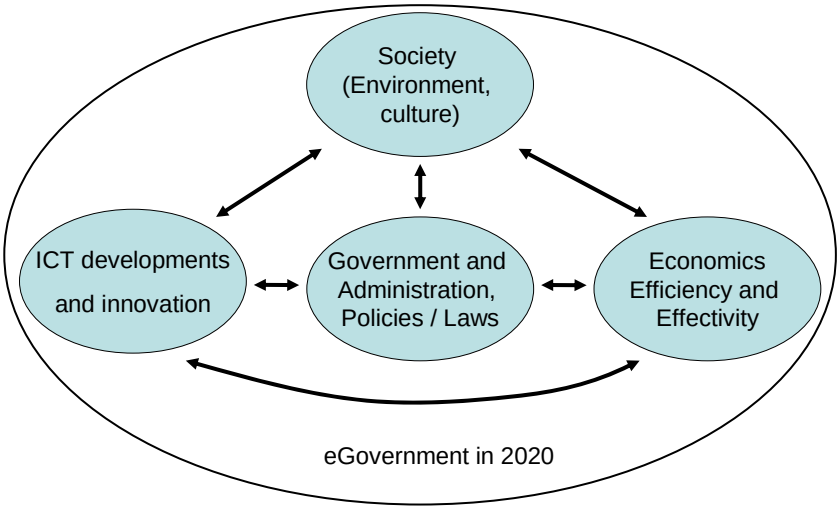

Figure 2: Overall framework for comprehensive scenario description

Certainly, the single aspects of eGovernment and their interplay need to be reflected by their surrounding interaction environment and their global context (e.g. [17][21]). In this model the central scenario topic, in our case eGovernment in 2020 is surrounded by two areas, the interaction area and the contextual area.

The interaction environment contains actors such as citizens, business, other governmental agencies, NGOs, PPP, suppliers, customers, politicians, legislators, and other stakeholders in the society. Also the type of services provided and the various modes of participation and technology used to involve people in policy-making processes are part of this environment. Their influence on the scenario-subject is direct and takes place within a short time-horizon. Due to the dependencies, it is likely that the actors influence the scenarios.

The *contextual* environment is further away from eGovernment. It contains social, technological, economic, political and environmental factors by which we mean subjective forces such as basic values, societal trends and developments. Examples of such forces or trends could be the speed of technological development, individualism in society, changing political climate, economic development, migration patterns or constitutional values like privacy and human rights. These factors influence the scenarios in the long term but often are not affected by eGovernment developments. For example, it is not possible for actors involved with EGovernment to influence the birth rate.

4.2.3 Validation workshop design

The 7 regional workshops resulted in 29 different scenarios all capturing different types of issues. The scenarios are constructed bottom-up and are heterogeneous. Each scenario might contain many issues on a global, regional and national level. These heterogeneous scenarios view the global and national trends from a regional perspective. Similar and overlapping issues might be mentioned in more than one scenario. Therefore each scenario need to be analyzed into a number of issues. The main issues resulting in various futures should be derived and the final set of scenarios is constructed *top-down* and contains all the issues mentioned in the regional scenario building workshops. The following steps are taken to analyze the 29 regional scenarios.

1. *Validation workshop*: A workshop was held and all scenarios developed in the regional workshops were presented. Based on these presentations, the participants identified the main dimensions influencing eGovernment in 2020 in the environment, government and technology cluster. The dimensions were thereafter discussed in more details and finally voting took place to determine the impact and uncertainty of each dimension on eGovernment in 2020.
2. *Organize and describe dimensions.* All the issues in the regional scenario workshop and validation workshop having high impact were clustered into the 15 categories of dimensions. The 15 categories are derived from the holistic framework and each category contains a list of dimensions, 159 dimensions in total. Each dimension contains a number of topics of interests and a description of each dimension was derived from the regional and validation workshops.
3. *Analyze dimensions*: The dimensions area analyzed based on their occurrence in the regional workshop and in the validation workshop. Although counting occurrences provides no statistical evidence for generalization, it gives us an indication in how many regions might be affected by alternative futures. The dimensions occurring in more that 6 regional workshops and/or in the validation workshop were selected to derive the final set of scenarios;
4. *Derive concerted scenarios*. The selected dimensions were clustered resulting in three key dimensions. The 3 key dimensions were used to create a final set of 8 scenarios in a top-down manner. Each scenario is given a typical, easy-to-recognize, and understandable name and the main characteristics for each scenario are added.
5. *Develop scenario stories*. For each scenario an ease to read and understand story was written down to enable communication of the scenarios to non-involved and non-experts.

A scenario is an internally consistent and coherent sketch of the future visions of eGovernment. Each scenario consists of a collection of *issues*. An issue can be either a dimension or topic of interest (TOI). A *dimension* is a variable depicting two opposing extremes on the future of eGovernment in 2020 and is a particular type of issue. For example the dimension trust in government, one extreme is distrust in government and the other extreme is a high trust in government. Only dimensions having a high impact on how eGovernment will look like in 2020 are considered. A dimension has at least two opposing topics, i.e. denoting to the extremes, and can contain further topics along the scale.

Topics of interests are single points positioned somewhere along a dimension. One topic of interest can belong to more than one dimension. For example, the trust dimension can contain certification authorities as a toi. One topic of interest can belong to more than one dimension. For example the toi certification authority can also belong to security dimension.

Figure 4 shows schematically the process of analyzing the scenario. A scenario consists of a number of issues. The first issues result in a new dimension (e.g. if the first issues is privacy it results in the dimension privacy. A dimension has two extremes, on the one end there is no privacy and on the other end privacy is completely ensured). Thereafter, each issue was taken and analyzed whether it can be added to an existing dimension. If not it results in a new dimension. An issue found in a scenario can be either an extreme on a dimension (i.e. no privacy anymore, privacy is fully assured) or as toi positioned in a dimensions (i.e. privacy is content dependent; under normal conditions ensured, but sacrificed in crisis situations).

