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eGovRTD2020
Roadmapping eGovernment RTD 2020: Visions and Research
Measures towards European Citizenship and Innovative Government

Instrument: Specific Support Action

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Extract of the deliverable D 3.1.:
Gap analysis report

Preliminary results as input for the roadmapping
workshops – not to be cited and not to be widely spread

Category: Government

(1) Lean government

No clear understanding and reasoning of which services should remain within the responsibility of governments, as well as which services could be outsourced to the private sector (cost/benefit analysis) exist.

Research is needed to find proper solutions for the situation when governments lose the control of the services provided by the “third sector” and for the situation when private sector starts to misuse the ability to provide public services. As public service provisioning isn’t very profitable, it is difficult to attract private agencies for this area of activity. Governments create possibilities of benefits for private agencies through e.g. collecting of fines (e.g. in public transportation), organizing IT learning courses, etc. Sometimes the prices for these “extra-services” are higher than they should be. In this way, companies make bigger profit out of public service provisioning. In this case the rights of taxpayers are trespassed.

(2) Power of government

At the moment there is no clear vision for the integration of e-services at the EU level without radical changes in the models of public administration of the member states. The model of public administration depends on the political traditions of the country. EGovernment IT systems are created according to the existing model of public administration and differ among the states. As citizens’ mobility increases, the EU member states have to integrate their IT systems (some, if not all). Current solutions of interoperability are not yet facing proper solutions.

The public services, which could be and should be integrated on EU level to reach more effectiveness and efficiency in EU public administration, must be defined. At the moment EU is trying to centralize certain services, but the centralization of health and healthcare, education, etc. is not likely to be possible because of the resistance of member states.

(3) Integrated vs. fragmented public administration

The research should be focused on the possibilities to use the shared services model in public administration. The existing shared-model application practice in public administration must be analyzed to find out in which cases this model is suitable and what effect does it have to the operation of public agencies in terms of cost reduction, mitigating the operational risks, creating a more value-focused culture, fostering innovation and operational excellence, introducing new technologies and commercial approaches.

(4) Distribution of decision-making power at local government

There is a need for the research on possibilities to distribute the decision-making (related to eGovernment issues as well) power at local government concerning the specific administrative structure of the country. Local vs. central power problem is tightly connected with the size of the country, its political traditions and settled administrative structure. Some of the countries have very strong local governments, but others tend to concentrate more power at the national level.

(5) Simplify regulatory framework

There is a problem in achieving more unification of eGovernment legal framework between member states as at the moment almost every country has its own distinct legislation in the area. Regulatory framework must implement the national traditions of the countries as well as to be compatible with the common EU guidance. There is a need for the research to find

out to what extent the framework should be national and to what extent common for all EU member states.

(6) **Risk avoidance**

At the moment governments and other public institutions have no motivation to change their work organization (in contrary to private sector). So the research must focus more on finding ways to **reduce and control** the public sector personnel's resistance for back-office reengineering, which comes from the fact that usually IT implementation means the reduction of the bureaucratic apparatus and this is an undesirable outcome for those who belong to it. To find possible solutions for this problem would be very important for eGovernment as the public personnel's resistance has a very strong influence for the progress of eGovernment implementation.

There is also the lack of the research on measuring the influence of digitization on the effectiveness and efficiency of governments (electronic public services quality measurement).

(7) **Government communities**

The research should be focused more on finding the means to reduce the political passivity factor of society and involving more citizens in participation in decision-making and e-engagement.

There should be more research on appropriate knowledge management techniques that could be used in government authorities for policy-making. E. . to analyse, disseminate and effectively use information gathered from citizens (by e.g. using different computer supported computation methods).

(8) **Power of EU in world**

At the moment online public services systems are focused on local users and aren't adopted to newcomers from other countries. A thorough analysis must be done to find out what preparation is needed to adopt eGovernment systems for the newcomers from Asia, Russia, and Eastern European countries.

The problems that might evolve if some other country (e.g. USA, China) would create its own public administration standards and would try to enforce it to EU are still unknown and any research doesn't focus on this issue at the moment.

(9) **Hierarchies will flatten**

At the moment there is a contradiction of governments remaining strictly hierarchical vs. flattening their hierarchies in world orders. Even large digitization of front- and back-offices hasn't changed governmental hierarchy in any of the countries. Research on solutions how government could become "flat governments" is needed.

(10) **Fragmented politics**

The importance of coalitions seems to grow at the moment, though government modernization using ICT should reduce the importance of parties/ coalitions at all. E-democracy tools that are already used in policy-making would influence the reduction of number of parties and their role in policy-making (contrarily to the situation proposed in the dimension's description). The assimilation of ideologies of political parties could be seen as well as the reduction of their influence in decision-making (because of the implementation of different e-engagement tools).

At the moment there is no research done to find out the solutions for ensuring the effective collaboration among the online communities and government; and for shifting it from the level of declarations to reality.

As many political parties are fighting for their popularity, they make only tactical decisions not the strategic. This is because the results of tactical decisions can be seen almost outright while the results of strategic decisions would be felt only after few years when another political party might be holding an office. As eGovernment needs strategic decisions, the ways to change this situation has to be found.

