Bringing Together and Accelerating eGovernment Research in EU

Policy Issues in eGovernment

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eGovernment   EUROPEAN DYNAMICS

Executive summary

eGovernment, when viewed as a research field, exhibits a strong correlation between research and policy. Analysis of the lack of research utilisation has not only commented on the limitations of research and the apparent inhospitality of the policy making environment but also on the divergence of these two worlds. The research and policy worlds have different priorities, use different languages, frequently operate to different timescales and are subjected to very different reward systems. The response to these problems has generally been twofold. Firstly, improvement in communication between researchers and policy makers and secondly the establishment of better institutional mechanisms to bridge the research/policy divide.

A 2006 survey organised on behalf of the European Commission shows that European eGovernment policy should focus on a small number of high impact services over the coming years. Over 70 per cent of respondents said the most important objective of eGovernment in the EU is to improve the quality of service provision based on user satisfaction, while two-thirds said it was necessary to reduce red tape for businesses and citizens. Asked what services the EU should prioritise 65 per cent of respondents said citizens' mobility in social services, such as pensions and healthcare. The same percentage cited organisational barriers in the union as the main barrier against achieving these services. Participants were also quizzed on their views of the main barriers against effective eGovernment generally by 2010. In response to this, more than six-in-ten of respondents said lack of interoperability between EU states was a problem.

The survey also canvassed views on inclusiveness of online public services in the EU. Forty-four per cent said the most important objective would be to increase access and use of public services through greater accessibility. The findings of the survey broadly endorse the EU's principles for eGovernment that will form the basis of the EU eGovernment action plan due later this year. These include accessibility for all EU citizens and the need to highlight the benefits eGovernment can bring to high impact services such as freedom of movement of labour, goods, persons and capital.

Both eGovRTD2020 and eGOVERNET have paid attention in identifying and analysing gaps in eGovernment as such, accompanied by proposed measures. In the sections to follow, we proceed with briefly presenting the gaps identified in the application of eGovernment throughout Europe as perceived by both eGovRTD2020 and eGOVERNET. The gaps in eGovernment as a field of application are addressed and information on developments towards this direction from FP6 eGovernment projects is provided. The fact that these gaps persist despite advances in technology is a direct manifestation of the complexity of eGovernment as a multidisciplinary field. It is here that research following policy gaps has a distinct role to play as highlighted in the findings of eGovRTD2020 analysed in the present document.

We then turn the focus on research addressing the gaps arising within the research conducting process itself, including research programme management. eGOVERNET experts provide fruitful conclusions on the state and possible strategic options for eGovernment research and policy in Europe. In relation to recent findings on research policies and practices among Member States the first and paramount consideration is that eGovernment research, though undergoing a process of recognition and consolidation, is fragmented even within the Member States.

It is evident that research programmes and funding are a "bottleneck" between policy awareness and research effort. At the policy level, eGovernment research is mentioned as an important application field of IST research. At the same time, in the research community, there are increasing research activities on eGovernment. However only a minority of countries have a dedicated eGovernment research programme, and the budget devoted to eGovernment research is low.

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1   eGovernment research and policy

Perhaps more than any other subject in IST research, eGovernment is ultimately connected to policy. Indeed, while policy enables the development of eGovernment and other ICT disciplines, it is only eGovernment which can have a strong effect in the opposite direction: it can affect application and even formulation of policy itself. As a consequence, eGovernment, when viewed as a research field, exhibits a strong correlation between research and policy[1].

Analysis of the lack of research utilisation has not only commented on the limitations of research and the apparent inhospitality of the policy making environment but also on the divergence of these two worlds (Walter et al, 2003)[2]. The research and policy worlds have different priorities, use different languages, frequently operate to different timescales and are subjected to very different reward systems.

The response to these problems has generally been twofold. Firstly, improvement in communication between researchers and policy makers and secondly the establishment of better institutional mechanisms to bridge the research/policy divide[3].

- **Improving communications**: Much of the focus for this approach has been on finding ways in which researchers can improve how they communicate and disseminate their findings. Walter et al (2003) found that provision of targeted research outputs can raise awareness of research findings and that seminars and workshops, which enable the discussion of findings, can encourage more direct use of research. In Switzerland the National Research Council set aside ten per cent of research funding explicitly for dissemination work outside the academic community.

- **Building institutional bridges**: Analysis suggesting the benefits of sustained interaction inevitably leads to discussion of how this can be institutionalised within the policy process. One approach is to use policy-making guidelines to encourage the early involvement of in-house and other researchers in the policy process.

The definitive projects which examine the research and policy correlation in the eGovernment area are two Actions:

- **eGovRTD2020** (eGovernment RTD 2020), Specific Support Action

- **eGOVERNET** (European eGovernment Research Network), Coordination Action

Of those, eGovRTD2020 was completed at the end of April, while eGOVERNET will be completed at the end of this year. Both projects examine the position and the role of research within the eGovernment evolutionary process. Their findings also refer to gaps which appear in the entire sphere of operation of eGovernment, from application to policy to research.

The objectives of eGovRTD2020 target evolution of research directions and supporting policies till the end of the next decade. As the consortium state, a modern government using innovative ICT has become an increasingly important factor of competitiveness and growth in the European knowledge society. Despite persistent efforts in this direction made by many Member States, however, most of the strategies and activities which currently take place are short to mid-term oriented. eGovRTD2020 aims at sketching eGovernment in 2020 and, thereby, identifying future strategic research fields for the development of eGovernment and the public sector as such. The methodology consists of both scenario building and road-mapping. Visions were described through scenarios, which detail governments, society and economics, as well as the interaction based on modern ICT. Guidelines for eGovernment research programmes and national long-term eGovernment policies were also developed at

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[1] "eGovernment: research and policy", A. Varghese, European Commission, DG-INFSO, Unit H2, workshop session at IST 2006, Helsinki, 22nd November 2006.

[2] Walter I, Nutley S and Davies H (2003) Research impact: A cross sector review. Literature review ESRC

[3] eGOVERNET D5.1 Impact Indicator Overview

the final phase of the project. The general conclusion drawn is that research is needed so as to shape the future: nurture those developments which we want to enable, while simultaneously avoiding those which are undesirable.

On a similar note, eGOVERNET paints the current picture in the field: "Uncoordinated research funding, lack of publicity and poor nation-to-nation cooperation over eGovernment research policies: these are some of the obstacles holding back the establishment of a European Research Area in the eGovernment domain. European eGovernment research needs to be boosted by a research strategy designed to work at European level. A vitalisation of eGovernment research in the Member States could feed the benefits of new technology directly into change in administrations."

It is important to note that the results of the two aforementioned Actions are currently (June 2007) the only mature results referring to the interaction between research and policy in the IST funded eGovernment research for FP6.

2   Addressing eGovernment research and policy gaps

A 2006 survey[4] organised on behalf of the European Commission shows that European eGovernment policy should focus on a small number of high impact services over the coming years. Respondents to the survey on the future of eGovernment in the European Union overwhelmingly endorsed a strategic approach, with 92 per cent advocating a narrow focus on a small number of priority actions and services. The online survey of 403 EU citizens and organisations asked a variety of questions on priorities for eGovernment in Europe up until 2010.

Over 70 per cent of respondents said the most important objective of eGovernment in the EU is to improve the **quality of service provision** based on user satisfaction, while two-thirds said it was necessary to reduce red tape for businesses and citizens. Asked what services the EU should prioritise 65 per cent of respondents said **citizens' mobility** in social services, such as **pensions and healthcare.**

The same percentage cited organisational barriers in the union as the main barrier against achieving these services. Participants were also quizzed on their views of the main barriers against effective eGovernment generally by 2010. **In response to this, more than six-in-ten of respondents said lack of interoperability between EU states was a problem.**

The survey also canvassed views on inclusiveness of online public services in the EU. Forty-four per cent said the most important objective would be to increase access and use of public services through greater *accessibility*. The findings of the survey broadly endorse the EU's principles for eGovernment that will form the basis of the EU eGovernment action plan due later this year. These include *accessibility* for all EU citizens and the need to highlight the benefits eGovernment can bring to high impact services such as *freedom of movement* of labour, goods, persons and capital.

Both eGovRTD2020 and eGOVERNET have paid attention in identifying and analysing gaps in eGovernment as such, accompanied by proposed measures.

Gap analysis has been used by both projects in identifying existing practice, policy and research deficiencies. Gaps are defined as the differences between current and desired states of eGovernment areas. Suggested measures for bridging them are quoted by both projects. We proceed with a brief presentation of the gaps identified in the application of eGovernment throughout Europe as perceived by eGovRTD2020[5].

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[4] http://www.egovmonitor.com/node/4487

[5] "Roadmapping eGovernment Research Visions and Measures towards Innovative Governments in 2020", edited by Cristiano Codagnone and Maria A. Wimmer, eGovRTD2020 Project Consortium, 2007.

2.1 Networked governments

This gap refers to lack of readiness of governments to network among each other and to collaborate efficiently in the physical and virtual space. Current research is perceived as not addressing the challenges of large networked governments in terms of responsibilities, reorganisation of hierarchical structures and change in the distribution of power. Likewise, the role of ICT to effectively support and enable fully networked governments is not sufficiently addressed by current socio-technical research. Two factors are considered in this role:

- **Government Networks**, strongly dependent on ICT albeit with unclear organisational, operational and legislative needs and

- **Government Communities** as effective government structures of the future.