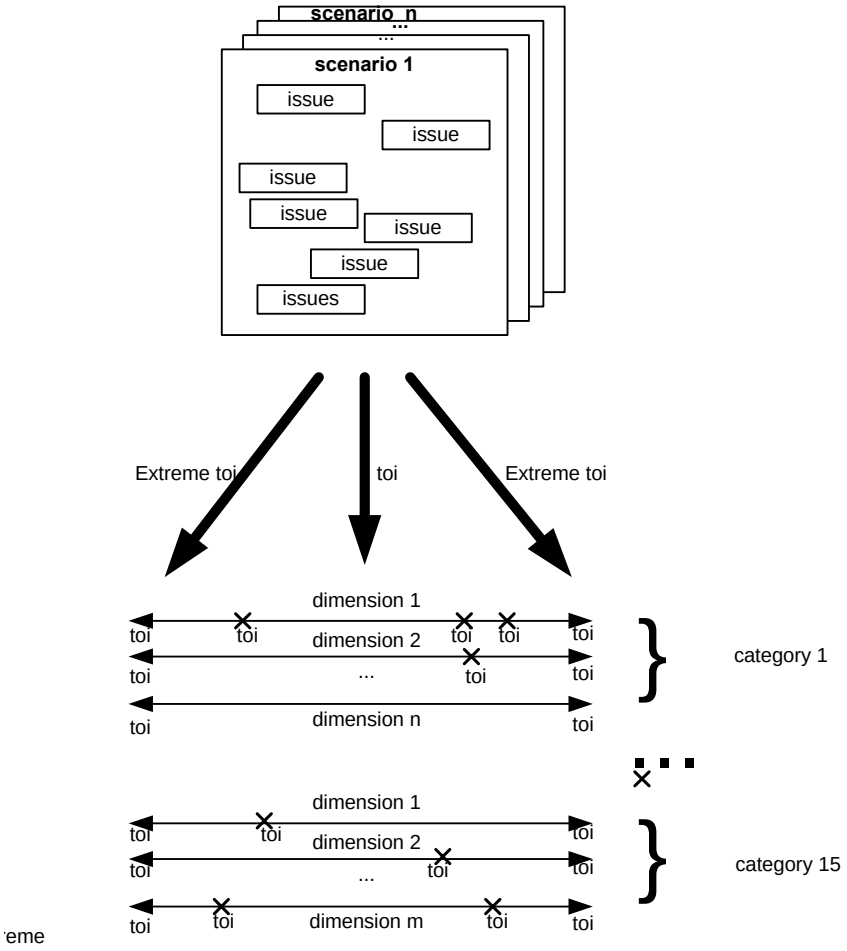

Figure 4. Translating scenarios into dimensions and topics of interest

Now we have outlined the scenario-building methodology we will discuss the results in the following sections.

4.3 Overview scenario building workshops results

In total 140 participants attend the 7 workshops held in various parts of the world. During the workshop 29 different scenarios were generated and 159 dimensions depicting to different futures were identified. The basic information of the workshops is shown in table 1. In the following subsections we present the background of each workshop and present an abstract of each scenario.

Table 2. Overview scenarios

Workshop name	Region	Participants	Number of scenarios	Place and date	Workshop organizers
1. Prague	Eastern European	15	4	Prague, 22nd April	IWVI, MRU, TUD
2. Vilnius	Northern an Baltic states	18	3	Vilnius, 26th May	IWVI, MRU, TUD
3. Koblenz	Central Europe	19	5	Koblenz, 16th May	IWVI
4. Delft	Mid-West Europe	18	4	Delft, 19th May 2006	TUD
5. Linz	South-East Europe	24	4	Linz (A), 2nd June 2006	IWVI
6. Bled	Central Europe	19	5	Bled, Bled, June 7th, 2006	UoM, IWVI, TUD
7. San Diego	USA	27	4	San Diego, May 24th, 2006	CTG, IWVI, TUD

4.3.1 Prague workshop

The first workshop of the regional workshops was held in Prague during the Eastern European E-Gov days (http://www.ocg.at/egov/eeegovdays06.html). In total 14 people representing 6 European countries and mainly coming from the academic world attended the workshop. During the workshop the group was split up into four subgroups creating four scenarios. The scenarios can be summarizes as follows.

1. *The ambient government of Europe*. In 2020, society has changed and has grown older. Government is ambient, providing basic services for all, but the private sector gained more

power by delivering extended services for those who can afford them. The democratic system has been eroded and there is a large divide between the haves and have-nots.

2. *Sustainable and pervasive governments*. Government services and participation in policy-making and law enforcement (whatever) are accessible whenever/ wherever and are ambient. The public sector delivers services in all areas. Governments participate in community to ensure close relationships with their citizens. The EU has grown strong and social systems have grown even stronger. A strong education system is the major factor to ensure nations' competitive advantage.

3. *Government as industry puppet*. Government is fragmented and performs a limited number of functions. Almost all service provisioning is left to the private sector and industry rules the world and influences policy-making to a large extent. The EU is fragmented and weak. Privacy is sacrificed for business purposes and businesses have a large influence on politicians and their decisions.

4. *Orchestrating government*. Government is primarily aiming at understanding the needs and wishes of their constituencies and on coordinating the fulfillment of their needs. There is a small and lean public administration aiming at directing the implementation, execution and enforcement of policy-making. Most functions are performance by the private sector within the policies and conditions set by governments. There is an emphasis on collecting information, processing to improve policy-making.

4.3.2 Vilnius workshop

In Vilnius a workshop was held with 18 people. A number of consultants and academia and 11 representatives of ministries and other governmental organizations participated in the workshop. Due to its diversity the group was split up into three subgroups, which resulted in three main scenarios as summarized below.

1. Human centered government. In 2020, the EU member states have grown closer together. EU-wide seamless data exchange occurs. Governments provide user centric services in a fully automatic fashion. Individuals belong to multiple, global and diverse communities of interest. People are globetrotters and continue to learn from anywhere. Privacy well understood and well protected. Participation is not only possible through voting but via the exchange of opinions and feedback. There are technologies to direct and manage the information-overload.

2. The new eWorld order. The EU has expanded to the east, and seamless trading with Russia as part of an extended Schengen agreement takes place. Virtual territories make up borders and new voting rights. The world is divided between democratic and non-democratic countries. Privacy is made content-dependent. Government innovation is mainly coming from businesses, government focuses on providing standard services. The end of party politics is envisioned, and participation has both a central and local focus, with the rise of many horizontal virtual communities. Interoperability between EU-countries and between EU, central and local levels of Government is accomplished.