There is a need for the research that could help to re-consider the functions of political parties as their inner interests made to forget the primary role of political parties: to represent the public interests not the interests of different economical groups.

There is a need for the research on the problem of the increasing power of lobbyists, sometimes even personalities in politics.

(11) **Incident politics**

As governments have no intentions to stay in the background of governance, there are no initiatives, projects or research concerning this particular dimension. There are no signs of seamless government and reduction of bureaucratic apparatus at the moment. Actually, bureaucratic apparatus even increases despite the use of IT in public sector. So, the research should be done on finding the ways to reduce the bureaucracy with the implementation of eGovernment. There should be the ways found how to avoid the creation of e-Bureaucracy while implementing the eGovernment.

Government is not only the routine process when relationships with users are sustained. It is also the disposition of money and national resources. That's why different economic groups are fighting for the influence to governments. They even buy political parties in case to benefit from their political decisions (e.g. oil corporations block the research and implementation of cars with alternative engines world-wide; private businesses fight in process of the allocation of EU money; manufacturers seek governments "to forget" pollution problems, etc.). There must be a research to find the ways how to fight this problem.

Category: Society

(1) **Ageing**

The workforce grows older which result in a shortage of government employees if the retirement system will not be adapted and it will result in a lack of public services especially developed for the elderly.

Although noticed for decades this question is not solved in general and for the special case of eGovernment. It seems that in solving this gap new types of policies are necessary.

(2) **Unemployment**

There might be high levels of unemployment in the future or there might be high levels of employment. In various labour segments there might be large differences. There might be a shortage of skilled workers and a surplus of unskilled workers. EGovernment might help to bridge the gap between desired employment by improving productivity of public administration and reducing the need for high-skilled employees be providing automated support.

(3) **Geographic borders disappear**

In general current efforts concentrate on geographical borders between countries. In the scenarios it is expected that new type of virtual borders will come into existence. 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. A geographic location will not determine the governing government, but

people will choose the government they wish to be involved with. Also new type of borders (which might be the current geographical borders) might become more important due to all kinds of wars, crises and conflicts. No research deals with issues like: What is virtual citizenship? What kind of virtual borders exist already and will come into existence? How will those virtual borders affect citizenship.

(4) Immigration

Immigration and seamless movement of people has been an issue starting at the very beginning of the EU. The EU has initiated research and founded laws and policies to enable seamless immigration among countries and reducing entry and exit barriers. A number of issues are solved, despite that the physical borders still remain as virtual borders and there is a large gap between the dream of seamless moving from one country to another country. Data cannot easily pass borders and pan-European systems are not interoperable. There is a need for uniformity among European countries and standardizing and harmonizing systems. There is a gap between available systems and cross-border interoperability.

One of the most prominent and sensitive themes in the field of ethics of information technology is the subject of 'profiling'. With the help of advanced profiling techniques, multiple databases are linked to one another, through which – with the help of data mining – profiles of persons/data subjects can be created. Since these profiles often cannot be directly reduced to the original data and databases, profiling triggers new ethical and political questions, for example concerning privacy.

(5) Role of the Individual in society

Changing public values results in new roles of the individuals in the society. Society can become more individualism where people take care of their own interest. The elderly are stimulated to live on their own using all kind of technology.

The new roles are unclear and the impact on ICT need is not assessed yet.

(6) Tribalism

Tribes might be one form of organizing in the futures. It is unclear if they will become into existence, why they will come into existence and what implications this will have. Tribes might be considered as unwanted parts of society. Research might be needed as to understand how to avoid the emergence of tribes.

(7) Religious wars and conflicts

New type of wars and conflicts might disrupt nations, EU or society as a whole. Conflicts might use conventional arms, but also bugs, viruses and any virtual attacks. This might not be wars or conflicts among nations, but even within nations or initiated by a small group. Research relate to how public agencies can cooperate in real-time with each other to react immediately to all kind of wars and conflicts. This area is often related to the current field of crisis management, i.e. how to deal with incidents like terrorism attacks, influenza and so on. A gap remains how government agencies can collaborate with each other to deal with these kinds of attacks, having a first responders systems to deal with it and coordinate efforts is not known.

(8) Virtual Borders and Citizenship

A borderless EU has still not be realized fully. In the future, new virtual borders might appear and existing borders might vanish resulting in citizens becoming member of different communities separated by virtual borders. No research deal with issues like What is virtual citizenship? What kind of virtual borders exist already and will come into existence? How will those virtual borders affect citizenship and governments?

(9) eParticipation

Despite ample research and experiences, there is still a lack of knowledge how to make e-participation work. Moreover it is unclear of direct forms of participation or preferred over current democratic forms. A main gap is how to realize that government listen to its' constituent and constituent can ensure that their opinions are included in the decision-making processes and taken seriously.

Category: Government & Society

(1) Level of participation

In the future all citizens of the EU might be able to participate in all decisions at all levels of government. Other scenarios show a lack of participation and people are stuck of participation as the government does not listen or participants are not able to influence decision-making.

