Section 3: Solutions for the seven eGovernment barriers

In this section, we propose solutions to some of the barriers to eGovernment identified in the course of the project. We outline each of the seven categories of barriers that we identified earlier in the study, and for each category, we nominate a key barrier – and identify a solution to that barrier.

The seven barrier categories are:

- Leadership failures
- Financial inhibitors
- Digital divides and choices
- Poor coordination
- Workplace and organizational inflexibility
- Lack of trust
- Poor technical design

We are not, therefore, aiming to produce solutions to all the potential problems of eGovernment, but to identify a range of tangible solutions to specific barriers. For each solution that we propose, we give some examples of where it has been used and make a recommendation to the Commission in terms of encouraging its take-up across member states.

Leadership Failures

eGovernment progression can be limited by failures in political and management leadership (e.g. OECD 2003a, United Nations 2003). Indeed, the Lisbon Ministerial Declaration of the 19th of September 2007 highlighted the importance of strong leadership to ensure transformational change that harnesses the value of new technologies. Successful leadership requires an ability not only to manage complex ICT projects but to motivate and support sustained commitment to eGovernment within public administrations and the use of eGovernment services by citizens. There is also a need to effectively manage differences in interests; perceptions and understanding among different stakeholders to ensure such conflicts do not become blockages to eGovernment.

Leadership failure can lead to low prioritization of eGovernment in public policies and resource allocation; lack of integration of the eGovernment agenda with mainstream strategies for public sector reform; poor senior management understanding of eGovernment; and poor strategic vision and planning. Basically, eGovernment needs champions. Political support from the top is an important (identified as such by 68 % of participants in the Breaking Barriers project online survey[1]) but not a sufficient condition to overcome leadership failures; it may indicate the presence of a champion at the highest levels of government, but it can be difficult to sustain or to feed down to other tiers of government without a seam of personnel throughout departments and agencies who prioritise eGovernment issues. Lack of sustained leadership for eGovernment will lead to cycles of attention and inattention that lead to patchy, stop-go progress.

[1] For the survey report please see: http://www.egovbarriers.org/?view=project_outputs. All further references to this survey will be indicated by the phrase “project survey”.

Key Solution: Creating a Network of eGovernment Champions

One way of sustaining attention to and prioritisation of eGovernment is the creation of a Chief Information Officer (CIO) role throughout government organizations, as in most private companies and as (for longer than in any European country) in US federal departments and agencies. Such a role should not be restricted to one per department, but should also be created in agencies and public bodies and even, for very large departments, at division or bureau level, so that there is a 'seam' of eGovernment champions throughout public administration, ready to promote eGovernment initiatives.

Such a strategy would complement the current i2010 eGovernment subgroup who report to the High Level Group on the implementation of the i2010 eGovernment Action Plan. The sub-group is made up of eGovernment leaders and national representatives from Member States and Accession Countries which are members of the i2010 High Level Group. The creation of a seam of CIOs throughout government in all member states would complement and assist the i2010 eGovernment group, providing input when needed and ensure the work of the i2010 eGovernment subgroup has an influence at all levels and departments within government (European Commission 2006b).

There are two elements that must be built into the creation of a CIO network. First, some cross-departmental forum of CIOs must be built into the routine of a government administration on a regular basis, so that CIOs are continually aware of developments in other departments and possible synergies between initiatives and projects are highlighted. In the UK, such fora have facilitated discussion, awareness and even cross-departmental working on eGovernment issues between (for example) taxation and benefit agencies, to a greater extent than ever before. Second, it must not be assumed that the departmental CIO is the only official from a department who should attend the highest level CIO meetings. In some cases, the IT budget of an agency will be far larger and more policy-critical than the budget of the parent department (the taxation agency is likely to have a larger IT budget and role than a Treasury department, for example) and no government wide discussion of eGovernment issues should take place without the presence of this agency's CIO.

CIOs were introduced in many US federal government agencies from the early 1990s and the Clinger-Cohen Information Technology Management Reform Act of 1996 mandated provision for CIOs as information change agents and 'technology watchdogs' across the federal government (Buehler 2000). Their creation was aimed at ensuring that 'a CIO has a powerbase as a major participant in agency management', arising from concern over the earlier practice of Information Resource Management (IRM) officials acting as top information persons in the majority of agencies and departments, who were essentially "techies" who held the philosophy of 'IT for IT's sake' (Buehler 2000).