2.2 Legal frameworks

Legal frameworks are not aligned with the new possibilities enabled by ICT investments or even create barriers to effectively exploit technical opportunities. This is accentuated by a distinct, identified lack of uniform systems of laws, regulations and taxes across the Member States and by an equivalent lack of understanding regarding the effect regulation reforms can have on modernisation and ICT innovation. Two factors are proposed as decisive:

- **Standardisation of laws, regulations and taxes** to the extend that in the future an increasing number of domains of government activities may consist of one part common to all EU Member States and another part applicable to each Member State.

- **Rationalisation of the legal framework for eGovernment** itself, an issue which will raise the question of whether this should be national or common for all Member States.

Within the eMayor[6] context, certificate management services provide a way to invoke security requirements prevailing in a functional framework. However certain organisational, regulatory and legal requirements must be addressed in order for SMGOs to be able to adopt certificate management. These requirements define certain aspects related to the ways that certificate management can set up and organised with respect to the legal framework defined by both European and member state legal implication.

The eMayor objective is to develop and implement an open, secure and affordable eGovernment platform for SMGOs in order to support secure communication between municipalities and between municipalities, businesses and citizens. In this perspective, certain directives made a significant impact on eGovernment application were examined:

- Directive on electronic signatures
- Directive on data protection
- Directive on databases protection

The main purpose of the iWebCare project[7] is to identify and analyse the main legal and organisational issues as applied in the existing systems of the health care domains in the EU-25 countries and thus to create an initial legislative and organisational bases for their incorporation in the future Integrated web services. Accordingly the results of this analysis of legal and organisational issues will affect also the establishment of data validation fraud detection e-services in the EU e-Government framework of the e-Health care.

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[6] D2.2 Analysis related to security and PKI services

[7] iWebCare D02 – Pan-European Survey on the Legal and Organizational Issues Associated with Fraud Detection e-Government Processes in the Health Care Domain

2.3   Changing power structures and new government roles in the virtual world

Changing power structures and new government roles in the virtual world are not well understood yet. This refers to the consequences and impacts caused by a change in the government (federal) systems across Europe as regards public value perception, political power and competition among regions and different government systems. Issues such as the drivers for competition, the transition mechanisms and the role of eGovernment in such a scenario are still pending. Factors judged as decisive are:

- Competition among governments, regions, nations
- Delegation of more decision-making power to local government
- Globalisation
- Role of eGovernment versus that of the EU in world politics
- New types of virtual borders which may arise and the role of governments in influencing or even regulating such virtual communities
- Fragmented politics
- Integrated vs. fragmented public administration
- Flattening of hierarchies as a result of certain levels of government (such as the EU level and local levels) becoming more powerful
- Increasing power of multinationals, something which is likely if governments prove unable to provide good, strong and balanced services using advancing technology and promoting society evolution

As also observed by COSPA[8], public administrations are gradually implementing OSS in many of their units. Open Source usage generates wide-ranging changes that require time and human resources both for the switch and for helping end-users overcome their natural resistance to change. It is therefore the government's duty to:

- Guarantee free access to public information;
- Maintain the permanence of public data;
- Assure the security of public data (including that provided by citizens);
- Avoid unnecessary public spend.

2.4   ICT innovation in governments and ubiquitous government systems

The pros and cons of fully integrating and exploiting modern ICT in public sector applications are not well understood. There is a lack of investigating and identifying opportunities for merging different ICTs for government modernisation purposes, and for spurring ICT innovation from within governments. Furthermore, studies about the large-scale deployment of embedded chips and subsequent innovative public sector modernisation in surveillance, monitoring and prevention of crime have not been carried out. Identification of crucial non-technical barriers to the wide application of such technologies should be part of such studies. Dominant factors are as follows:

- **Non-stop-government**, continuously accessible to a massive number of users based on ubiquitous systems using a number of delivery channels, such as:
- **Voice control**
- **Small sized, ubiquitous wireless technologies** and
- **Sensors networks.**

The application of these technology challenges in the public sector is currently not well understood, thus necessitating applied research starting with pilot case applications. This may have to be followed by further research on the way to full deployment. As eGovRTD2020 accurately conclude, this is the reason that **innovation in the public sector is generally at a low level**.

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[8] http://www.cospa-project.org/

As observed by COSPA, governments today must be aware that the growth of an Open Source (OSS) developer base is increasingly an indicator of **the innovative capacities** (in the software domain) of a national economy. There are a number of reasons for this:

♦ OSS is a public resource with low entry barriers. Unlike forms of intellectual property with restricted access for re-use (through patents, restrictive copyright licensing), OSS can both quickly disseminate innovations, and provide for further development and innovation from any source without inefficient time delays or other costs.

♦ Second, OSS is an excellent training system that comes at no direct cost to society, i.e. neither public subsidies nor future employers need to pay directly for the training provided to (often novice) programmers through their exposure to source code and the Open Source developer network. This is implicitly recognised by employers, who may prefer prospective employees who have worked on Open Source projects, explicitly recognised by developers themselves, who join the Open Source community "to learn and develop new skills".

♦ OSS is by its nature an automatic source of de facto standards for any number of protocols or systems, both historically as well as those being developed today.

eMayor contribution to innovation lies on the fact that it is the first really large scale set of trials achieving interoperability among European Municipalities. The technologies developed and reworked for these purposes, address a new way of the handling of digital forms, the implementation of security enforcement module, the handling of language issues in cross border eGovernment and the integration into one adaptable and easy to implement eGovernment platform. eMayor is a lightweight implementation of a full eGovernment platform for use with the clients that fulfils future requirements of exchange of documents between stakeholders and works for users without coding.

Actually to our knowledge eMayor is the first and only project that *shows* how one can practically solve the cross-border interoperability challenge, without making use of a centralised architecture. As such it may form the basis of a number of applications serving mobility in Europe. Apart from the local advantages of eMayor, for municipalities and other smaller government organisations this solution for dealing with cross border eGovernment is considered by the consortium as a real possibility to work on real politically important priority actions (see also the exploitation section).

2.5   Towards pan-European standards & interoperability

A lack of information exchange can have a high impact on successful service completion and effective communication in any situation to manage. For this purpose interoperability at a technical, semantic and organisational level must be ensured. However, some common European eGovernment ontology and an agreed-upon European eGovernment glossary have not been established yet, something which creates barriers to semantic interoperability of systems. Factors considered important are:

- **Interoperability standards** and the complexity of providing organisational, semantic and technical interoperability across systems in a pan-European dimension are still not fully resolved issues.

- **Central EU eProcurement** has not been achieved yet, as this requires rationalisation of procurement processes of Member States' practices and laws.

- **Interoperability among cultures and government systems** in society and the diversity of EU Member States are key issues in terms of "Europeanisation" and European citizenship. Social and cultural interoperability of public services (thereby respecting cultural diversity across EU Member States) is currently not well-understood

- **Peer-to-peer communication** models and their impact on interconnectivity between existing ICT systems and eGovernment efficiency

- **Service-oriented architectures** (SOA) bear a great potential, however, their full implementation in government networks is still missing and demands more research.

As eGovRTD2020 remarks, once immediate interoperability problems are solved, the emphasis will shift from technical and semantic interoperability to cultural interoperability, an issue which although currently overlooked is decisive for the formation of a powerful European society and market.

eMayor focuses on issues that are considered to be at the core of the European Commission's eGovernment policies. It contributes to addressing what are considered the main barriers against effective eGovernment: That is (apart from improving knowledge management) the **interoperability** between government organisations in general and between Member States in particular.

eMayor covers all three aspects/dimensions of interoperability of the European Interoperability Framework for Pan-European eGovernment Services (EIF), namely organisational interoperability (the cross-border process itself), semantic interoperability (the transformation of the documents is an important step towards the desired direction, as well as the analysis of the different European national digital XML-standards) and technical interoperability (BPEL, E2M/M2E). EIF[9] provides guidelines for innovation towards interoperability and eMayor achieved a successful realisation of those guidelines.

The Manchester Ministerial Declaration has proposed ambitious objectives by 2010: At least 50% of public procurement above the EU public procurement threshold will be carried out electronically. Also all public administrations across Europe will have the capability of carrying out 100% of their procurement electronically. To be fully applied, e-procurement will need some basic support on a European level. This will relate to identification and authentication and interoperable electronic signatures. More difficult is the interoperability of company registrations of companies across Europe. This is often handled by Chambers of Commerce. This could be handled by secured web services that allow for the exchange of company registration between government organisations and authorised registration authorities for companies.

When Member States agree on using standards such as for example company identification, by following standards already widely in use in practice, the step to implementing a company identification service for cross-border usage will be realisable with open source tools like the ones used for the eMayor platform. As a matter of fact a similar architecture, allowing for the use of different eID mechanisms across Europe may be implemented without the need for any (huge) centralised system.

Another issue is the translation issue. Also here there is a need for achieving a means to allow for verifiable translation of company information across Europe. In practice a government organisation could play such a role in the different European countries and the eMayor example, which allows for the exchange of translated certificates among smaller government organisations, may serve as an example.

The figure below gives an impression of the actors that might be involved and the type of information exchange that can be realised.

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[9] EIF can be found on http://europa.eu.int/idabc/en/document/3761/5583
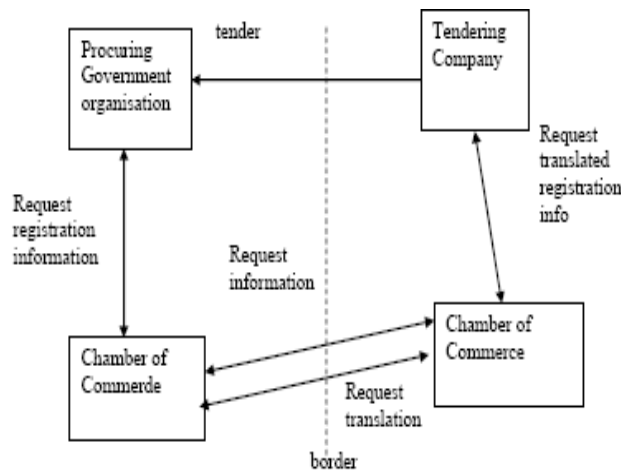
A possible set-up of a cross border eGovernment application supporting the implementation of the eProcurement Policy goals as defined on the Ministerial Conference in Manchester.