Most EU countries have or have had research projects and experiments in the field of participative democracy. A number of implementation can be found and there are many evaluations of such efforts available. This topic can be viewed as a large research area having mixed results. Research is necessary as to understand how disengagement of people can be overcome and as to ensure intense participation.

(2) Pseudo-democracy

Pseudo-democracy is that citizens participate for the sake of participation and their input is limited. They have to participate, but know that their input is likely being ignored. This is likely to be undesired and research should try to avoid this.

(3) Less interest in politics

Citizens are fed up with politicians as they promise too much, are hardly accessible (as they receive thousands of emails a day) and finally make decisions without listening to the opinions of others. Technology might facilitate the easy involvement in democratic processes and might ensure that every opinion is automatically given the attention it needs and included in the decision-making. Research into technologies that are able to ensure that democratic processes are democratic is needed to solve this gap.

(4) Decreased power of political parties

Political parties might become less important. The system of representation might change, one option might be direct voting. It is unclear if this change is desirable or not. Moreover research is necessary into how the political systems can be arranged in the future. Which arrangements are possible?

(5) Global participations

Citizens participate in various communities to take care of their various rights from various locations from all over the world. They should be able to participate from anywhere at any time.

(6) Direct voting

For major decisions, topics and issues on the European, national, regional and/or local level all citizens are invited to vote. Direct voting on legislation is present with referenda. Some scenarios view direct voting as the ideal supported by information processing and simulation & visualization techniques, whereas other scenarios have a negative view on the

possibilities. Current technologies to support voting are limited and need to be further explored and developed.

(7) Participation by different age groups

In the future, there might be a voting-divide among groups (in analogy to the digital divide). Which might not be an eGovernment problem but primarily a social problem.

(8) Participation in communities

Politics might change from party politic to communities clustered around certain themes. People participate in communities to influence the democratic processes. Some communities might have more power than others. More and more democratic processes and participation will be shaped around communities of interests, based on peer-to-peer networks, blogs, etc. These kind of new application and the impact on the democratic processes might require future research.

(9) Local governments arrange healthcare

The system of governance might be subject to changes. Politicians might try to influence the healthcare more directly and aim at reducing costs and improving efficiency of healthcare. New types of governance mechanisms become necessary that might have a different degree of centralism and decentralism.

(10) Changing public values

Combining information sources and processing information provides new opportunities. Especially combining sources by different types of agencies situated in different (EU) countries and the relationship with public values is not explored yet. Public values vary from country to country which makes comparison difficult. Moreover, public values change in time which make it even more complicated. Many current efforts do not take into account that current public values might change over time, which make new types of services possible, for example related to monitoring.

Privacy protection is subordinated to the public welfare and the fight against terrorism. Both might be considerably different from how they are done now. Public values should be better understood and the impact on eGovernment should be better known. It might restrict current applications (cross-organizations processes) but also might provide new opportunities.

(11) Level of inclusion of governmental services

Although the options and alternatives one can choose from are known, little is really known about what is the best option given certain conditions for sourcing service provisioning. Current results and experiments need to be consolidated. Moreover, knowledge seems to lack concerning cross-country sharing and outsourcing of services.

Category: Society and ICT

(1) Interoperability systems in society

In general current research focuses strongly on interoperability and leads to a variety of standards covering certain interoperability problems: existing standards are only linking up isolated applications of a domain. Future networked governments will need generally admitted standards within one domain, and even beyond certain domains – reaching a global interoperability scale. Besides, gaps arise from disregarding possible impacts on personal data protection towards private sector misuse.

(2) Open universal access

Gaps arise from different foci. Current accessibility research focuses on topics to overcome the Digital Divide and serves to set up the basic infrastructure for people (ICT equipment, skills and overcome psychological barriers) to take part in the Information Society. But future cases require open universal access not only for empowering citizens to use ICT (general eParticipation) but also for providing value-added services related to eDemocracy (eVoting, eParticipation).

Besides, the focus of the EC regarding access is on providing access to the necessary ICT. Fewer foci are on social factors e.g. which also might be to anticipate accessibility for certain stakeholder groups.

Present research covers many topics related to open universal access e.g. eInclusion, multiple channel access, accessibility for all and intuitive handling. In many future scenarios not a single access point (one-stop shop) is mentioned but a no-stop shop which is related to ambient intelligence and embedded software is required. From this it follows that current research should also take into account the requirements of ambient systems.

(3) Artificial intelligence and intelligent information processing

Artificial intelligence research should be more integrated in information and knowledge management to develop new technologies to filter information and only present relevant information and provide indication about information quality (e.g. understanding also the economics of information).

Besides, the results and the handling of data mining methods and devices have to be responsive to user needs and opportunities. Intense exploitation of such technologies needs to be researched in eGovernment environments.

(4) Small, ubiquitous, wireless technology

Gaps arise from the separate views towards research regarding the development of embedded systems. Integrated research is needed towards convergence of technologies.

(5) Proprietary software used by society

The main gap is the challenge to integrate Open Source Software solutions and proprietary software solutions. Future research should focus on the challenge to integrate and make interoperable Open Source Software solutions and proprietary software solutions in order to let both coexist to each other and increase the competition to raise ICT quality and innovation.