Strong and competent leadership by CIOs has a positive influence on the success of eGovernment (Seifert and McLoughlin 2007). However the effectiveness of the implementation of CIOs as a consequence of the Clinger-Cohen Act has varied from agency to agency. One key issue to explain this diversity is the specific role the CIO has within the agency (e.g. Kost 2005; Liu and Hwang 2003) Indeed, a lack of clarity regarding the CIOs role, the relationship of the CIO to other existing IT management initiatives at that time, the placement of the CIO in the agency hierarchy and uneven budget allocations have all been identified as potential brakes on the establishment and impact of CIOs in federal government when the act was first implemented (McClure and Berot 2000). The issue noted above of disparity between IT budgets across the hierarchy has been important; the Federal Aviation Administration, for example, has a far greater e-government role than the Department of Transportation and their absence at departmental CIO meetings has caused problems in the past. A related issue is the importance of the CIO having support from the agency head and the senior management team (Moore 2004). Thus, the effectiveness of the CIO position is not just about the competences of the individual, but their place with the government agency and the resources they have at their disposal.

Mechanisms should also be put in place for communication between those championing specific eGovernment initiatives, therefore increasing the likelihood of 'joined-up' or 'seamless' government. In the UK from 2004, the CIO Council was set up to ensure that CIOs 'operate on a "collective responsibility" basis to steer, own and deliver agreed strategic

actions' (www.cio.gov.uk). It meets for a minimum of three full days a year, with CIOs attending in purpose, thereby ensuing that the CIOs of major departments meet on a regular basis and facilitating the discussion of common issues. It plays a role in consolidating the public sector IT profession, particularly through contributing to the Professional Skills for Government agenda, thereby reinforcing the concept of a network of IT professionals across UK government. But most importantly, it facilitates communication and discussion between IT divisions of departments that formerly were unlikely to do so, giving rise to cross-departmental eGovernment initiatives and strategies.

One way of drawing attention to and incentivizing champions at any level of administration is to introduce prizes for eGovernment development. In Denmark, for example, the "Best on the Internet" initiative gives ratings of public homepages and thereby encourages authorities to prioritize usability of their websites; and secondly the "Prize of eGovernment" is given to public institutions in three categories "Efficient eGovernment and service to citizens", "Coherence of IT Infrastructure" and "Good eGovernment Leadership". In Germany, the BundOnline Star is awarded twice a year to recognise excellence of a service and its implementation in three categories (G2C, G2B, G2G) by the Ministry of the Interior following a vote by the Institute of Electronic Business in Berlin. The Federal Ministry of the Interior awards annually a set of prizes within its eGovernment competition. Participants come from all levels of the administration (federal, regional and local) and prizes are assigned in four categories (G2C, G2B, G2G and G2E). The competition is organized together with partners (Cisco, BearingPoint) and prizes are awarded during the CeBIT fair. Italy also has a number of awards, for example I Successi di Cantieri, organized by the Department of public administration, (http://www.cantieripa.it/inside.asp?id=204); COMPA assigns awards to administrations in the innovation area of citizen-administration relationships including on-line communication (www.compa.it); and EuroPA assign awards to best websites of local administrations (www.euro-pa.it).

Recommendation: Creating champions for eGovernment across public administration is one way to ensure that the objective of 'making efficiency and effectiveness a reality' is achieved, through the prioritisation of eGovernment issues at the highest levels of public organisations' strategies. In future guidance to member states on the development of eGovernment, the European Commission recommend the creation of CIOs, at least at departmental level.

Financial inhibitors

The costs of developing, implementing and maintaining eGovernment (e.g. costs of software, hardware and training for government officials) can be important financial inhibitors. Furthermore, difficulties in calculating tangible long term benefits to offset clear, often apparently high, short term costs can severely hamper the speed and scope of eGovernment progress; particularly when spending on eGovernment competes with other critical demands on public resources (e.g. building roads or schools). Understanding both costs and benefits can help to inform eGovernment expenditure, yet such analysis is complex and rarely undertaken. Difficulty in demonstrating the cost benefits of eGovernment initiatives was considered an important or very important barrier by 60% of project survey participants.