3. *Collaborative and highly networked society*. The hierarchical system of the society is flatter and communities of interests are used to support participation in policy-making. The biggest problem is: possibilities for total surveillance and the "black technologies". Partnerships between different interest groups are organized via networks. Several serious problems have to be managed such as social divide – only the "in-crowd" people have

possibilities to participate in serious decisions leaving the grassroots only simple and irrelevant ones.

4.3.3 Koblenz workshop

In the Central-Europe workshops, in total 19 persons participated coming from governments, software providers and consultancy organizations. The session resulted in the following scenarios.

1. A brave new world. In 2020, the population's need for more security in Europe has lead to that kind of brave new world in which government deploys more and more ICT supported control and monitoring mechanism in order to satisfy this exigency. Citizens and business are strongly regulated and values like privacy protection are subordinated to the public welfare. Understanding citizens' needs is unnecessary, because public services are not provided to satisfy citizens. Instead, the fundamental values are to set up the best possible security standards.

2. Active state. In 2020 Europe's economy is weak and brain drain wastes it more and more. An ageing society and knowledge society lead to digital divide. Many public services are provided by the private sector. Privatization and capitalism determine Europe in 2020. People work till the age of 75.

3. Cooperative state. In 2020, all federal systems have a central decision-making policy, whereby federal and state institutions cooperate very closely. Public and private sector have developed many cooperation and collaboration structures. The public sector is responsible to ensure public service provision but the private sector implements these services. Personal data is requested and stored at a minimum level. Data specification is based on gratuitousness.

4. Liberal night watcher state. Governments provide and supply the minimum of public services. Individualism and personal responsibility are the most important values of society. Governments evolved to a distressed institution and the private sector performs most of its functions. Through a high degree of self-administration and self responsibility, elbow society occurs.

5. Divergence and parallelism. Particular interests are more important than public welfare. Knowledge society leads to a strengthened two-class society. Administration is minimized and technology is seen as instrument to solve problems of society.

4.3.4 Delft workshop

In the workshop held in Delft, 18 people coming from national and local governments, NGOs consultancy companies. The workshop took a whole day and was supported using a electronic meeting system (Group Support System) to facilitate brainstorming and voting on scenarios axis. The workshop results in a large number of topics, dimensions and these were aggregated in the following four scenarios.

1. Ferris wheel. Few opportunities are created by using technology. There are many ad-hoc actions to leverage the advances and much of eGovernment is outsourced in open markets. Some centralized systems are developed and operated by government. Local customization becomes the main role of local government. Monitoring of almost everything is possible and

laws and regulations are immediately enforced. There is a large innovative EU, and an accepted privacy policy resulting in stable growth.

2. *Dodgems (cars*): Innovation is based on competition. Brokers and agents deal with dynamics and the interplay of government and businesses/citizens. High complexity, no large and dominating ICT-players exist. Open source is mostly used. Community-based innovation and development happens, where IPR is ensured. High investments are done in ICT. Niche players innovate. No UN or EU exist. An ICT-arms race takes place to develop cyber crimes, viruses, bio and smart weapons. With advanced anti-crime-ICT, fast reaction to crises and events is possible. Media plays an important role and it cannot be muzzled.

3. *Carousal*: There is limited economic growth and most people are satisfied with the situation. Society is ruled by common sense instead of emotions and there are no hypes. IPR is ensured and the winners on the software market take it all, ICT is only used to solve real problems and the media is critical toward politicians and decision-making. There is a large focus on privacy and security. Governments have achieved operational efficiency and development is based on a coherent long term vision and perspective. There is a predictable impact of ICT.

4. *Roller coaster (in the dark):* The world is characterized by incidents and religious conflicts. Crisis management systems have become the most important systems. And the EU is disintegrated. All decision-making has a short term focus and is based on opportunism. Each country has its own, closed systems. Local governmental powers compete with each other and there is a low economic growth. Regional distinction is important to remain attractive. There is much social tension among communities, limited trust in each other, no avatars, and the media is put a muzzle on.

4.3.5 Linz workshop

The Linz workshop targeted South-East Europe and in 24 participants generated 4 scenarios within half a day.

1. Knowledge based society / self administration. The political climate and institutional systems are changed totally. Society, business and government are based on knowledge management. Self-administration is realized to a high degree and education is a collective task.

2. Polarized Society Vision 2020. Education is seen as a resource like water. The pressure of learning as much as you can increased and leads to a two-class society. Simple work is automated and there is high migration into cities. Globalization leads to overall standardization. Economical scope decreases.

3. Mature (e)Government in the united federal states of Europe. In 2020, Europe's member states closely work together and national thinking shifts to European thinking. Technology is used everywhere and is part of daily life therefore 'e'Government did not exist longer it is just government.

4. Business Rules. Citizens and freedom rights are restricted. Digital Divide becomes Social Divide and splits society. Democracy becomes more and more a media-'democracy'. Public administration is mostly automated but rigid. Multinational companies influence increasingly. Privatization of public services leads to less jurisdiction and quality. Biometric identification and implanted RFID systems serve as passports.

4.3.6 Bled workshop

This workshop happened at the 19th Bled eConference, Bled, Slovenia (June 5-7, 2006). It is the only workshop taking place in Slovenia in the series of scenario-building workshops held by the eGovRTD2020 consortium. The targeted region was Central Europe.

1. *Large Organizations will dominate*. Large local organizations exert a very high impact on the society and also on governments, because these have gained very strong political power. There are no elections and no envoys. Government services are strongly ICT-supported and highly personalized. Private entities offer personalized, highly integrated services for citizens and organizations. There are "Personal Brokers" for arranging of eGovernment services.

2. *Technology Driven Society*. There is very strong impact of technology on the society and governments. This is related also to the availability and possibility of the use of energy for operating the society. It is expected that the energy supplies will be limited and therefore also the use of available resources. Therefore governments are organized virtually. New ICT will have to be invented, which will be able to operate with low energy. Privacy is diminished, but acquired by citizens, who are giving up parts of privacy in order to get better services.

3. More power to the Europe, less to the nation. The environmental pressure increases (e.g. water shortage, climate change) and requires strong countervailing power. There is a migration of large masses of population due to the climate, demographic and political tensions. Only talented immigrants are welcome in a country. There is a strong ability to problem solving due to synthesizing information. Privacy is eroded. China and India are changing their legal and political system more in line with democratic and individual rights.