(6) 24x7 everything

Although accessibility is one of the main mentioned topics within the state-of-play report 24x7 availability of everything is not explicitly named, 24x7 hours access to public administration services is one objective in every current eGovernment strategy but this objective is still restricted to leave a digital notice or at once download information and documents or in seldom cases to initiate a process, which you will receive per post. Digital access of all services at every time requires corresponding research, for instance workflow management, business process reengineering, interoperability, etc. The 24x7 dimension is closely related to mobility in regard to free movement of people and to ambient access. The main gap can be extracted from comparing state-of-play issues and scenarios covers research does not investigate enough demands and upcoming needs if people become more and more globetrotter. Currently the number of globetrotters within a society is low. But it continuous to increase.

(7) ICT dependency

Besides the Digital Divide an additional socio-psychological related challenge might occur. Within some future cases ICT dependency is expected as result of the continuing trend of ICT penetration of everyday life. Social sciences investigate some aspects of this problem but it is not mentioned within any eGovernment research programme, project or strategy although such developments certainly will impact future eGovernment and society. These possible impacts should be investigated. Besides, this topic should be also investigated in relation to eParticipation and ICTs influence and impact to eParticipation.

From the technical point of view there is the need for governments to build up a secure infrastructure for the use of eServices. Research should focus more on issues regarding reliability, continuity, correctness, fault tolerance, efficiency, portability, recovering, etc. of software.

(8) ICT as driver for economic growth

In future ICT development in particular ICT innovation and industry will be a driver for economic growth. Business sciences investigate some of these relations but in eGovernment research these relations are still not considered although it is already well-known that governments are lead the way for innovation and consequently for economic growth. Hence, research in the field of innovative ICT should be funded.

In particular ICT research is needed which covers the special characteristics of governments including eGovernment (eAdministration), eGovernance and ePolicy. Main problem of current eGovernment implementation projects is still the lack of integrated research before, whilst and after implementation process to prevent and avoid misinvestments, ensure quality of the implemented system, set up a proper risk assessment and find potentially opportunities to improve quality and efficiency of the system.

Category: ICT

(1) Ubiquitous systems

Current research focus is too specialized and not broad enough to cover the requirements mentioned within the scenarios for ubiquity. There are many isolated applications which are not related to a whole inclusive objective.

(2) Peer-to-peer

The underlying sense of peer-to-peer computing within the future cases describes the need for more interconnectivity between existing ICT systems at the local, national and international level

(3) Service-oriented architecture (SOA)

It should be approved if the research which investigates user needs and demands are properly and well-founded. Not directed towards the applied theoretical measures but to the final outcome.

(4) Holographic technologies

ICT research should be more enhanced and enlarged to virtual and other new ways to communicate in order to substitute human resource through virtual presences.

(5) Pattern recognition / Visualization of data patterns

In order to support information and knowledge management, as well as to handle still increasing information overload research in the field of pattern recognition and the visualization of recognized data patterns is necessary.

(6) Integration of various modes (convergence)

Convergence of ICT is not explicitly mentioned within the research programs and strategies of the single member states but the trend towards convergence of ICT arises from several forecasting studies. Hence the lack of corresponding eGovernment research is already discovered but still not fully integrated in eGovernment research except the development and deployment of multi-channel access to eGovernment services.

Category: Government & Society & ICT

(1) Governance in service provision

In respect to the current financial situation of nearly all EU member states future research should concentrate its efforts to identify the core competencies of governments and generate a corresponding public service portfolio in order to reduce public service delivery to its required minimum as requested by the future cases.

Besides, the general framework and in particular the legal framework should be investigated to continue guaranteeing the quality and security of service provision even if it is outsourced. Hence, new control mechanisms should be developed to support government's supervisor role. Task of government is to fulfil its regulating work by setting up the general framework and a strategy for the information society.

(2) Role of government in services

The challenge of governments is to focus on its core businesses. Hence the role of governments in service provision should investigate how the deployment and application of new ICT by public agencies can promote and support this challenge.

(3) Large scale, customized services

Automated service delivery requires a holistic approach to redesign and ICT support government processes. If governments provide large scale and customized services the complexity of task processing will increase and automating is difficult to realize because task complexity in combination with flexibility (occurs by individual service delivery) is much more difficult to implement than standard processes.

Besides, there occurs the challenge to integrate large scale and customized services within governments approach to focus on its core businesses only.

(4) Personal brokers

In future, the Digital Divide will be threatening society and only a few people will be able to operate complex data and information. Hence, socio-technical research should investigate if this threat can be overcome by empowering citizens best possible through e.g. changes in the educational programme or user friendly devices or any kind of intelligent agent or the combination of both education to use intelligent technical solutions.

(5) Simulation & Gaming

eGovernment research regarding eParticipation mainly focuses on how and which ICT is able to cheer citizens on participating in the political decision making processes. But detached from this only social science focuses on why citizens are not longer interested in participation in the democratic decision-making. Socio-technical research is required to find a solution. The issue 'simulation and gaming' extracted from the scenarios just mentions one opportunity to solve disenchantment with politics.