Key Solution: Calculating the Benefits

Working out the benefits of eGovernment (including the risks of not developing and innovating) is as important as working out the costs. As noted by the Lisbon Ministerial Declaration of the 19th of September 2007 the measurement of the impact of eGovernment is a key area. As eGovernment developments progress, working out the benefits becomes increasingly important, as it becomes more difficult to cost-justify investment in eGovernment through 'conventional' savings such as reduction in staff costs for administrative operations, through which IT projects have traditionally been cost-justified. Private corporations calculate the 'asset value' of web sites and electronic services – governments should do the same, taking account of the real public value of easily available, visible, accessible and navigable government information.

Possible strategies for estimating asset values (Dunleavy 2006) include:

- Taking asset values as a multiple of income generated from the resource – e.g. company websites are often valued at between 2 and 6 times the income generated. In the public sector some agencies have near-commercial activities where a direct read-across of corporate asset valuation methods might be appropriate. But most government agencies pay out or expend money rather than collecting it. At the other extreme, taxing agencies pull in high yields via eProcesses – but they commonly apply tests that restrict their administrative costs to a fraction of revenues generated – e.g. the rule that the marginal tax officer must generate 8 times their salary in revenues. The same rule might be applied to eResources and IT investments for taxing agencies.

- Imputing a positive value per thousand visitors to websites on grounds going beyond simple income – e.g. taking account of brand recognition, market positioning, goodwill, protection against competitors, or the ability to leverage other corporate benefits from contact with customers or potential customers.

- Assessing what it would cost to run the organization's operations without the web site. The more digitally-based an agency becomes, the larger this asset value would be. This has the advantage of signalling greater risks the more dependent an agency is on eProcesses and hence a greater need to make IT investments as digitalization proceeds and conventional processes dwindle. However, the high transaction costs (and utopianism) of re-establishing conventional processes once some operation has been digitalized may tend to inflate asset value estimates unrealistically. Possibly once could strip out transactions costs, but the resulting numbers would then be rather theoretical or notional only. Do private sector companies use this approach at all and how do they then fit it to their specific position and industry so as to achieve realistic results?

Recommendations: Furthering the objective of implementing high-impact key services for citizens and businesses will only be achieved if the positive impact of key services can be measured. Methodologies for calculating public sector asset value is an underdeveloped area of public administration research. The EC should commission research on methods of calculating the asset value of public sector web sites, to complement the programme of research into common impact/benefit-oriented eGovernment measurement framework outlined in the i2010 Action Plan (European Commission, i2010 eGovernment Action Plan: Accelerating eGovernment in Europe for the Benefit of All 2006: 6).

Digital Divides and Choices

Social and economic divides demarcated by wealth, age, gender, disability, language, culture, geographical location, size of business and other factors – can mean eGovernment resources are used in very different ways (or not used at all) by different individuals, groups and organizations. Indeed, addressing the challenges of digital divides is highlighted as a key objective of the 2006 eGovernment Action plan in the goal: 'no citizen left behind' (European Commission 2006) and was reinforced by the Lisbon Ministerial Declaration of the 19th of September 2007. Without a more nuanced understanding of user needs and choices, uptake of eGovernment will remain limited and the potential benefits (e.g. cost reductions or greater user satisfaction) will not be realized. Two particularly important barriers of this kind are that citizens can lack strong motives to use eGovernment services (considered an important or very important barrier by 61% of project survey participants) and low levels of Internet use amongst certain groups (considered an important or very important barrier by 69% of project survey participants)

Governments need to accept that there is no simple divide between Internet access/no Internet access, but rather a segmented citizenry with quite different eGovernment needs.

Key Solution 1: Segmentation

A key way to overcome divides in digital access and choice and to increase take-up of eGovernment is to segment users of eGovernment services into specific groups and treat them in distinctive ways. Survey research suggests that in the UK, the majority of Internet

users now go to the Internet first if they want to find out something they don't know already, like the name of their MP (64%) or information on their taxes (55%) (OXIS 2007). For these most ardent Internet users (which we might estimate at around a third of the population), everything should be available on-line – that is where they will expect to deal with government. They are likely to be skilled Internet users and are likely to use search engines rather than portal sites, so eGovernment information and services need to be easily visible, appearing near the top of search engine results. Other Internet users need to be persuaded that eGovernment can provide the same benefits as eCommerce or eBanking, so a targeted advertising campaign for eGovernment services could have pay-offs for this group. A significant proportion of non-Internet users know someone or some organisation who can use the Internet for them if they need it; 88% of ex-users and 73% of non users in the 2007 UK Oxford Internet Survey replied positively to this question. For this group, government needs to identify the relevant intermediaries for particular sub-groups and target them in eGovernment initiatives. They should also consider formalising on-line channels of communication for intermediaries such as Citizen Advice Bureau and Non-governmental Organisations dealing with specific groups such as the elderly.