4. Individual eGovernment. ICT is integrated in every-day life. Persons both natural and juristically persons are connected through ICT systems to government every time. Therefore government is able to provide individual eGovernment services based on high data accessibility resulted from that ubiquitous ICT interconnectivity. The degree of data collection is enormous but citizens and business is not interested in data protection as long as benefits are higher than drawbacks.

5. *Central EU Gov frame with local self-organizing operational governments*. ICT is integrated in every-day life. Persons both natural and juristically persons are connected through ICT systems to government every time. Therefore government is able to provide individual eGovernment services based on high data accessibility resulted from that ubiquitous ICT interconnectivity. The degree of data collection is enormous but citizens and business is not interested in data protection as long as benefits are higher than drawbacks.

4.3.7 US workshop

The workshop in the USA was associated with International Digital Government Research Conference in San Diego (http://dgrc.org/dgo2006/). It included 27 participants representing 10 countries, four of them outside Europe. Most participants were academics, with a few private sector and government managers. The following scenarios were developed.

1. Demographics Rule: In 2020, older people will command an increasingly large proportion of public services, especially healthcare. This generation will also control a huge proportion of the wealth of Western societies. This will be accompanied by massive migration of young workers from other parts of the world to meet the economic needs of many countries.

Government will play a major role in allocating services, such as healthcare and balancing the needs of different segments of society, particularly different age groups. Except for specialized functions, central governments will recede in importance and local governments will become more important. Regional levels of government will become increasingly irrelevant. Small, ubiquitous, wireless technologies will make information and services widely available, but at the expense of personal privacy because a network of sensors will record all kinds of daily activities.

2. Global networked synchronous and ubiquitous mobile government: The essence of this scenario is that technology has made geographic location irrelevant. Citizens will move across borders freely, government will not restrict access and citizens will take part in all decisions that affect them. Government will take on a moderator and gatekeeper role. Biometrics as a form of identification will be commonplace. Smart cards, sensors, mobile technologies of all kinds abound.

3. Local wins: The Me, I, My World of mass self-segregation: After years of increasing globalization, and a blurring of sense of place, people react by self-selecting into communities of "sameness" using IT to keep them connected to (but still apart from) the rest of the world. In this scenario, everyone has access to technology therefore every person can select the community of interest he/she wishes to associated with. People migrate to these communities with ease and may choose to live in small enclaves composed of people who are most like them in terms of interests, economic status, religion, etc. All their face-to-face interactions take place in these small units, all other interactions, including those with governments take place virtually. Citizens can choose which government they wish to interact with and obtain services from – a person living in one place could choose to pay taxes and take advantage of the services of a different place. Governments thus compete for citizen attention and support.

4. Strong nomadic individuals: Central government will have become a weak except for special functions like security and defense. Government no longer has strong ties to individuals' daily lives. Ubiquitous data stores are accessible by everyone, everywhere. High quality education is widely available through e-learning programs devised for you as an individual. Although people have great personal freedom and mobility, they no longer have privacy as sensors are everywhere and personal data is traded outside one's control. Individuals therefore bear a heavy burden to find the information they need and manage the data and technology of their daily lives.

4.4 Deriving the final set of scenarios

The scenarios derived in the regional workshops were analyzed. Dimensions and topics of interest were aggregated and described in tables. For determining alternative futures, one should only look at developments having a high impact and a high uncertainty. Developments having a low impact (independent of the level of uncertainty) do not influence the future. Developments having a low uncertainty will likely come out and will thus not result in different kinds of futures. This does not mean that is known how it will come out, i.e. identity management will likely to occur in the future, however, it might be uncertain in what form. The high impact and high uncertainty dimensions in the workshops are aggregated and compared with the dimensions in the validation workshop. Figure 5 shows all dimensions mentioned in more than 6 scenarios and all dimensions mentioned in the validation workshop.

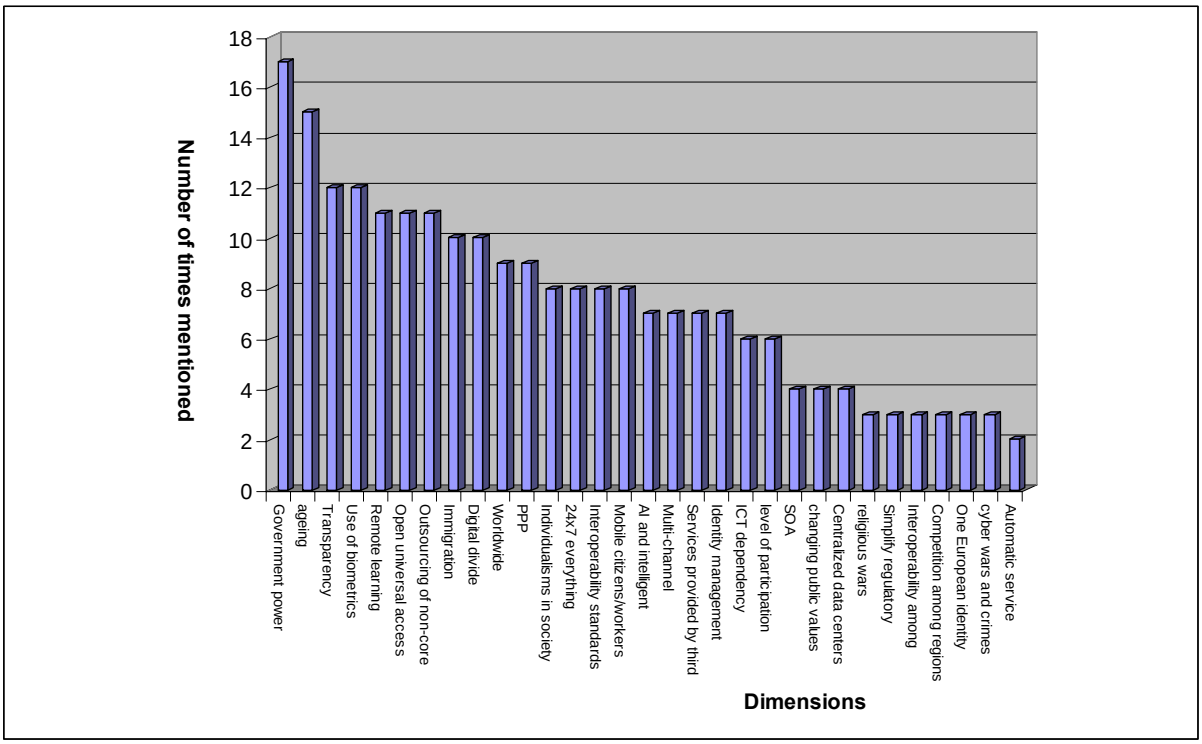

Figure 5: Most important dimensions found in the regional and validation workshops