On the other hand simulation & gaming is mentioned as measurement to analyze and evaluate certain situations for prevention purposes, e.g. traffic simulation, crisis simulation.

(6) Data access and regulations

New ways of communicating and interacting with ICT systems to access data are required, e.g. human formulated questions instead of keyword research. Besides regulations regarding data accessible through the internet are still in its initial stage and have to be enhanced (see information ownership).

(7) Mobile citizens/workers

The possibility of free movement of money, goods and people within the European Union will likely lead to high mobility and lot of traveling of people including frequent changes of jobs. Current eGovernment research and strategies do not cover the challenges eGovernment will have to face if Europe citizens continuing to become more mobile. In some cases governments of the single member states collaborate and cooperate for instance in law enforcement and health care but there are a lot of additional issues should also be considered within the transformation process of governments.

(8) Communities of internets politics

Although eParticipation is part of the single member states eInclusion strategies as well as it is well-funded by the European Commission but research focus only on existing political and participation structures. The future cases assume that the participation and democracy structures will change within the next couple of years. Europeanization is one opportunity and will change the operational and organizational structure which should be investigated.

(9) Voice control (UI)

Besides, new ways of communication and interaction are expected in future in particular voice input and control instead of input via keyboards. This kind of ICT development maybe is already mentioned within the topic of user friendly and eInclusion promoting services but it is not explicit named within the state-of-play.

(10) Embedded Chips

The development and deployment of chips (in devices or as implants) should be standard in the expected future but is not mentioned in any case within the state-of-play except the use for identification and authentication, e.g. embedded chips are used for passports at presence. Some necessary ICT is available to use embedded chips for the future expected applications hence research should focus more on current barriers, e.g. legislation, social factors like trust. A technical gap occurs in the case of convergence of ICT. (see Integration of various modes)

(11) Entertainment ICT

Like describes above eParticipation is a main topic of interest within the state-of-play but entertainment ICT to increase citizens participation in democracy processes is not explicit named.

Current eParticipation research is based on the assumption that the deployment of ICT will help to overcome disenchantment with politics. But this assumption is not approved. Disenchantment with politics is closely related to culture, tradition, personal attitudes to politics, the whole socio-economic environment etc. Does the deployment of ICT really increase participation? Surely the deployment of ICT will support the participation in democracy issues of disabled (physically or through wide distance etc.) and might be increase economics of the participation processes (reduce costs e.g. in the case of elections)

but will any kind of ICT increase general participation. Current research should focus more on these socio-technical topics.

(12) Ontology and Semantic Web

Common European eGovernment ontology and agreed European eGovernment glossary are not established.

Common specifications for semantic interoperability are claimed in as being needed for instance through a regular eGovernment service terminology and service information model. In regard to globalization, a need and likely a successful development of automatic translation machines will progress, which will help to bridge the distance between people speaking different languages. For assuring this, more research is needed to be focused in this field. . Trans-disciplinary approaches aiming at reducing the gap between humanist and technologist perspective in: intelligent agents, semantic web, ontologies, broadband communication, ubiquitous computing are needed.

(13) Interoperability

At the moment interoperability research focus mainly on technical interoperability issues. The biggest challenge is to reduce the number of isolated applications and define one standard within one domain and then across domains.

Furthermore, interoperability research should focus more on interoperability at organisational and semantic level, particular within the European Union and its common public administration.

(14) Information and Knowledge Management

Information overload is one of the biggest problems in the private and public sector at present. Currently lots of websites host unstructured content and confusing citizens more than that they support their information research because intuitive information research is not always possible and leads very often in the wrong direction. Therefore, further research towards information and knowledge management is high relevant in order to support eInclusion (make interaction between citizens and government possible in the first place) and to provide useful eServices (value added services, indicator of quality of services).

Besides, information collection could be useful and improve the quality of political decision-making, if the collected data could be valuable processed.

(15) Intellectual Property

The protection of intellectual property is more complex than ever before because the internet provides a lot of opportunities for such criminal activities. For instance silver screen and pirate copies of music through internet peer-to-peer systems are threaten the music and movie industry. Research is required to develop solution to counteract this business and protect intellectual property. Hence spur on e.g. digital rights management.

Category: Government & Economics

(1) Government compete with each other

Lack of knowledge concerning the role of e-gov policy and e-gov services quality in the decision of citizens and companies to select a national government.

(2) Competition among regions

Lack of knowledge concerning the role of e-gov policy and e-gov services quality in the decision of a citizen to select a region for his residence or a company for direct investment.

(3) Reform of public administration:

Lack of knowledge concerning the methods and key success factors, which are specific to public services, to improve public services through ICT and the factors slowing down improvements.

Lack of knowledge concerning the formulation process of eGovernment policy. (Equivalent to what is done for companies).

(4) Transparency

More research is needed to identify which are the public data and services for which transparency is important and which would be of general interest. Also a comparative analysis of the legal texts related to this question seems to be lacking. How to create value out of public information produced by the various administrations or public organisation does not seem to have been the object of systematic study.