Figure 1 Exchange of certificates among government bodies
(adapted from eMayor D 1.1)

2.6 Value of ICT-investments and ICT-dependency

The distribution and coordination of governance functions between centralised and decentralised levels of public administration are expected to change over time due to large investments in common ICT infrastructures. The issues of public administration being able to take advantage of modern ICT and of ICT being able to facilitate and enable new types of governance using public eServices has not yet been investigated properly. The dependency of governments on a proper functioning ICT services providing equipment most probably not under the supervision of governments is perceived as a risk, whose impact and dimensions have not yet been investigated properly. There is a need for more research on the consequences of distributed and remote eGovernment applications and the governance of public eServices in general. Decisive factors identified by eGovRTD2020 are:

- **Governance and role of government in service provision** refer to the lack of properly investigated business models on in-house or outsourcing public service provisioning via effective deployment of ICT

- **New types of IT-governance** appear, which need proper investigation of the impact and consequences as well as the added value of change

- **ICT dependency.** There are currently hundreds of millions of computers connected to the Internet, generating huge volumes of traffic data per day. This infrastructure can become a target for disruption of economic activity therefore reliability, security and robustness of the Internet infrastructure are important priorities

- **Proprietary software** used by various groups of society points to the need to integrate such solutions with current open source software with proprietary software solutions. Obstacles, challenges and benefits of both business models coexisting are not well understood.

Drawing on the proprietary software issue, Morgan (2005)[10] points out that one main problem holding back OSS growth might be that while the involvement of most of the users of OSS applications are technically sophisticated, the average desktop user using standard commercial proprietary software is not and is lacking in basic computer skills[11]. However the COSPA consortium feels that the apparent reduction of the expenses for software licenses will allow for investing more money in personnel training.

eGovRTD2020 comments on the issue of the future of Internet with respect to eGovernment and quotes T. Modis[12] who predicted that, in a few years, the Internet rush will be over, because penetration will be exhausted. However, most scenarios elaborated by the project within workshops with experts foresee that the Internet will further grow rapidly and that the economic system of the EU and its Member States will become more and more dependent on the Internet infrastructure, ICT and applications. Such systems will run most public and private services, something which generates substantial dependency on the proper functioning of this infrastructure for all sides of actors – private, public and civic. Research must be carried out on various aspects of measurement and reliability of Internet infrastructures.

2.7 Goal-oriented, value-added public service provision at all levels of government

The questions posed here is how governments can reform themselves from within, which reforms are needed, and for what benefit. Cost-benefit analyses need to accompany the service portfolios of governments – both, for traditional service provision as well as online offers. Main factors considered are:

- **Centralisation of service provision** at national level vs. competition in regions

- **Centralised / decentralised storage**

- **Reform of public administration.** This refers to the need to find the right cost-efficiency and public value balance of service offers at the right government level. Depending on the trends of government structures, a proper investigation of the level of service provision, the underlying mission of a public service, and the added value to be provided is required. Such studies are currently not performed.

- **Use of ICT to redesign government structures and processes** has to be examined carefully. ICT can be a driver for modernising governments. Yet, a proper goals-and-performance management has to accompany such endeavours.

- **Local governments arranging healthcare**. Rationale to govern healthcare at the level of local government versus benefits and difficulties resulting from the absence of central coordination.

eUser experts provide insight on this centralisation – reform gap drawing on Sweden's example[13]. Sweden is a centralised state. This means that Sweden has centrally managed authorities and agencies that have responsibility for almost all government services. Apart from the central administration, Sweden is divided into 19 Counties run by County Councils, whose main responsibility is for health care. There are also two regions and one municipality with similar roles.

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[10] Morgan L. (2005), An Analysis of COSPA – A Consortium for Open Source in the Public Administration, Proceedings of the First International Conference on Open Source Systems Genova, 11th-15th July 2005, Marco Scotto and Giancarlo Succi (Eds.), pp. 125-129

[11] D.M. Nichols and M.B. Twidale, "Usability and Open Source Software", http://firstmonday.org/issues/issue8_1/nichols/

[12] "The End of the Internet Rush", by T. Modis, in "IST at the service of a changing Europe by 2020: Learning from world views", FISTERA final conference, 2005.

[13] eUser – Workpackage 5: Synthesis and Prospective Analysis D5.1: First Synthesised Inputs to Knowledge Repository, Including Initial Survey Results and Good Practice Examples

The Government's Action Plan 'towards the 24/7 Agency' sets out the objectives for the development of eGovernment according to the fundamental values of democracy, rule of law, and efficiency. The plan lays the foundation for significant reform of public administration and states that public administration must supply eServices in such a way as to deliver maximum benefit to citizens. Barriers that hinder the implementation and uptake of eGovernment services include:

Technological and administrative barriers. The vast majority of all administrative procedures require a hand-written signature from the user. This will need to be replaced with digital signatures if transaction eServices are to expand. Other barriers include the need to provide documents that are only available in hard copy and the requirement for supplementary information from other agencies in the absence of a common IT platform.

Legislative barriers. Existing laws are out-of-date and do not cover the requirements of ICTs. Many laws were designed to cover individual agencies and are not applicable across agencies.

Organisational barriers. Processes and systems involving several agencies are complex and difficult to manage. Costs and responsibilities for services and projects have to be divided between the agencies. There are also cultural differences between agencies that render co-operation problematic.

2.8   Free movement of citizens and companies

Current eGovernment research and strategies do not cover the challenges eGovernment will have to face when European citizens and companies continue moving from country to country in increasing numbers. Factors considered important in this direction are:

- **EU-expansion**

- **"Europeanisation"**

- **The disappearance of geographic borders**, when European citizens and companies become more mobile and "Europeanisation" increases. Likewise, the EU-expansion policies have to be carefully investigated in terms of consequences for eGovernment structures both in new Member States as well as 'old' Member States. Factors such as diverse languages, national laws, level of economic and ICT development, dominant culture, etc. have an impact on interoperability and compatibility with already established EU circumstances. These impacts are currently not well understood.

- **Competition** among governments, regions and nations as a consequence of those developments.

2.9   Government's (re)action to socio-demographic change

Socio-demographic changes like massive migration of workers, ageing, lack of workforce and other disturbances of the environment such as religious wars and tensions might result in a disruptive environment and constitute concerns shared by many countries and politicians. Important factors isolated are:

- Problems with social security and pensions
- cultural convergence and slowdown
- old people rule, as a result of an ageing population
- immigration
- ageing
- religious wars and conflicts.

Demographic changes and tensions might result in a disruptive environment. Respective policies to deal with such factors are missing, although most of the socio-demographic changes can hardly be contained by governments directly. Nevertheless, proactive measures to prepare for such changes are required, such as new types of services for the elderly, exploration of technology to ensure that cultures understand each other; rapid reactions to events disturbing stability. The impact of these socio-demographic influences on the future is barely understood, and cannot be assessed by current methods and means.

2.10   New technologies for automatic monitoring and surveillance for security

There is a lack of understanding of the potential and impact of new technologies in monitoring, tracking and surveillance of persons, communications and goods by governments. Modern ICT and built-in devices open many opportunities for data gathering, its use and provision. Advanced sensors, RFID chips and image/voice recognition technologies enable automatic monitoring and sophisticated surveillance. Can governments take up the advantages of new technologies for the purpose of providing advanced security and safety, and to provide these public duties more effectively and efficiently? Factors affecting this issue have been singled out as:

- **Automated monitoring and enforcement**, which refers to gathering of personal information and using it legally under particular circumstances

- **Embedded chips and implanted technology devices**

- **Remote monitoring** for law enforcement, crime detection, healthcare etc.

These are all possible scenarios for identification, authentication and authorisation procedures for which questions such as legislative barriers, social consequences and public value have to be answered. Limited freedom can be the result and can impair any freedom eGovernment may try to offer, such as freedom of speech through the Internet.

It is common practice, in Government Interoperability Frameworks, to specify different levels of assurance of authentication required in relation to different eGovernment application contexts. Most Member States have very similar definitions of these, and an attempt at an EU consolidated view has been derived in the IDA Authentication Policy[14], which defines them as:

- Level 1: Minimal Assurance
- Level 2: Low Assurance
- Level 3: Substantial Assurance
- Level 4: High Assurance

GUIDE[15] intends to provide a wide range of authentication mechanisms per assurance level than currently specified in the policy, or possibly create additional levels. Furthermore, it is assumed that the assurance level not only dictates the authentication mechanisms that can be used, but also defines the level of identity verification required at registration (e.g. whether face-to-face registration is required), and the general level of security surrounding the associated identity provider, and network, including encryption of both stored and in transit identity data.

2.11   Advanced technology in crime prevention and crisis management

The opportunities new technologies bear for terrorism and crime in the virtual world and in the real world by effectively coordinating crime via ICT are not well understood. Also, a lack of understanding of the potential of ICT in crisis management and emergency recovery has been identified. The question is how the executive body and rescue teams can benefit from the advantages of new technologies in order to enable government activity to be more effective and efficient. Factors identified as important in this respect are:

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[14] http://ec.europa.eu/idabc/en/document/3519/5927

[15] GUIDE D1.2.1.B – Identity Interoperability Services Report: Core Services Descriptions

- **Crisis management.** Proper response to crisis demands strong pan-European collaboration among government agencies and other private or civil emergency teams. There is a strong need in creating first response systems to deal with coordination of multi-national efforts to prepare, respond and recover from any kind of disaster situation.