The dimensions that are correlated with each other were merged into three key dimensions. The purpose of this step is to end up with only a limited number of key variables, from which we would be able to derive general characterizations of the scenarios. The following key dimensions were identified

1. *Environment*: The environment can either be stable or disruptive. A stable environment can be characterized by economic growth, a balanced world order, living in harmony. In a disruptive environment all kinds of crisis and incidents occur. The war on terrorisms continues, cyber crimes, viruses and bugs escape from labs, religious tensions and wars and a large social divide resulting in riots

2. *Attitude towards government*: Citizens can have a positive attitude towards government and having faith in the government. They trust that the government takes care of them. Persons like to participate in policy-making and democratic processes and believe they can influence the outcomes of governmental decision0-making and perceive the outcomes as fair. On the other hand, there might be no trust in government. The government is not transparence, decisions are hard to comprehend, the results of participation in decision-making are ignored.

3. *Government scope*: Government can focus on their core business and leave as much as possible to the private sector, including social security. Governments might determine laws, regulations and policies to guide the private sector. In general they focus on their core-business and outsource as many activities as possible. Governments having a large scope provide as many services as possible and to be all inclusive. They hardly outsource their ICT or business processes and try retaining everything in-house.

The three dimensions result in 2*2*2 = 8 scenarios. Figure 6 shows a 3-dimensional picture of the three axis and the scenario names in every corner. The scenario names are as much as possible based on the names derived in the regional workshops

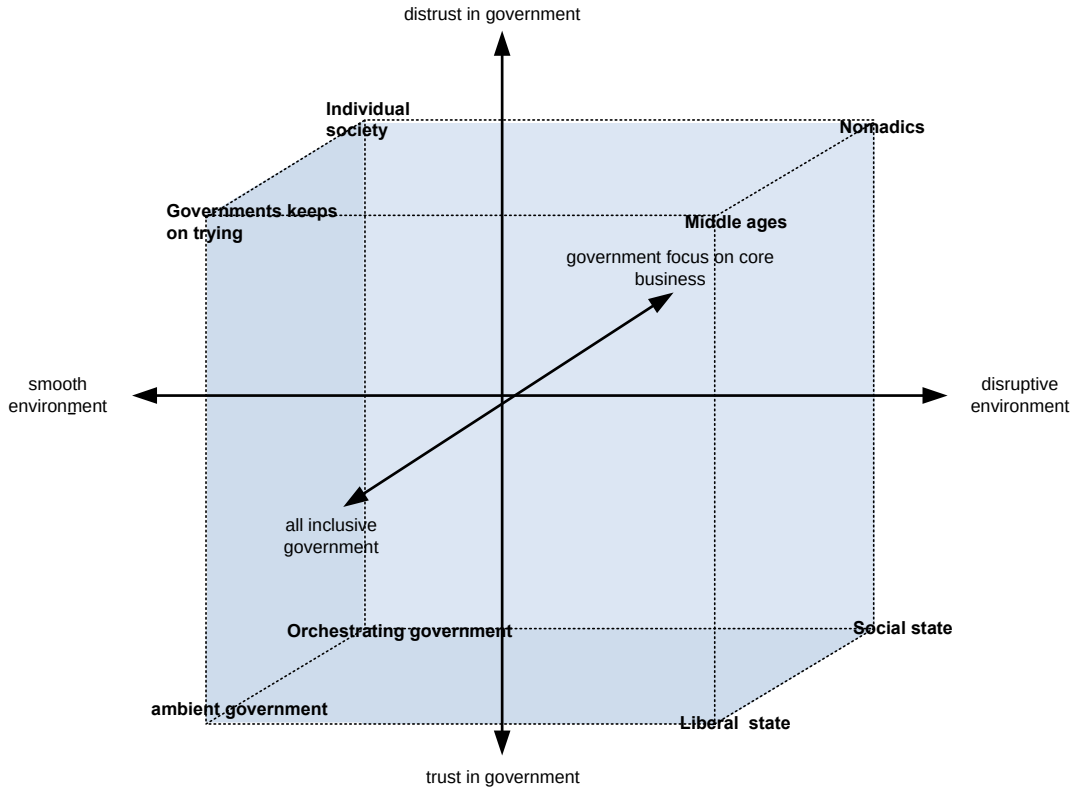

Figure 6: Key dimensions and final set of scenarios

The following sections present the scenario sketches of all 8 final scenarios. The sketches provide a consistent and coherent picture of a possible future and are aimed at enabling the communication of possible futures to non-experts and participants.

4.4.1 Final scenario 1: Orchestrating government

Disruptive developments that were predicted at the start of the 21st century did not occur or had only a modest effect on Europe's societies. The government adopts a facilitating, but limited role in society, which attitude is broadly supported.

4.4.2 Final scenario 2: Individual society

People have become more and more individualistic. They want to get the maximum out of their potential, and take it as an individual responsibility to be successful. Government should take care of essential facilities, but it cannot live up to the highly demanding citizens.

4.4.3 Final scenario 3: Ambient government

Government is all around. Citizens have a high confidence in government to effectively and efficiently settle issues for the common good. They are helped by a stable development of key environment variables.

4.4.4 Final scenario 4: Government keeps on trying

Despite its efforts to be involved in the bettering of the quality of life at all fronts, trust in government is low. Mainly caused by a lack of modernization of participation mechanisms, people experience a big gap between the technocratic government and their own wishes and worries.

4.4.5 Final scenario 5: Middle ages

In a highly polarized world, government's focus on key state tasks. The socio-economic policy is aimed at individuals taking their own responsibility, a mentality that rests on great support in 2020's society.

4.4.6 Final scenario 6: Nomadics

Always on the move and always on the run. Society has become largely individualistic, with only a small role for government that is distrusted.

4.4.7 Final scenario 7: Liberal state

Though society has changed dramatically because of demographic and security-related developments, government has been able to catch up with the high expectations from citizens and fulfills a key role in the provision of e-services, using state of play technology.