(5) Simplify public administration

Lack of re-engineering method specific to public administration processes, with example of successful applications. In particular taking into account legal and regulatory aspects. These methods should lead to e-gov applications where information held by administration and required for an administrative act (change in civil status, change of address, tax declaration, etc...) are automatically obtained by the administrations concerned. This interoperability is needed within the same nation state but also more and more at the European level. Citizens and companies are operating increasingly all over the EU union.

Notes: This raises difficult technical questions of organisational interoperability (administrative procedures), semantic interoperability (including translation). Indeed national governments require certified translation. The definition of common requirements and interface for interoperability is a fundamental question for several public services. The technical interoperability problems are not specific to e-gov

(6) Standardization of laws, regulations and taxes

Research is needed to understand to which extent the existing differences concerning national law, regulation and taxes are an obstacle to free trade and equal with the same opportunities between the citizens of the EC.

Notes: It is not sure that all differences are to be seen in a negative way, in particular when related to norms people wish to abide with. The important research point here is related to where harmonisation is providing a benefit and where it just limits diversity which is usually a source of creativity. Interesting research could be carried out concerning the use of technology to support citizens and organisations about their decisions in various legal domains. To keep our IP example knowledge based technology could be used to provide expert advice on IP, or work law according to the nation state and international law (EU directives, international agreement etc...)

(7) New type of governance

Research work could be made to identify how to improve the supply of general interest services in a transparent way to citizens and companies in particular when activities are crossing national state borders. Research on how to embed knowledge based application and models in e-gov application to provide better services to the citizens and companies is highly useful.

(8) Central EU eProcurement

Lack of knowledge concerning pros and cons of central e-procurement and unique source of e-gov application. Central procurement can also have disadvantages such as diminishing flexibility and freedom of choice in the decentralised units.

(9) EU expansion (additional member state)

Lack of knowledge on the expected impact on e-gov of new member states. The identification of the nature of the impact related to e-gov applications in the new member states and interoperability problems with other nation states would be useful. The nature and number of member states should be taken into account in the research.

(10) New up-coming economies:

The support of innovation and entrepreneurial spirit is a key factor for a nation and a region to stay competitive. How to support these values the best way is not clear. E-gov application in the field of education and professional training could be involved here. However the support of values and entrepreneurial spirit in a society and government by technology may not be the best way to achieve this goal. This factor is more likely to be influenced by education (and hence educators) and facilitated by law, fiscal policy and the statute of researchers (possibility to take partnership in spin-off etc...) . The Lack of knowledge on how governments could take advantage of new up-coming economies in their policy could be clarified by research related to how private companies and Multinational are integrating their activities with new developing economies. Research study concerning how gov can support better access to capital market or private equity for research spin-off could be useful here.

(11) Disturbed world order

Crisis management application have been existing for a long time, environment control application are also very important and often linked with satellite observation systems. Research could be useful to provide better crisis management support and better environmental information for governmental decision concerning management of natural resources and environment.

(12) No separation of powers

The lack of research about the psychological, societal, legal, institutional and economic aspects of using ICT to balance between security control and privacy protection. Complex problems will be raised if the ID card and passport become European and not national. It is probably in this hypothesis that additional research could be useful.

(13) Crisis Management

New type of wars and conflicts might disrupt nations, EU or society as a whole. Conflicts might use conventional arms, but also bugs, viruses and any virtual attacks. This might not be wars or conflicts among nations, but even within nations or initiated by a small group. Research relate to how public agencies can cooperate in real-time with each other to react immediately to all kind of wars and conflicts. This area is often related to the current field of crisis management, i.e. how to deal with incidents like terrorism attacks, influenza and so on. A gap remains how government agencies can collaborate with each other to deal with these kinds of attacks, having a first responders systems to deal with it and coordinate efforts is not known.

Category: Society & Economics**(1) Resource wars**

Lack of knowledge on how different national and/or regional governmental agencies can better be coordinated in a efficient way using ICT system (Enterprise Resource Planning Systems)when natural disasters occur. It should be stressed however that organisations independent from government are required since unfortunately experience shows that government have often not behaved in a professional and trustable way but have hidden the danger to the population!

(2) Environmental pressures

Lack of knowledge concerning which kind of risk management competences should government possess and how ICT applications can support it? The research concerns government readiness to face pandemic and how eGovernment application could help facing such situations. (keeping population informed, providing advice etc..;)

(3) Bugs escape from lab

Lack of knowledge concerning which kind of risk management competence should government possess and how ICT applications can support it if disruptions and crisis's occur in society?

(4) Adaptive economy

Economic growth will depend more and more on the ability to react rapidly to changes. Decision-making software supporting real-time decision-making about stock value, global economy market trends etc.

(5) End of US primacy***Category: Government & Society & Economics*****(1) Market regulation**

Improving our knowledge of industry where market mechanism do not work properly, of improving the efficiency of justice and public-private cooperation is of course important, but the link with eGovernment application is not clear.

(2) Problems with social security and pensions

Lack of knowledge concerning the evaluation of the efficiency of these services and lack of development. of pan-European eGovernment services.

(3) Funding and control of education

There is no doubt that technology can help a government improve the educational and professional system of a country. However the role and efficiency of e-Learning and e-Inclusion etc. are not clear. Research is needed to undertake to evaluate efficiency various use of technology in education and training. (eLearning approaches).