- **Cyber wars and crimes** demand accelerating development of core infrastructures and Internet security protocols as well as monitoring concepts for managing emerging risks and increasing complexity.

- **Incident politics** express the need of proper governance models for governments to act and steer correctly and effectively when incidents happen, e.g. terrorists attacks, bio attacks, natural disasters.

Current research relates to how public agencies can cooperate in real time to react immediately to all kind of wars and conflicts, both at an operational and at a policy level. The exchange of information requires interoperable systems among all those involved, including hospitals, fire departments and private companies. Simulations and games are necessary to find the problems in current plans and to improve infrastructure and interoperability of systems. This research is often related to the current field of crisis management, i.e. how to deal with incidents like terrorism attacks, influenza and others. However, different kinds of crisis situations are expected to appear at a European or even worldwide level in the future. Research should also focus on related domains like psychological, societal, institutional, legal or economic aspects which can prevent eCrime.

2.12 Securing transparency, trust and data privacy

There is a need for better understanding conditions of access to data and use of these data so that the rights of citizens and organisations which are guaranteed by law are protected and enforced. Proper analysis of the contexts in which government can legitimately use ICT to provide value-added services is lacking. Ways to create value out of public information produced by the various administrations or public organisations does not seem to have been the object of systematic study. Factors affecting the issue are:

- Data access and regulations for access through the Internet. Such regulations are still in their initial stage and have to be enhanced

- Digital rights

- Information access and transparency

- Intellectual property

- Information ownerships, referring to challenges in order to set up a common regulatory framework which is transparent, recognised, enforced worldwide and which provides the respective data privacy and rights of (intellectual) property in the virtual world. Restrictions and requirements to overcome these gaps need extensive and careful research

- Transparency, which is identification of public data and services, and open information as to who has access to, and who uses one's private data or (intellectual) property are preconditions for trusted governments. Comparative analyses of the legal texts related to transparency and data access, digital rights and information ownership seem to be lacking. Furthermore, generating added value out of public information does not seem to have been the object of systematic studies.

- Privacy and security should be considered in these contexts from different points of view: psychological, societal, legal, institutional and economic aspects of using

ICT to provide an acceptable balance between security control and privacy protection.

- Legitimacy and trusted state and politics in the decision-making process. This tackles eParticipation issues and assurance of trust in governmental institutions.

The QUALEG[16] project looks to improve the transparency of local government by creating a 'policy lifecycle management' software solution. This will improve the citizen's perception of local government, but the product itself will not have an immediate impact on the services provided to the citizen, nor is it aiming to use the advanced technologies explored in HOPS.

HOPS[17] provides an example of a recent initiative to gain transparency and to provide a better online service has been the Barcelona Citizen's Folder Service. The Barcelona's Citizen's Folder service has been designed to personalise the citizen access to public services whilst facilitating complete transparency of access to all citizen information and related services. The interface focuses entirely on the citizen's perspective.

The project supplies the citizens all (and only) the information the City Council has recorded about them, which is permanently updated, be it personal or fiscal, whilst guaranteeing and fulfilling all privacy requirements as imposed by legislature. Therefore citizens can see at a glance with all transparency their entire personal relationship with the City Council.

The project's philosophy implies a substantial change in the paradigm in that now the citizen becomes the core focus of the service, displaying all information and actions, completely personalised to their own and individual reality. The service presentation is made from the citizen's perspective, making the citizen's access easier, intuitive and totally accessible.

2.13 Access for all in an inclusive society

Social and digital divide, reaching and involving people, and providing high-speed access to the virtual world and online public services are ongoing problems. Ideally everybody has the same facilities and ability to interact with government, but even in the future this might not be true. Although there is plenty of research in this field, the divide remains a problem and appropriate measures to address and solve social and digital divides are still immature. Factors affecting this are:

- Level of inclusion
- Broadband
- Digital and social divide.

Ideally all people have equal access and have a minimal level of ability to use technology means to communicate with government. In most study cases this is implicitly assumed. Only in the case of distrust in government citizens may not be able to communicate with government. The social divide is mentioned much more often, between those skilled and those not skilled and between those who have and those who have not.

Optimal exploitation of online public services is important for both competitiveness and **social reasons.** Competitiveness benefits can be achieved through efficiency and effectiveness gains, through increased human capital and through achievement of market share in the increasingly global markets in some of the domains (e.g. eLearning and eHealth). **Social gains** can be achieved by **improving access to and quality of public services** and by reducing disadvantages posed by constraints in time and place that may arise in relation to more traditional modes of service delivery.

On the other hand, there is also a risk that the increasing provision of services of public interest in online modes may accentuate existing disparities in service access and usage because of **enduring digital divides** in relation to online access, orientations and usage. For

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[16] http://www.qualeg.eupm.net/my_spip/index.php

[17] HOPS D21 – User Requirements

this reason there has been a growing policy emphasis on **multi-modal access to key services**, to include online, phone-based (person-to-person, call-centre based or automatic voice response) and more traditional face-to-face. So far, however, there is little robust data available on service user preferences as regards particular modes of access under particular circumstances. This is another gap that the eUSER project aims to fill.

As regards first order digital divides, the results from eUSER[18] are generally in accordance with those from other studies, with clear digital divides being found in relation to age, education and various socio-economic factors. Three key barriers to Internet take-up are apparent – lack of interest, costs and lack of skills – as well as more generalised negative attitudes to technology. When these are taken into account the divides along socio-demographic lines reduce, in some cases quite substantially.

In addition to reinforcing the results from other studies, the eUSER analyses also provide some added-value to our understanding of the factors that underlie prevailing digital divides in Europe. In particular, the multivariate analyses represent one of the first efforts to tease out how the different socio-demographic factors, attitudinal factors and more tangible barriers are associated with Internet usage and with likelihood to become an Internet user in the relatively near future. Some new factors that have hitherto not been given much attention have also been identified, such as the importance of having access to someone who can help with getting started with computers and the Internet. Interventions are therefore needed that target both the user-side (to increase interest and skills) and the supply-side (to make ICTs and Internet access more available and affordable, and to provide support for those who have none within their family or social networks).

As regards issues relating to second order divides, the survey data indicates that Internet users vary widely along a range of dimensions that may have implications for their usage of and experiences of eHealth, eLearning and eGovernment services. There was evidence of socio-economic divides in relation to some of these dimensions, with Internet users in less advantaged circumstances being somewhat less likely to have home access and broadband connections and to be heavy users Internet users, and more likely to be leisure-oriented than functional-oriented in their usage, and to have lower levels of online skills. Larger differences were apparent across age-groups, however, and there were also considerable variations across countries. These factors, in turn, explain a substantial amount of the patterns of usage and non-usage of eHealth, eLearning and eGovernment services. Interventions aiming to increase digital skills and encourage an orientation towards useful usage of the Internet should therefore be an important element of public policy in this field.

2.14 eParticipation

There is a lack of a common understanding of the concept of eParticipation and of the way it can become a successful supportive mechanism to strengthen democracies. A number of questions still remain unclear: Why has eParticipation not yet succeeded, and which policies, measures tools and actors are needed to turn it into success? Factors which are dominant in this issue are as follows:

- **Virtual borders and citizenship.** A borderless EU has not yet been realised. In the future, new virtual borders might appear and existing borders might vanish resulting in citizens becoming members of different communities separated by virtual borders. No current research deals with issues such as virtual citizenship, what kind of virtual borders exist now and may do so in the future, how they will affect citizenship and governments.

- **Communities of Internet politics and Community Society.** Despite all efforts governments have difficulties in keeping citizens engaged in community discussions, especially on politics. On the other hand, the trend towards community building in social – and even virtual social – matters grows. Research is needed to better understand the forming of virtual communities, especially in order to reengage citizens through eParticipation

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[18] eUser – Workpackage 5: Synthesis and Prospective Analysis D5.2/D5.3: Report on current demand/supply match and relevant developments1

- **ICT usage in democratic participation** (eParticipation) projects has not yet gone past the pilot phase. Many countries are disappointed about the limitations of current solutions. Much of the work is fragmented and knowledge about good and bad practices, as well as lessons learnt is not shared. Evaluations of the impact of eParticipation projects have not been carried out yet. And there is lack of understanding of which indicators to apply for such evaluations of impact. Participation deciding upon and relating public issues might via Simulation and Gaming for visualisation of the problem and problem solving, a technique not yet exploited fully in this context.

- **High media impact of participation**. The use of media to inform people about political parties, programmes and politicians requires proper understanding of the media competencies and impact assessment on the public opinion.

The overarching objective of DEMO-net[19] is to strengthen scientific, technological and social research excellence in eParticipation. The aim is to advance the way research is carried out in Europe with respect to quality, efficiency, innovation and impact to overcome the currently fragmented approach to eParticipation in this important European research area. With this overall objective, the network provides a major contribution to the strategic goals set by the European Council.

The DEMO-net workshop in Edinburgh (June 2006) yielded a wide range of challenges and needs of eParticipation. Likewise, many barriers, obstacles and opportunities have been identified. These need to be investigated in research and implementation. The discussion revealed that further analysis needs to be done to improve research and development of advanced technologies and methods to understand the variety of influencing aspects of eParticipation. Many of the aspects are known to the community, others have emerged during interaction with the constituency. Even to understand the whole picture of eParticipation needs further efforts. The results at hand are a first step towards a more comprehensive understanding.