4.4.8 Final scenario 8: Social state

In a rapidly changing, confusing world, citizens do not have much trust in public administration. The government persists in its role as care-taker for society.

4.5 Reflections on the results of scenario-building

If we would already know the future, we would not need scenarios depicting possible future directions. The scenario approach is suitable way to describe different futures and to understand the different dimensions that make up possible different futures. Since the future cannot simply be viewed as a continuation of the past, seven regional workshops with experts from governments, information and communication technology industry and academia were conducted to stimulate interaction and creativity in order to derive scenarios. This resulted in 29 scenarios having 159 dimensions, i.e. variable depicting to other types of turns. A validation workshop was held to identify the main dimension and the main dimensions were clustered in three key dimensions resulting in a final set of 8 scenarios.

EGovernment innovations are expected from the use of existing technologies within a context. One cause of this might be that disruptive technology cannot be predicted. On the other hand, most of the participants expected that future eGovernment challenges would come from the changes in the societal and interaction environments which are more likely to

determine the methods of monitoring, interaction, collaboration, policy making and enforcement. As such, the participants expected that societal and modernization of government aspects will primarily influence the different futures. Technology was viewed as an instrument to help solve problems of society.

The idea is that the 'real' future for eGovernment in 2020 lies in some combination of these wide-ranging possibilities. Nevertheless, in order to develop a robust research agenda, it is important to consider the implications of the full range of future possibilities that is encapsulated by the divergent dimensions. The scenarios help to draw attention to the variety of developments and visions that could be the future. For Europe, this variety should help policy-makers to leverage the potential of the diversity and take into account the differences when transforming the European government landscape into a coherent community. On a more global scale, the scenarios offer insights into broad social, political, and demographic concerns that will shape both government and society in the coming decades

5. Gap analysis

Kristina Bogataj, Andreja Pucihar, Maria Wimmer (further authors may join)

The objective of the gap analysis is to investigate the future scenarios developed in the scenario building process in respect to the current research taking place (covered in the state of play report). The analysis will elicit research gaps to be addressed and measures to be taken to implement the future scenarios. Gap analysis assesses the differences between today's eGovernment research and possible future scenarios for eGovernment in 2020. In the gap analysis, the future needs of eGovernment research will be identified and mapped with current research. Thereby, strengths and weaknesses of current research in eGovernment will be recognized. Likewise, new challenges are being elicited. On that basis, the foundations for a potential roadmap for future eGovernment research will be extracted.

The chapter at hand will reflect the results of the gap analysis.

5.1 Related work on gap analysis

Several methodologies have been introduced for performing the gap analysis as for example: soft system methodologies, SWOT analysis, ITPOSMO.

Most commonly authors recommend to develop set of criteria for gap analysis according to the needs identified in investigated case.

5.2 The eGovRTD2020 gap analysis methodology

In eGovRTD2002, gap analysis will be peformed in four steps:

Step 1 of Gap analysis methodology – Identify communalities

Filter out issues from scenarios and from current situation (dimensions which are in the state of play and in the scenarios):

Identify and understand communalities. Analyse communalities (compare the communalities according to current research and needs of the future scenarios) of issues (tois and dimensions) and assess if the research needs are covered or not. In this way, relevance for future research is being validated. If we think the issue still needs research, we need to argue why the issue is not covered satisfactorily yet (argue the gap: why is the issue still an open issue in future (e.g. it is only dealt with in a research project so far). Investigate the categories of issues: when issues are grouped we have to check if there are differences in the State of play issues vs. grouped issues from the scenarios

Results: List of communalities, arguments for clearly identified gaps from commonalities

Step 2 of Gap analysis methodology - Identify the dimensions, which are not in the state of play but are in the scenarious

Identify a lack of issue in current research. An issue may have come up in the scenario, but it is not in the state of play. Then, arguments have to be investigated why it is in the scenario and not in the state of play.

Results: List of identified gaps - issues that are not yet addressed in research but need to be investigated in the future

Step 3 of Gap analysis methodology – Assess the dimensions according to criteria

According to step 1 and step 2, dimensions and tois of the gaps are being evaluated according to the criteria (discussed and defined in the meeting – see next section – yet reflection and final approval has to be carried out by all partners).

Results: Table of dimensions of gaps with rankings according to the criteria

Step 4 of Gap analysis methodology - Develop the hypothesis from dimensions in 13 categories

Next step is to take a gap (highly ranked) and develop a hypothesis (one or more).

Hypotheses are a coherent collection of issues (dimensions and TOI) within one category including a problem, a goal and potential solutions in the future. Hypotheses may enlarge issues of scenarios with new aspects to make them internally complete and consistent.

In eGovRTD2020, hypotheses aim at

- approving, whether all crucial dimensions in categories have been mentioned (maybe some are missing - also strategic documents should be used to check)

- identifying research issues that are mentioned neither in the state of play nor in the scenarios

- In developing hypotheses, some dimensions will appear as solutions (Example health care issue – robotics).

Results: Hypotheses, new dimensions of future research

5.3 Criteria for Gap Evaluation

During the discussion, the following list of criteria has been generated:

Name of criterion	**Possible values for assessment**	**Killer criterion (most important ones for ranking)**
Importance	not important at all/very important	killer criterion 1
Relevance	not at all/very relevant	killer criterion 2
Impact	low/high	killer criterion 3
Resources		
Costs	low/high	
Time for implementation	short/long	
Time of performance (service execution, time of delivery)	short/long	
Human resources (skills, expertise)	low/high	
Knowledge/information		
Availability	not available/available	
Accessability	not accessible/accessible	
Feasibility ▪ Economical ▪ Technological ▪ Legal ▪ Political ▪ Organizational ▪ Social/Ethical ▪ Public value	not/yes	
Convenience ▪ Citizens ▪ Business ▪ Governments ▪ Politicians	no/yes	
Economic value		
Benefits	low/high	
Resource savings	low/high	
Quality of services ▪ Devices ▪ Services ▪ Applications	low/high	
Usability ▪ Devices ▪ Services ▪ Applications	low/high	
Satisfaction	low/high	
Fun factor	low/high	
Interest	low/high	

The criteria should also be weighted towards wanted/unwanted/recommended!