(4) Health is privatized

Much knowledge is needed concerning the **good** use of technology to support the management of health care. To support the medical personnel as well as the management of

organizations in charge of health care: from doctors to large hospitals. Research needed on evaluation of government policy related to health economics.

(5) Services provided by private parties

The conditions for efficient sub-contracting to private sector with respect of general interest service requirement is a major issue. Research aiming at comparative legal and policy analysis could be useful as well as research on cooperation between private organizations and government

(6) Outsourcing

The conditions for efficient outsourcing of public services have to be clarified according to the nature of the service. In particular the respect of citizens rights and duties is an issue.

(7) Public-Private-Partnerships (PPPs)

Lack of studies about the efficiency of the cooperation through these PPPs structures. Studies needed for the comparative analysis in various member states of such partnership. The link with eGovernment is moot.

(8) Simplifying international trade

More knowledge is needed to understand which eGovernment application is needed to simplify this cross-border trading. There is also need for legal framework research for international trade.

(9) Globalization

Clarification of the interaction of globalization on government **policy** and services is needed as well as eGovernment application to help solving problems of global public goods.

Category: Government & Society & ICT & Economics

(1) Worldwide identification / authentication is not present

No single system for government-controlled identity management is established. There is still a need for system integration in the EU level research and application. Use of RFID, biometrics and other build in devices, including chips and biometrics data at the EU integrated level are still issues for future research.

(2) One European Identity

Further research and development programs should be focused to establishing one European identity system. Innovative identity management systems would empower the user and include technologies that authorize users to handle their identification themselves or choose to leave it to the service provider. For identity management across heterogeneous systems, interoperability and some minimum standards are essential. Legal, technical and inter-organizational barriers must be identified before the one European electronic identity is applicable.

(3) Use of Biometrics

“Use of biometrics” is highly related to “Worldwide identification and authentication”. Consequently, the application of biometrics for unique identification needs to be understood well.

(4) Privacy

Due to development of advanced technologies for monitoring and network sensors, privacy is not completely assured. Privacy enhancing technology and methods are topics that have to be addressed in the future. There is a need to support more research programs in this field.

(5) Customized services

Automation, integration and standardization of e-services is not fully provided in the meaning of integrated customized eServices in the common European Union space. The European Commission research focuses also to personalization of services and service platforms, which will be different from today's physical platforms, whereby Internet and mobile platforms will start playing a central role. Also research themes eServices provision in general and with specific focus of pan-European services integration have been identified as important research topics in the future of European research and application.

(6) Government networks

Government is becoming more and more networked and also virtually organized. There is strong dependence on ICT. The Government hierarchy is changing. One European single access point does not exist. There are still open questions regarding organization and operation of government network: What roles and activities of interest groups will impact government activities? What role will private parties play in government service provision and in participation in policy making? Will government be centralized or decentralized? This open issues need to be addressed in the future research and policy regulation programs. Also the issues of assuring the interoperability of eGovernment at the EU level remain an open issue.

(7) Network of sensors

Use of ambient intelligence and intelligent agents, avatars for a smart home environment in a means of network of sensors which will enable collecting and sharing the necessary data is still an open issue. Also privacy and security are important issues to be addressed from this perspective.

Build in devices for ubiquitous sensing (e.g. chips or RFID) are still open research issues to be addressed in the future. For this reason, they are indicated to be very important research topics in the near future, especially in a means of networked environment of sensors in the common EU space.

(8) Broadband for all

None existence of Pan-European broadband accessibility of information, services and non-balanced development of state region. Broadband for all is still an area where investments in research program and implementation should be addressed.

- Universal (Pan-European) broadband accessibility of information products and services for all is not present
- World wide wireless accessibility to networked information and services does not exist.

Both issues are still open research issue to be addressed in the future.

(9) Decision-making technology

Quality of decision making support and knowledge management through the establishment of integrated information and management environemnt is not achieved. With the fast development of modern technologies, methods and solutions more research is needed in orther to realise how to implement this technologies to gether the necessary information for effective decision making..

Development of Intelligent Agents and Avatars in the future is recognized to have many opportunities. Expert and intelligent systems and decision making software could enable

automatic judgment and other automated eServices. Therefore it is estimated that research programs will need to cover further research in this field in the future.

(10) Robotics in healthcare

Non-coherent integration of eServices and partial usage of robots in healthcare is realized. Research focused on Smart intelligence robots in healthcare is needed in the future in order to offer eServices to the citizens, especially older population and population in rural areas.

(11) Multi-channel

Providing advanced eServices through multi-channels in order to contact and interact with public agencies. Furthermore, information and services are more and more accessible through multi channels and multi media – enabling up to date eGovernment information through easy usable devices as TV, wired and wireless devices.

(12) Information available and use

Governments shall establish national platforms for disaster reduction and management. In particular, such platforms shall be encouraged and empowered to share relevant information, to develop common standards and practices, and to link up with platforms that already exist. The delivery of high-quality of eGovernment services, which would be more effective and easy accessible, economically effective and easily accessible services to citizens and businesses, is necessary.