2.15 Identity management

In the context of globalisation, identity management becomes more and more important; in Europe, however, there is no single European identity system as yet. A worldwide unique electronic identification and authentication mechanism is not foreseeable. Instead, several heterogeneous identification systems are currently handling identification for various levels and purposes across Europe and worldwide. Electronic identity (eID) management solutions are not yet mature enough, while the impact and consequences of misusing digital identities are not yet clear. Factors considered as important in this topic are:

- Identity management based on **biometrics**, for which research is needed to balance efficiency and privacy
- Requirements for the establishment of a European-wide identification and authentication system
- Worldwide identification and authentication needs

Legal, technical and inter-organisational barriers should be identified beforehand, so that the one European electronic identity to be developed is applicable and compliant to laws and organisational preconditions. The security industry should switch emphasis from "managing ownership for users" to "empowering users" to manage their own data. In addition, worldwide identification requires thorough analysis of the implications and potential infringement of laws, privacy and basic human rights. The development and deployment of chips (in devices or as implants) to facilitate monitoring and collecting of information via mobile services needs to be standardised. Current research is not properly investigating the potential and dangers of large scale unique digital identification and authentication means.

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[19] DEMO-net: Report on the first Stakeholder Workshop in Edinburgh, 14th June 2006: "Challenges and Barriers of eParticipation Research and Practice"

GUIDE's strategic vision is to develop an open Identity Management architecture that integrates local, regional, national, and pan-European identity management services in an interoperable manner that allows for the accommodation of existing systems and the requirements of member states. The objectives of the project are planned as sequential phases of research and development leading to adoption and implementation. During its first phase (research) the project is contracted to deliver an Open Identity Management Architecture for eGovernment. The architecture constitutes a first step toward the testing, piloting and enablement of pan-European eGovernment services in the EU (implementation). In this context, a critical aspect of GUIDE is engagement of the governments of the EU in order to stimulate political consensus and support among member states that will ensure the realisation and political sustainability of the project in the long term.

Like many aspects of digital government and other instances of applying technology to policy, common themes run through different problems, and what might address one concern could exacerbate another. On the other hand, a topic such as identity is so broad that some division is necessary to gain a better understanding of the overall shape of the research agenda, and then to isolate what might be considered a research priority. GUIDE[20] experts present seven problem areas described below to serve as an organisational rather than methodological guide.

- *Information architecture and management strategy.* The overall shape of a system is an important point to isolate from lower level questions. The "back end" must be thought through, as an understanding of how different entities, public and private, will interact with the system. What identifiers will be used, where will they be stored and how will information flow throughout the system? How can secure identifiers be created from the range of failed or fragile systems now in places?

- *Privacy and personal information protection.* Apart from its priority as an important and endangered social value, control over personal information is necessary for a good identification system.

- *Governmental policies.* Assuming an ID system is at least tied to government programs, the federal administration will play a strong roll in dictating how a program will and will not be used. Inter- and intra-agency policy will need to be defined in addition to regulation of commercial actors and citizens.

- *Accountability inside and outside the system.* Abuse and fraud prevention is necessary to make sure that the problems the identity was designed to solve are not duplicated and new ones to not arise. Among other things, this means having the system capacity for due responsibility.

- *Metrics for design and evaluation.* In order to design a successful system that can be judged to be an improvement, measures must be developed to evaluate what success would look like. Identity deals with risk, and proper risk analysis requires metrics to coordinate management.

- *Implementation of the infrastructure.* Any system will be used by individuals, and those individuals must interface with the system with a minimum of difficulty and a maximum of efficacy, equity and comfort. The user end of a system, however, is often one of the largest security liabilities. Again diffusion and initialisation are issues.

- *Roll-out and enrollment phase.* Systems do not magically spring into implementation, and converting from an old system to a new system always has kinks. Identifying obstacles ahead of time helps smooth the transition process. All previous steps in the planning process require consideration of rollout.

Each problem area has many independent and related research topics. This report subdivides these topics into six academic disciplines. As above, an inter-disciplinary world advises

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caution, and many of these issues can fall between disciplines, or across multiple disciplines. This is noted where possible. Each discipline brings unique qualitative and quantitative tools to the study of identity, and this report seeks to highlight the value of each discipline in addressing identity issues.

Qualitative research focuses on design principles; quantitative topics test implementations and prescribe standards.

- ***Computer Science and Engineering.*** Hardware, biometric tools, cryptography and the technical side of human-computer are core issues in the development of an identity system. Of those, the cryptographic and hardware research is well supported, but there is little analysis of the policy implications of different technical choices. Qualitative research focuses on design principles; quantitative topics test implementations and prescribe standards.

- ***Management Information Science.*** MIS focuses on information systems, and how they are shaped. Building on computer science, it focuses more on the structure of a system, and the impact of that structure. Research areas focus on both the design aspect and evaluation of performance.

- ***Organisational Science.*** People can behave predictably in structured environments, and optimal identity systems require understanding these structures and behaviours. Public management scholarship has much theory on organisational dynamics and how technology can best be implemented inside an organisation.

- ***Economics.*** Identity affects how resources are distributed and is, in turn, affected by these resources and their distribution. The field comprises economic models, game theory and business issues on the qualitative side. There are many economic tools to evaluate the quantitative impact of policies on a large scale and on individual decision making.

- ***Social Sciences.*** Understanding how society behaves is critical to properly evaluating policy. A critical topic trust, which spans traditional disciplines such as philosophy, psychology, sociology and political science. Qualitatively, the social sciences offer the ability to experiment with computer-human trust interaction. Quantitatively, we can better comprehend how the population might respond, or how segments are likely to use technologies and systems they are exposed to.

- ***Law.*** Significant changes to current authentication practices will implicate current legislation on individual rights, administrative responsibilities and organisational liability burdens.

2.16 Public-private-civic relationships in public service provisioning

Existing eGovernment research shows that governments must improve their efficiency. Outsourcing of some public services to the private sector is a possible way to transform government. This is already practiced for the certain services such as water supply, public transportation, healthcare, etc. However, the level and scope of services allocated to governments and businesses is a matter of democratic decision which takes into account dominant norms in the population of different countries. There is a lack of organisational mechanisms for the efficient and socially inclusive public-private-civic relationships in public service provisioning. Factors addressed in this context are:

- **Lean government** refers to achieving maximum efficiency, effectiveness and transparency in governance of public service provisioning. Following such a model, government focuses on general issues and provision of fundamental public services, whilst basic services are outsourced to the private sector and services are provided by private parties

- **Evaluation and impact assessment of outsourcing** are missing. Frameworks and methods for assessing the outsourcing scope of a particular public service are lacking. Incentives for the private sector to take part in the public service provisioning are unclear. Proper frameworks and policies need to be developed to enable the public sector to steer service provisioning by private and civic sectors and to prevent misuse and commercialisation. A notable lack of comparative legal and policy studies related to this issue exists.

The implementation of this lean governance model needs thorough analysis of the existing public services and determination of the possible range of outsourcing public services. Experiences in outsourcing of public services have to be carefully analysed in terms of legal, political and social impacts and challenges to be addressed. Based on these insights, a standard framework for activating, carrying and controlling public-private-civic relationships could also be developed.

2.17 Changing public values

A change of public values results in new types of relationships among individuals and governments in society. The public value perception and its change over time can have substantial impact on nearly all gaps in eGovernment mentioned here. For example, eParticipation solutions will only be successful if the key actors (citizens, politicians and other actors) perceive an added public value in using ICT in democratic processes. Likewise, a unique European-wide digital identity will only succeed if there is a perceived public value for the stakeholders involved.

There is a lack in understanding and investigating of the user side as regards expectations of constituencies from government services, policies and state. This includes the public value of governments' ICT investments and of online public services using taxpayers' money. The question is how these public values change over time. One has to visualise the role of the individual in the society in future. Current research investigates privacy and security, autonomy, content awareness, employment and empowerment. Governments need to be aware that they should be able to meet public values.

However, public value is a concept barely understood. How to measure public value, when is a public service creating a public value, and for whom? A lack of proper measurement frameworks exist. The opinion and the change of public values over time might affect the potential of ICT-enabled public services as well. Public values may vary from country to country which makes comparison even more difficult. Moreover, as people can get used to things, public values might change also over time and need to be continually re-assessed. Proper frameworks and methods of analysis, comparison and assessment are lacking. Public value is an abstract concept, which although present and felt by citizens, has not been well understood so far.

2.18 Full online availability of public services

There is a lack of online availability of public services. Although many opportunities exist to reduce the physical interaction with governments, users are not yet convinced of the benefits of fully online available public services. The full automation of public services raises legal, social and ethical issues which should be studied. Bureaucratic resistance is likely to occur against front and back office reengineering. The methods to introduce modern ICT in public administration in order to decrease bureaucracy and to provide better [face-to-face or online] interaction between administration and citizens when needed should be explored. Factors considered as important are:

- **"24x7 everything"** refers to public administration services being available at all times. This objective has not been attained yet, although it remains in the agenda of most governments. Integration of various modes: the potential of converging access modes have not been exploited fully for online eServices

- **Multi-channel delivery and open universal access** represent opportunities for radical changes in the way government operates and interacts with its constituency. This is of particular interest with respect to globalisation and free movement within Europe, where remote access to public eServices needs to be provided.