5.4 eGOVRTD2020 Gap analysis results

5.4.1 Communalities and weaknesses in these communalities

5.4.2 Gaps among the state of play and future scenarios

5.4.3 Assessment of gaps and dimensions according to criteria

5.4.4 Hypotheses for key dimensions and their gaps

5.5 Reflecting the final results and inputs for Roadmapping

6. Roadmap for eGovernment research

Xiaofeng Ma, Bernhard Katzy, Michel Klein (other authors may be added)

This chapter will reflect the methodology of roadmapping eGovernment research based on the results of the scenario building exercise and the gap analysis. It reflects the preparation and organization of the interaction with the expert stakeholders to generate high quality ideas and receive feedback on the roadmapping results (the roadmapping workshops). Apart from that, community building among the stakeholder experts shall be furthered to build a constituency and stronger dialogue among public administrations and research.

Specific parts of roadmapping chapter include the methodology description that shall allow high quality interaction and feedback across regionally distributed workshops and the conduction and evaluation of regional workshops for testing potential scenarios and creating roadmap ideas and for gaining feedback on the roadmaps developed and prioritizing their elements. The roadmap for future eGovernment research shall be described in terms of topics and measures to take to bring forward eGovernment research.

6.1 Roadmapping Introduction

More recently, roadmapping become quite more recently in the world, especially in terms of technology roadmaps, as an approach to strategic planning for the future of technology in different sectors. The main benefit of technology roadmapping is that it provides information to make better technology investment decisions by identifying critical technologies and technology gaps and identifying ways to leverage R&D investments.

However, a common definition for roadmapping or roadmap does not exist till now, and an observation of roadmaps that have been created so far indicates that there is considerable diversity among practitioners as to what constitutes a roadmap and the roadmapping techniques employed. One definition, for example [34]:

"Roadmapping is a disciplined, consensus building, analysis, solution development, and decision-making methodology that supports strategic programmatic and project planning. Roadmap preparation focuses all parties on the needs, risk-reduction alternatives, desired end-states, and the paths that will lead to efficient and timely resource investment."

eGovRTD2020 roadmapping is clearly positioned at the strategic science and research roadmapping level. Therefore, the achieved result is not a roadmap focused on a particular product or technology (the most usual type of roadmaps), but rather the definition of a strategic research program for eGovernment.

In spite of the growing interest in roadmapping and a few attempts to structure the corresponding process, there is not yet a real systematic roadmapping approach or even visioning methodology defined [31]. For example, even for one of the main (and well known) steps, the "gap analysis" there is no clear procedure or set of tools available. The known approaches, such as the "SWOT analysis", do not directly apply here and cannot help, due to the fact that:

1. They are not "procedural" methodologies that can be simply applied to this case, and

2. The target context of these approaches is different than what is needed to be generated here for roadmapping, which is an ordered set of transition steps and a time line.

Hence, although looking for inspiration from a number of roadmap examples, eGovRTD2020 has to develop its own innovative methodology and procedures for roadmapping.

6.2 eGovRTD2020 Roadmapping logic

At a macroscopic level, a roadmap includes three main components: the characterization of the state of the play (baseline), the vision or desired "future", and a structured set of actions to achieve the vision. The goal of eGovRTD2020 roadmap is to develop a Roadmap, identifying all necessary transition steps, involving research, development and implementation, to reach the future desired state of the eGovernment. These three components can be operationalized as several key concrete roadmapping steps:

6.2.1 Step 1: The State of Play Analysis

The objectives of the state of play analysis were to collect information about the main eGovernment research programs and policies as well as about existing relevant eGovernment research projects in Europe and all around the world.

6.2.2 Step 2: Scenario Development

In addition to the baseline, it is important to perceive major trends and analyze plausible future scenarios that can be envisioned from those trends.

6.2.3 Step 3: Gap Analysis: from where we are –to- where we want

To identify the gap between the current baseline and the desired vision is the next important step. State of the Play and Scenarios will be instantiated into several key dimensions and will be grouped into certain numbers of Categories. A detailed comparison between the results of Step 1 and Step 2 would be conducted at this step to identify the key areas which have high uncertainties and gaps. The results will be directly input to the following roadmapping tasks.

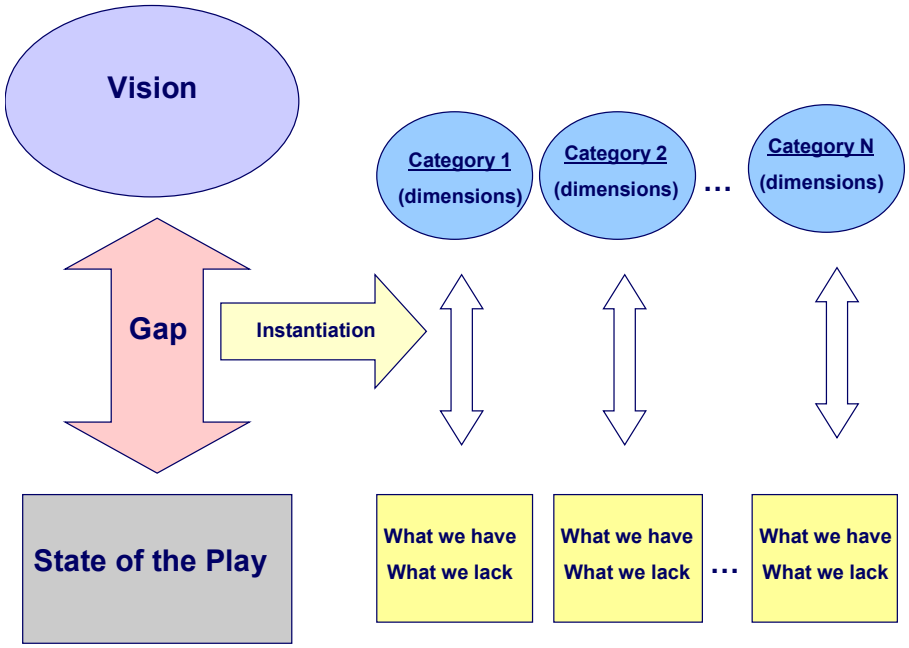

Figure 7, Gap analysis and its input to roadmapping workshops

6.2.4 Step 4: Verify and prioritize the identified Gap categories and dimensions (in roadmapping workshops)

The proposed categories and dimensions of gaps will be verified and prioritized during the roadmapping workshops. The intention is to gain the higher level validity through experts's consensus building process. Moreover, considering the valuable resources avaiable during the roadmapping workshops, it is wise to concentrate the resources on the highly admitted gaps and to collect the proposed actions from experts in the workshops.