(13) Remote Monitoring

A great research potential exists for achieving constant and sustainable monitoring and surveillance for law enforcement and crime supervision. Also remote monitoring of people and health is not achieved yet. Built-in devices will help to implement and achieve data collection for decision making and monitoring in all needed fields. This is also related to the big brother issue, which people are afraid of. But many of them are willing to give up some privacy in order to get and use data, information and eServices, they need. How all these issues relate to each other needs to be understood well.

(14) Automatic monitoring and enforcement

Automating monitoring for data collection and enforcement is closely connected to privacy issues and remote monitoring dimension. In order to provide automatic judgment, intelligent judgment, control over information gathering and use, monitoring for data collection and decision making more research is needed in this field for the future.

(15) Implanted technology devices

Research is needed in the field of where and how implanted technology devices can be utilized and which consequences such application might have.

(16) Media richness

Currently, research projects within FP 6 are focusing on multimodal and multilingual speech technology. How can this technology be used to provide services to the citizens and civil servants, applied also in noisy environments?

(17) Information quality

Information quality is very important for decision making processes. Pollution of information can result in bad decisions. How can information quality in eGov contexts be secured?

(18) Automatic service provision

The government should improve the service provisioning to the citizens – enabling fully automatic eServices. According to the eEurope Action Plan and the i2010, many countries develop modern forms of public service provisioning and eBusiness via large-scale broadband distribution with low prices and via safe and reliable information-infrastructure. Secondary objective is monitoring of the realization of the Lisbon-agenda, which have to consider all EU member states. This dimension is highly related with services recommending and customized services dimensions. However, current implementations are not yet such comprehensive and fully automated.

(19) Cyber wars and crimes

Over the last years, eCrime increased tremendously. Government duties have increased to provide proper protection mechanisms. Effective research is needed to develop concepts, methods and tools to detect and counteract corruption, crime and terrorism activities taking place also via the Internet or being prepared via the Internet. Secure core infrastructures and Internet security protocols, as well as monitoring concepts for managing emerging risks and increased complexity shall be developed by corresponding research. Research should focus on related domains like psychological, societal, institutional, legal or economic aspects which can prevent eCrime.

Gap Name	Very low	Your opinion about the gap				Very High	Short-term (-2010)	Medium-term (-2015)	Long-term (2016+)
Category: Government									
Lean government									
Power of government									
Integrated vs. fragmented public administration									
Distribution of decision-making power at local government									
Simplify regulatory framework									
Risk avoidance									
Government communities									
Power of EU in world									
Hierarchical will flatten									
Fragmented politics									
Incident politics									
Category: Society									
Ageing									
Unemployment									
Geographic borders disappear									

Immigration									
Role of the Individual in society									
Tribalism									
Religious wars and conflicts									
Virtual borders and citizens									
eParticipation									
Category: Government & Society									
Level of participation									
Pseudo-democracy									
Less interest in politics									
Decreased power of political parties									
Global participations									
Direct voting									
Participation by different age groups									
Participation in communities									
Local governments arranges healthcare									
Changing public values									

Level of inclusions of governmental services									
Category: Society & ICT									
Interoperability systems in society									
Open universal access									
Artificial intelligence and intelligent information processing									
Small, ubiquitous, wireless technology									
Proprietary software used by society									
24x7 everything									
ICT dependency									
ICT as driver for economic growth									
Category: ICT									
Ubiquitous systems									
Peer-to-peer									
Service-oriented architecture (SOA)									
Holographic technologies									
Pattern recognition / Visualization of data patterns									
Integration of various modes									

(convergency)									
Category: Government & Society & ICT									
Governance in service provision									
Role of government in services									
Large scale, customized services									
Personal brokers									
Simulation & Gaming									
Data access and regulations									
Mobile citizens/workers									
Communities of internets politics									
Voice control (UI)									
Embedded Chips									
Entertainment ICT									
Ontology and Semantic Web									
Interoperability									

Information and Knowledge Management									
Intellectual Property									
Category: Government & Economics									
Government compete with each other									
Competition among regions									
Reform of public administration									
Transparency									
Simplify public administration									
Standardization of laws, regulations and taxes									
New type of governance									
Central EU eProcurement									
EU expansion (additional member state)									
New up-coming economies									
Disturbed world order									
No separation of powers									
Crisis Management									

Category: Society & Economics									
Resource wars									
Environmental pressures									
Bugs escape from lab									
Adaptive economy									
End of US supremacy									
Category: Government & Society & Economics									
Market regulation									
Problems with social security and pensions									
Funding and control of education									
Health is privatized									
Services provided by private parties service									
Outsourcing									
Public-Private-Partnerships									
Simplifying international trade									
Globalization									

Category: Government & Society & ICT & Economics									
Worldwide identification / authentication is not present									
One European Identity									
Use of Biometrics									
Privacy									
Customized Services									
Government Networks									
Network of sensors									
Broadband for all									
Decision-making Technology									
Robotics in Healthcare									
Multi-channel									
Information available and use									
Remomote Monitoring									
Automatic monitoring and enforcement									
Implanted technology devices									

Media richness									
Information quality									
Automatic service provision									
Cyber wars and crimes									