- **Always present and seamless government**, operating in the background, a vision which as yet has not been realised, despite the increasing sophistication of some services. A very relevant scenario developed by eGovRTD2020 in this respect is "Ambient Government", where new technologies for full automation of public services are judged as a prerequisite. This, in turn, calls for the investigation of legal, social and ethical issues, especially where sophisticated interaction and exchange of data between existing databases and IT solutions is required.

The overall objectives of the eUSER project are to:

- Prepare a state-of-the-art resource base on user aspects of online public services, which are here understood to be "**services of public interest**" in the areas public administration, health and lifelong learning.

- Use this resource base to actively support various parties – the IST programme and projects, EU and national policy, the wider European research community and providers of online public services – to better address user needs in the design and delivery of online public services.

The rationale for the project arises at a number of levels. To begin with, a major emphasis of EU Information Society policy, as articulated in the eEurope 2005 exercise, is to encourage the **ubiquitous availability of online public services** that meet the needs and preferences of users. However, most statistical data and benchmarking of European developments in online public services has focused on the supply side. Most of the demand side studies that have been carried out have not so far looked in any great depth at user needs and experiences or at the extent to which real user needs are being met by available service offerings. The eUSER project aims to fill this gap by providing richer and robust benchmarking data in this domain. In fact, there is a growing body of evidence suggesting that European online public services may not be sufficiently user-oriented and that Europe may be falling behind countries such as the US and Canada in this regard[21].

2.19 Information availability, retrieval and knowledge management

The lack of information availability and difficulties with retrieving exactly the information required at a certain moment create tremendous barriers for the effectiveness of decision-making and service provision. Whilst a huge amount of information is available online somewhere, proper support of knowledge management (KM) and decision support (DS) tools in government activity is missing. New ways of communicating and interacting with ICT systems through user-friendly devices to easily access data and information (such as artificial intelligence driven systems) are required in order to handle the information overload. Strangely, many advanced technologies for effective KM are available, although not exploited effectively in public sector domains. Important factors affecting this are listed below:

- **Lack of tools for efficient information and knowledge management**

- **New ways of communicating and interacting with ICT systems** to access data, such as human formulated questions instead of keyword research

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[21] As can be deciphered from, for example the report by Accenture, Survey of eGovernment, 2003.

- **New artificial intelligence systems** to handle the information overload to avoid the digital divide emerging when only few people become able to access and use the mass of available information

- **User-friendly devices** and interfaces for handling and communicating large and complex information and knowledge objects through ICT systems

- **Decision making technology** to enhance the required quality of decision making support and knowledge management

- **Multi-agent systems** to enhance reflexive and deductive skills of humans handling complex information-overloaded systems. Future scenarios elaborated by eGovRTD2020 describe information overload is one of the biggest problems in the private and public sectors at present. Consequently, future eGovernment research should focus on artificial intelligence including pattern recognition and pattern visualisation. This should be integrated with search (semantic web) and guidance (intelligent agents) methods to develop new technologies for filtering information while indicating the degree of **information quality**.

In an effort to address the issues raised above, the eUSER[22] support activity will be targeted directly towards:

- The IST programme projects;

- The IST programme overall, including identification of priorities for the evolving work programme;

- The policy environment within which the IST programme operates and contributes (including eEurope 2005 and policies on the development of public administration, public health and education/skills);

- The sectoral actors involved in the development of online public services in eGovernment, eHealth and eLearning; and

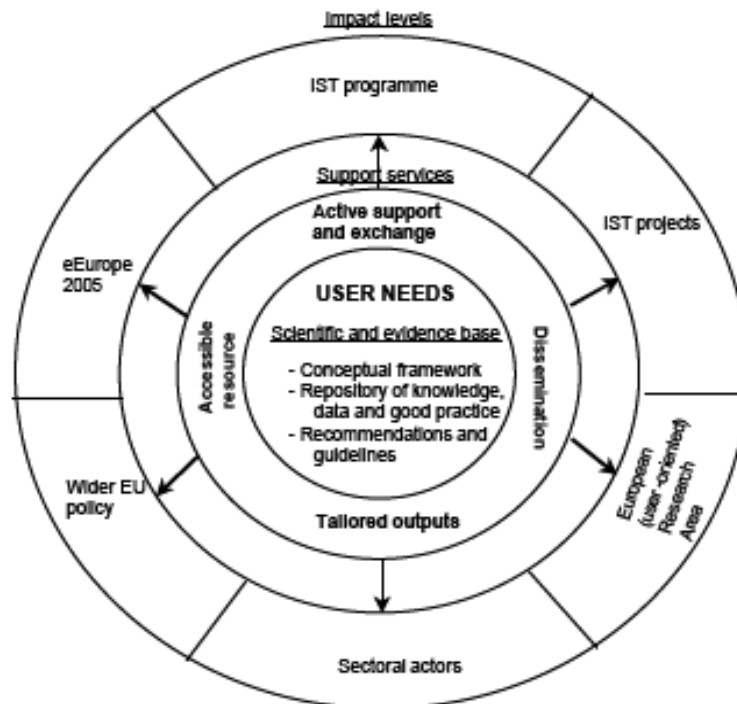- The wider European research community in the user-oriented disciplines.

The following figure summarises the main components of the project and the targets for the support activities and services that will be provided.

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[22] eUSER D 1.1 PART F

Overall schema of eUSER's support actions

Figure 2 Levels of impact and types of output planned for eUSER
(adapted from eUSER D1.1)

With its **Knowledge Base**, the eUSER project will be of value for the eEurope 2005 action plan and for EU public administration, public health and education policy in relation to policy development. As a support action, the project will also directly provide support to the IST programme and a series of relevant projects involved in the design and development of public eServices on the one hand but also those eService developers and providers active in the market throughout Europe but also public administrations and businesses developing eServices themselves.

The work in eUSER is determined by the current situation described above. This current situation contrasts sharply with the Commission's request that the *"user, the individual has to be placed at the centre of future developments for an inclusive knowledge-based society for all"*. eUSER will therefore address this key issue of user needs and demand side issues in eServices design and development.

2.20 Information quality

Efficient handling of information overload and extraction of high quality information are necessary for effective service provisioning to citizens and businesses. Information pollution and wrong or unreliable information can often result in bad or even wrong decisions, managerial inefficiency and lower confidence of citizens. Governments so far have done little to exploit advanced technological and organisational means to improve information quality. Questions such as which technology can tackle the flood of information in service provision and decision making, how low information quality can spread and even disrupt the functioning of public administration (especially when systems become more and more connected) are of critical importance.

eUSER[23] experts point out the critical importance of information provision and quality in the eHealth area. They state that health related information on the web needs to be accurate and

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[23] eUSER D5.4 Recommendations eHealth, eLearning and eGovernment for All: Recommendations from the eUSER Project

appropriate. The evidence from the supply side suggests that quality is uneven and the reach of quality assurance efforts has been patchy to date.

More specifically, the eUSER survey found that about one-in-eight users overall and just over one-in-five of the most frequent users reported finding health information online that they thought was wrong. However, although users give a relatively high importance rating to whether health web sites have a quality-approval mark or seal (although not all users are aware of these), this was ranked lower than factors such as the quality of explanation of medical information (facilitating comprehension), privacy protection and anonymity. In addition, other research has found that even when users say they give a high importance to information quality they do not always exercise particular vigilance in this regard in practice[24].

2.21 Summarising the Gaps

The following table (Table 1) summarises the 20 gaps in eGovernment as perceived by the final conclusions of the eGovRTD2020 Specific Support Action. We should note that all the issues mentioned above are active problems which eGovernment faces today and in which research can provide new angles of attack and novel points of view. Of particular interest are the last two issues mentioned, namely *information availability, retrieval and knowledge management* and *information quality* which are indigenous to eGovernment due to the vast quantity of public information available and the large variance in quality.

Categ.	Gap storyline	Gaps incorporated in gap storyline
Government	1. Networked governments	(1) Government networks
		(2) Government communities
	2. Legal frameworks	(1) Standardisation of laws, regulations and taxes
		(2) Rationalise the legal framework for eGovernment
	3. Changing power structures and new government roles in the virtual world	(1) Competition among governments, regions and nations
		(2) Competition among nations
		(3) Competition among regions
		(4) Distribution of decision-making power to local government.
		(5) Globalisation
		(6) Power of the EU in the world
		(7) new types of virtual borders
		(8) Fragmented politics
		(9) Integrated vs. fragmented public administration
		(10) Hierarchies will flatten
		(11) Increasing power of multinationals

Categ.	Gap storyline	Gaps incorporated in gap storyline
Government & ICT	4. ICT innovation in governments and ubiquitous government systems	(1) Ubiquitous systems
		(2) Voice control (UI)
		(3) Small, ubiquitous, wireless technology
		(4) Network of sensors
	5. Towards pan-European standards & Interoperability	(1) Interoperability standards
		(2) Central EU eProcurement
		(3) Interoperability among cultures
		(4) Interoperability among government systems in society
		(5) Peer-to-peer
		(6) Service-oriented architectures
	6. Value of ICT-investments and ICT-dependency	(1) Governance in service provision & Role of government in service provision
		(2) New types of governance
		(3) New types of IT-governance

Categ.	Gap storyline	Gaps incorporated in gap storyline
Government & Economics	7. Goal-oriented, value-added public service provision at all levels of governments	(1) Centralisation of service provision at national level vs. competition in regions
		(2) Centralised / decentralised storage
		(3) Reform of public administration
		(4) Using ICT to redesign government structures and processes
		(5) Local governments arrange healthcare

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[24] See Fogg et al, 2002; Fogg and Rainie, 2002; Eysenbach and Kohler, 2002