6.2.5 Step 5: Identify the proposed actions and their implementation plan (in roadmapping workshops)

After having the priorized list of gap categories and dimenions, A brainstorming section will be used to collect the proposed actions to fill out these gaps in the roadmapping workshops. These proposed actions will be disuccssed and summarized during the workshops. The results of these regional roadmapping workshops will be a set of draft roadmap charts.

6.2.6 Step 6: Validate and consolidate the results (in the validation workshop)

After these series of regional roadmapping workshops, a final validation and consolidation workshop will be held to guarantee the consistency of the results and incorporate these results into a final consistent roadmap chart.

6.2.7 Step 7: Finalize the Roadmap Chart

Based on these input, a roadmap chart will be drawed and circulated publicly.

6.3 Roadmapping workshops

A roadmap workshop protocol and template will be developed to make sure the highly consistence among the regional roadmapping workshops. (come soon). Figure 8 shows some necessary elements of supporting coordinating roadmapping workshops.

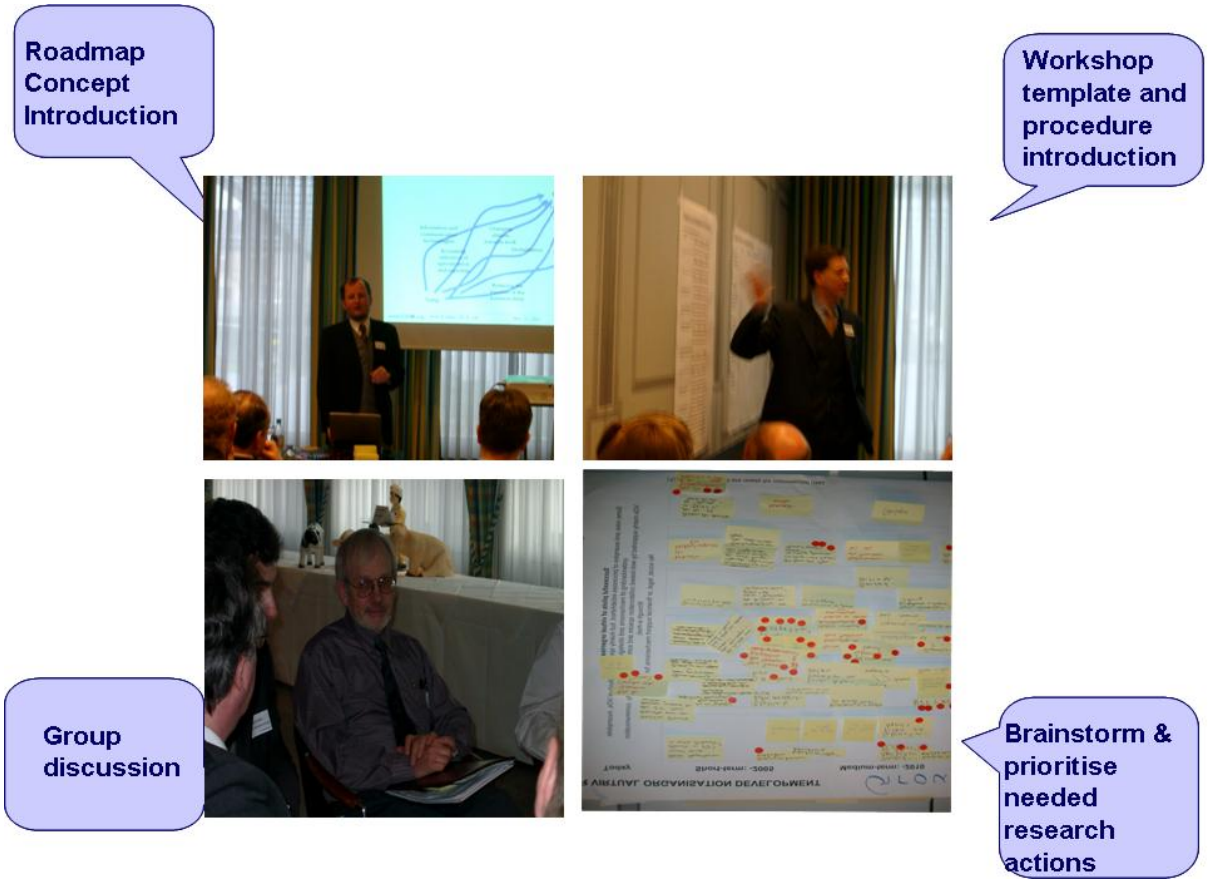

Figure 8, exmaples of workshop mechansims

6.3.1 Roadmapping workshop facilitating methodology

6.3.2 Regional roadmapping workshops

6.3.3 The Validation workshop

6.4 eGovRTD2020 Roadmap

7. Recommendations and measures to take to strengthen eGovernment research

This chapter will reflect the main results of the project in terms of its output. It will derive a set of recommended measures to take to further research in certain areas. Among them, the recommendation to foster stronger dialogue among research and practice could be mentioned.

The project aims to build the ground for further research in the 7th framework program. In this chapter, recommendations will be provided on which directions to chose, which foci to prioritize etc. Since the roadmap shall impact the national and international eGovernment research scenery to take up the research needs identified and to provide programs to initiate such research needs, recommendations will be given as to which measures could be taken.

8. Impact and community building

(Authors to be named)

The objective of impact and community building is to disseminate the results of the project to as broad an audience as possible to stimulate the debate on the topic and to explore new ways of working together in the field of eGovernment until 2020. On one hand, the impact and community building measures shall describe means to contribute and prepare the ground for further research in the 7th framework program and beyond. Likewise, community building shall provide a strategic measure to strengthen national research investments in the domain of eGovernment research.

In order to realize community building and impact, the project will publish a series of publications, take measures of awareness creation, initiate and strengthen the dialogue with experts; it will take attempts to impact policies and strategies, and to reinforce the community as much as possible. For example, the project methodology of scenario building and roadmapping shall support these goals.

The chapter will reflect measures to rise awareness and to provide a ground of community building.

9. Conclusion und outlook

(Authors to be named)

The conclusion shall reflect the results of the project and shall take a look ahead.

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