Government & Society	8. Free movement of citizens and companies	(1) EU-expansion
		(2) Europeanisation
		(3) Geographic borders disappear
		(4) Competition among governments, regions and nations
	9. Government's (re)action to challenges linked to large socio-demographic changes	(1) Problems with social security and pensions
		(2) Cultural convergence and slow down
		(3) Old people rule
		(4) Immigration
		(5) Ageing
		(6) Religious wars and conflicts

Government & Society & ICT	10. New technologies for automatic monitoring and surveillance to provide security	(1) Automated monitoring and enforcement
		(2) Embedded chips
		(3) Implanted technology devices
		(4) Remote monitoring
		(5) Limited freedom
	11. Advanced technology in crime prevention and crisis management	(1) Crisis management
		(2) Cyber wars and crimes
		(3) Incident politics
	12. Securing transparency, trust and data privacy	(1) Data access and regulations
		(2) Digital rights
		(3) Information access and transparency
		(4) Intellectual property
		(5) Information ownerships
		(6) Transparency
		(7) Privacy
		(8) Privacy and security
		(9) Legitimacy and trusted State and politics in decision-making
	13. Access for all in an inclusive society	(1) Level of inclusions
		(2) Broadband
		(3) Digital divide
		(4) Social divide
	14. eParticipation	(1) Virtual borders and citizenship
		(2) Communities of internets politics
		(3) Community Society
		(4) eParticipation
		(5) Simulation & Gaming
		(6) High media impact of participation
	15. Identity management	(1) Identity management
		(2) Use of Biometrics
		(3) One European-wide identification and authentication
		(4) Worldwide identification and authentication

Government & Society & Economics	16. Public-private-civic relationships in public service provisioning	(1) Lean government
		(2) Outsourcing of public services
		(3) Services provided by private parties
		(4) Health is privatised
	17. Changing Public values	(1) Changing public values

Government & Society & ICT & Economics	18. Full online availability of public services	(1) 24x7 everything
		(2) Integration of various modes
		(3) Multi-channels
		(4) Open universal access
		(5) Government is fully present and seamless, but operating at the backstage
	19. Information availability and retrieval and Knowledge Management	(1) Information and knowledge management
		(2) Decision making technology
		(3) Multi-agent systems
	20. Information quality	(1) Information quality

Table 1 Gaps in eGovernment to be addressed by research
(adapted from eGovRTD2020[25])

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[25] "Roadmapping eGovernment Research Visions and Measures towards Innovative Governments in 2020", edited by Cristiano Codagnone and Maria A. Wimmer, eGovRTD2020 Project Consortium, 2007.

3   Gaps in the eGovernment research process

In the previous section we addressed gaps in eGovernment as a field of application. The fact that these gaps persist despite advances in technology is a direct manifestation of the complexity of eGovernment as a multidisciplinary field. It is here that research following **policy gaps** has a distinct role to play as highlighted in the findings of eGovRTD2020 analysed in the previous section. What we turn to in this section is research itself, i.e. the gaps arising within the research conducting process itself, including research programme management. As the eGOVERNET consortium point out[26]:

"There is a grey area between research, innovation and implementation in eGovernment. It is often difficult to assess how far genuine research is carried out within a programme rather than simple implementation. Interviewees often mention implementation programmes and projects as directly or indirectly funding research and in general as promoting innovation. It is important to note that eGovernment research always takes place in the "applied research" area and generally qualifies as being needs-driven or user-driven research. One of the most quoted problems of eGovernment research is the lack of usage of research by practitioners, either because research does not produce the type of results needed by practitioners or because the practitioners are not aware of the research being carried out.

Some countries, such as Norway, clearly address the different phases of research and development by supporting: applied research, prototyping, pilots and technology diffusion. Other countries, such as Sweden, require the coordinator of a research project to be a public authority in order to ensure an easier take-up of research output. In both examples, a key issue is the promotion of take-up of research results in order to overcome the separation between research suppliers and users, and between research and implementation."

Another aspect of research in eGovernment has to do with its interdisciplinary nature. As it has been repeatedly demonstrated, technological aspects constitute only a limited potion of the research needs in the field. For this reason, eGOVERNET observe that *"…a very significant amount of investment, in all countries, is devoted to socio-economic research in support of **eGovernment policy-making**. This, unlike technological research which is funded through R&D programmes, is generally funded through alternative systems, such as procurement (e.g. Slovenia, the Netherlands), partnership with universities (Catalonia in Spain, the Netherlands) and research carried out internally by the public sector (Emilia-Romagna, Italy).."*

The gap analysis made by eGOVERNET is based on data collected on the needs and the current state of affairs. Both activities provided evidence through data collection and analysis. This avoided the pitfall of identified gaps being based on personal opinions of the authors; instead, evidence and input from different sources was used. However, because of the loose and ever-evolving definition of the eGovernment research field, these gaps should be considered as an evolving process subject to updating and fine tuning.

The exposition is accompanied by suggestions of measures which can be implemented by suitable policies.

The methodology was based on gap analysis, i.e. a comparison between current and desired state in eGovernment research. The differences between these two states constitute the identified gaps, which are subsequently transformed into measures and suggestions realisable within some time frame in order to achieve the desired state. The gap analysis followed 6 main steps briefly mentioned below:

- Identification of main goals of the desired state in eGovernment research programme management

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[26] "eGovernment research in the EU; overview report D3.2 (M 15)", eGOVERNET CA, May 2007

- Identification of the main emphasis on the current state regarding the goals of the desired state

- Identification of commonalities between current and desired state

- Identification of gaps between current and desired state

- Identification of measures which will help to bridge the gap between current and desired state

- Assessment of measures according to their impact and relevance for the development of a framework for eGovernment research.

As a result of the aforementioned method, the following gaps were identified in the eGovernment research process.

3.1 *Absence of an organisation and research management infrastructure*

The absence of an organisation and research management infrastructure for eGovernment research activities is evident but no measures have yet been taken to overcome it. Since this infrastructure should be established at EU level, it is necessary to for all Member States to cooperate

Measures proposed by eGOVERNET include:

♦ Establishment of a research management infrastructure for eGovernment research activities at European level with:

- clearly defined central management
- centres of excellence at a national level
- a single access point to reach all public agencies
- defined managing mechanisms to enable ordering, financing, managing and finally fostering the use of eGovernment research results

♦ Establishment of research management infrastructures for eGovernment research activities at national level

♦ Establishment of interaction between academic researchers which would be reflected in high applicability of research results to public administrations

♦ Unification and connection of eGovernment research initiatives and activities within government departments

♦ Seamless connection of different ICT systems

♦ Definition of the eGovernment research landscape

♦ Definition of the needs of knowledge and information exhibited by different user groups

♦ Discussion of the legal framework problem

♦ Clear exposition of the possibilities and mechanisms for European research collaboration and finance.

3.2 Lack of definition of a long-term eGovernment vision and strategy

Key government officials are usually not aware of the impact of research on the development of eGovernment. eGovernment research is not planned and usually depends on political decisions. The development of such research programmes is not correlated with a long-term vision and strategy, while industry and the general public are not involved in the decision of which eServices should be the next ones to be developed. Other major identified gaps are:

♦ Unclear definitions of eGovernment research areas

♦ Inadequate promotion and further development of eGovernment research management

♦ Lack of consolidation of eGovernment research programmes

♦ Insufficient promotion and development of eGovernment

♦ Lack of advance planning of eGovernment research and projects

♦ Ad hoc political decisions regarding eGovernment development projects, something which is mainly reflected in the rapid development of those eServices which serve the highest political priorities.

3.3 No clear definition of users and stakeholders

There is no clear definition of users and stakeholders and the relationships between them, resulting in the fact that the needs of different users are not understood. Such a definition must be confirmed by all interested parties.

Measures proposed by eGOVERNET include:

♦ Clear definition of the terms "users" and "stakeholders"

♦ Clear definition and strengthened relationships between different users and stakeholders

♦ Clear definition of governments' goals before building any eGovernment research agenda

♦ Systematic effort into understanding the needs of different users and stakeholders in eGovernment research

♦ Raising awareness among different actors in eGovernment research

♦ Leveraging the involvement of various stakeholders

3.4 No clear correlation between different types of research

There is no clear correlation between different types of research, for example between academic research and the research needed by public administrations and the ICT industry today

Measures proposed by eGOVERNET include:

♦ Establishment of a strong correlation between different types of research and identification of possible types and correlations among them

- Definition and assessment of the demand regarding execution of research

- Definition and assessment of the demand regarding users of research

- Awareness of the existing distinction between academic research and research needed by public administrations and ICT industry

- Establishment of strong correlation between eGovernment research and eGovernment strategies

- Systematic identification of the needs of eGovernment research

- Definition of activities, priorities and responsibilities among those carrying out research

- Establishment of a foundation for the development of eGovernment in Europe.

3.5 eGovernment research is not a high priority

Stakeholders and key government officials are not aware of the importance of research as regards the quality of eGovernment. A consequence of the low priority given to eGovernment research is the low budget provided for research activities.
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Measures proposed by eGOVERNET include:

- Promotion of eGovernment opportunities, by governments, public administrators and others.

- Continuous development of competences

- Enhancement of efficiency of administration systems and efficient use of resources

- Assessment and use if positive of benefit from commercial eServices

- Definition of longer term perspectives for projects

- Alert of politicians aiming in improving the chances of getting funding

- Advertising of business opportunities in order to attract content providers

- Provision of assurance for a systematic approach to eGovernment development

- Raise of the priority given to eGovernment research

- Provision of sufficient funding for conducting research.

3.6 Lack of modern and advanced technology

The use of modern and advanced technology, business models and open source principles is not common today. Many ICT systems in public administrations are still not interacting as they are supposed to. Sometimes the reason for this is current legislation and sometimes it is weak compliance between different systems.

Measures proposed by eGOVERNET include:

- ♦ Leveraging of technological advancement in terms of new information and telecommunications technologies, new business models and open source principles for all interested parties

- ♦ Seamless connection of different ICT systems

- ♦ Stimulation of the use of state-of-the-art information

- ♦ Stimulation of the usage of modern telecommunications technologies, business models and open source principles.

An appraisal of the current situation in this respect comes from the eGovRTD2020 project which states[27]: "Current research focuses on the different aspects of ICT systems instead of balancing multi-channel access, interoperability and convergence of distinct technologies and devices. Extensive conceptual modelling becomes a key success criterion to manage the large complexity of such ubiquitous information systems. As there are many isolated applications, concepts of embedded systems in eGovernment settings call for research on the opportunities and benefits of converging ICT in public sector applications, including convergence of technologies of various modes. New ways of communication and interaction between various ICT applications and devices are expected in the future, e.g. voice recognition and control instead of input via keyboards. Successful implementation of ICT implies user friendly service provision and eInclusion."

3.7 Underdeveloped pan-European services

eGovernment is a complex, multi-disciplinary issue that deals with technological, socio-economic, political, legal, psychological and several other aspects that are embedded in each service. A consequence of inadequate problem-solving is apparent in the development of national eGovernment in many different ways, not always caused just by national, legal or some other objective, understandable reasons. There are too many cases of the wheel being re-invented. Interoperability between local, regional, national and European administration is not fully developed at this point. Pan-European specifications are sparse and no systematic exchange of know-how and best practice exists yet. Consistent architectures, common policies and standards are absent at this point.

Measures proposed by eGOVERNET include:

- ♦ Preparation of an overview of developed eServices within the EU

- ♦ Establish that coordination of the eGovernment programme and creation of pan-European public values constitute challenges at EU level

- ♦ Development of pan-European services

- ♦ Definition of legal frameworks and elimination of legal barriers

- ♦ Unify of the agenda of what services are needed for different countries

- ♦ Definition of a common European eGovernment research agenda

- ♦ Definition of measures for overcoming socio-economic challenges so that they no longer impose on the field of (eGovernment) research.

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[27] "Roadmapping eGovernment Research Visions and Measures towards Innovative Governments in 2020", edited by Cristiano Codagnone and Maria A. Wimmer, eGovRTD2020 Project Consortium, 2007.

3.8 Low cooperation of stakeholders with ERA

Cooperation of researchers, industry and public administrations within the European Research Area (ERA) is not tight enough. Currently, ERA does not enable a single access point (possibly a web portal) where interested parties can find research results, published calls, and possible ways of cooperation with other researchers, public sectors or industry.

Measures proposed by eGOVERNET include:

♦ Establishment of cooperation and more open communication between public sector (purchaser) and private companies (vendors)

♦ Establishment of a united and coordinated research network

♦ Encouragement of increased collaboration between researchers, public administration and industry and strengthening of ties with users

♦ Definition of a common European eGovernment research agenda.

4 eGovernment research and policy in Europe

eGOVERNET experts provide fruitful conclusions on the state and possible strategic options for eGovernment research and policy in Europe. In relation to its findings on the research policies and practices among Member States the first and paramount consideration is that **eGovernment research**, though undergoing a process of recognition and consolidation, **is fragmented** even within the Member States.

EGovernment research is funded through programmes belonging to different policy areas, making thus coordination between them very difficult. This process increases fragmentation of research by adding the fragmentation of funding streams.

Moreover, eGovernment research funding appears clearly divided between socio-economic and technological research. With investment remaining marginal, most eGovernment programmes do not seem to have perceived a necessity to fund any research to accompany or support implementation. According to eGOVERNET findings, this may be because implementation was seen largely as a technological process and, undoubtedly, much of the technology for eGovernment is perceived as being well-developed. On the other hand, the socio-economic and organisational aspects appear to have been underestimated, both in the actual implementation of eGovernment and as a potential area for research.

It is evident that research programmes and funding are a "bottleneck" between **policy awareness** and **research effort**. At the policy level, eGovernment research is mentioned as an important application field of IST research. At the same time, in the research community, there are increasing research activities on eGovernment. However only a minority of countries have a dedicated eGovernment research programme, and the budget devoted to eGovernment research is low.

Experts place particular emphasis on the importance of institutional funding, public procurement, partnerships with universities and the creation of dedicated research centres in supporting eGovernment research. Public procurement in particular appears to be the most used, mainly in the field of socio-economic research for policy support, but also in some cases for technological research.

In terms of research topics the key themes emerging across countries are: eDemocracy and eParticipation; security; knowledge management and the semantic web; and impact evaluation of eGovernment. A thorough examination of the past and future research themes reveals that "understanding user needs" is not mentioned as a priority. There is certainly the need for a more systematic and cross-country collaborative effort for defining the research priorities within eGovernment, including emerging themes such as "users needs".

To summarise the above, there are important negative features which shape and limit the course of eGovernment research in Europe. These are:

♦ Fragmentation of research and of funding programmes
♦ Although much of the technology for eGovernment is perceived as being well-developed, socio-economic and organisational aspects appear to have been underestimated
♦ Research programmes and funding limit the realisation of high policy awareness at the top into great research effort on the ground
♦ Research priorities within eGovernment are in need of re-definition to include emerging themes such as "users needs".

5   Policy issues and recommendations

The 2010[28] EC Information Society strategy which was launched in spring 2005, set a new start for the Lisbon Strategy in which knowledge and innovation have been deemed among the drivers of growth and affirmed the importance of building a fully inclusive information society, based on the widespread use of ICT in public services, SMEs and households.

Furthermore, it stated that "*much remains to be done to demonstrate economic impact and social acceptance*" with respect to the benefits of online public services.

The new eGovernment Action Plan was published about a year later. The Plan was heavily impact measurement oriented and resulted in the new Competitiveness and Innovation Programme (CIP)[29] aiming in the strengthening of ICT-oriented developments in the public sector.

As the publication of the FP7's 1st call for proposals for IST in 2007 showed, there will be no fundamental research in eGovernment financed by the European Commission at least up to 2008. Instead, broadly defined eGovernment initiatives and activities will be supported by the ICT Policy Support Programme (ICTPSP)[30], which is part of the CIP. This means that the Commission considers that funding for research in the field should give its place to funding for implementation pilots.

As eGovRTD2020 conclude in their final policy recommendations:

"…implementation pilots are positive instruments, as long as they are not the only one, and as long as more fundamental research is also financed. The scenario, however, for eGovernment is currently that the EU will only finance pilots and not research. This choice seems to imply that all major important eGovernment research has been conducted and that it is now only the time for deployment. Certainly FP5 and FP6 have produced appreciable research, but our findings show that the current development of eGovernment has not reached outstanding results and that many challenges are still to be solved with the help of fundamental research. …"

Researchers in eGovRD2020 observe that although implementation pilots will mostly finance technological development, such investment of public has not been negligible in the past, (36.5 billion Euro in 2004) with no commensurate result in terms of impact and take-up. The consortium conclude that spending money for ICT alone is not enough for making efficiency and effectiveness a reality and increasing inclusion and participation.

In fact:

"…there exist some key challenges which can only be overcome via basic fundamental research …"

The eGovRTD2020 Action concludes with the following policy recommendations:

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[28] http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm

[29] http://cordis.europa.eu/innovation/en/policy/cip.htm

[30] http://ec.europa.eu/information_society/activities/ict_psp/index_en.htm

♦ Complement implementation pilots with funding for eGovernment research in selected identified areas (there have been 13 identified research areas by the consortium which cover the spectrum of eGovernment)

♦ Ensure that new eGovernment research is holistic and multidisciplinary and that each funded research project strikes the right balance between strictly defined technological research and development on the one hand, and more socio-economic, cultural, organisational, political and regulatory and legal research on the other hand

♦ Secure that fundamental research at the edge of transforming basic ICT innovations into large-scale applied solutions takes a wider view, including impact assessments, framework developments, and large-scale applicability of technology advancements

♦ Require research proposals to tackle the complexity of socio-technical systems in eGovernment contexts, thereby embarking on a multidisciplinary approach and securing contributions to advance methods and tools which deal with the complexity of socio-technical systems in the public sector

♦ Reinforce European and international researchers in the field of eGovernment to collaborate and contribute to the advancements of the field by working cross-disciplinary

♦ Foster a stronger dialogue among the key actors of the field (academia, governments and ICT industry and consulting) when investigating eGovernment research themes by supporting the actors to create the necessary favourable environment of exchange and collaboration

♦ Secure high-quality applied research through approving evidence of capabilities and competencies of project partners in the field of application.

Finally, eGOVERNET recommend consolidation measures for impact of research:

"There is a widely felt need for consolidation and reaching of critical mass in order for eGovernment research to have an impact. Several countries have created, often in partnership with universities, some kind of eGovernment research hub, as physical or virtual research centres. This is the case, for example, for EGIZ[31] in Austria, IBBT[32] in Flanders, the Fraunhofer eGovernment Centre[33] in Germany, and the eGovernance academy in Estonia[34]. In addition, dedicated umbrella projects have been supported in order to integrate and structure eGovernment research (in the UK, for example)."

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[31] www.egiz.gv.at

[32] http://www.ibbt.be/

[33] http://www.fraunhofer.de/fhg/EN/profile/alliances/eGovernment-Center.jsp

[34] http://www.ega.ee/