Examples of successful segmentation include:

- Lewisham has a number of successful initiatives which have been developed alongside analysis of customer views (e.g. phone and exit surveys, annual surveys, focus group meetings and visits to community groups) See http://www.idea.gov.uk/idk/aio/87366.
- In 2004 the Office of the Deputy Prime Minister in the UK launched the eCitizen Project that aimed to explore the motives and incentives to use eGovernment services by different target groups in order to increase eGovernment take up. As a result of this research a series of best practice examples are available online for use by local authorities as to how to target and market their eServices (see http://www.e-citizen.gov.uk).
- Transport for London redesigned their website on the basis of usage statistics to meet different Internet users needs. See http://www.tfl.gov.uk/.

Recommendation: Effective segmentation is going to be a key way of ensuring that 'No citizen is left behind'. The European Commission should build segmentation into their European Initiative on eInclusion, scheduled for 2008. To kickstart this process, the OII have submitted a position paper to the consultation in August 2007 at: http://ec.europa.eu/yourvoice/ipm/forms/dispatch?form=eInclusion

Key Solution 2: Providing citizens with a right to use eServices

As noted above there are a significant and increasing proportion of the population who would turn to the Internet first for their interactions with Government; and there is another group of Internet users who could be persuaded to use eGovernment services.

In order to improve the availability and quality of online services a legal solution could be to establish an eRight for citizens to use electronic media to access public services (based on Directive 2006/123/EC on services in the Internal Market). By forcing governments to permit citizens to use eGovernment, uptake and user satisfaction are likely to be increased. Further, while such a policy is aimed at Internet users all citizens will benefit due to the efficiency gains from using ICTs to transform eGovernment.

Recommendation: We recommend the approval of a new Directive on administrative services, linked to the free movement of persons and right of establishment (using Articles from Directive 2006/123/EC as a model, where relevant). Please see the part on Relationships between public administrations, citizens and other actors in section 4 for more details.

Poor Coordination

Emerging forms of eGovernment service delivery and ways of working often cross traditional government jurisdictions and administrative and departmental boundaries, as well as having

the potential to overcome geographic distance. Variations in legal, regulatory and administrative regimes on different sides of those boundaries can inhibit and block the flow of information and services through new networked governance channels at EU, Member State, regional and local levels (OECD 2003b). A lack of coordination across central, regional and local levels of government was considered an important or very important barrier by 84% of project survey participants), while co-ordination between member states and the European Commission was considered an important or very important barrier by 61% of project survey participants.

Government agencies should find ways of using the benefits of developments in the Internet and WWW to overcome coordination problems.

Key Solution: Working with Chaotic Coordination

As the Internet and associated technologies and applications have developed, there are new ways to mitigate against coordination problems across fragmented organisational arrangements. The simplest example is a web site which directs the user to a range of other sources via hyperlinks, thereby bringing together diverse information resources from different organisations in one virtual location. More recently, 'Mashup' applications have made it easier for users to be presented with a far more coherent package of information deriving from disparate sources. They can even allow field workers from different organisations on the ground to update centrally held information resources, such as the UN Refugee Agency's Google map of the disaster-torn Darfur region, which can be updated by aid agency workers and other actors in the region[2]. Such applications can be used for officials working within organisations at different levels of government, simplifying their administrative environment and creating a kind of virtual service chain for information delivery. Within web sites, effective internal search engines can make a huge difference to how officials find their way around inter-organisational networks. Portals which really link up and search across tiers of government can make uncoordinated government look coherent both from inside and outside governmental organisations.

However, this type of web-enabled 'chaotic coordination' is not an automatic by-product of developing a web presence. Organisations must think about how officials use their web sites (or protected subsections of them) as information sources, just as they do for citizens using eGovernment. Their needs must be built into the design of 'portal' or intranet sites and considered when assessing the navigability of sites. Good navigability can be aided by the optimisation of key metrics (such as maximising the size of the 'strongly connected component' and minimising the path length between any two nodes on a site, see Escher et al. 2006 for a full discussion). But for larger sites (for which it is inherently more difficult to preserve navigability) extensive usability testing will be necessary for users from a range of organisational contexts. Second, if external search engines are used then the extent to which users can find the information they need will depend on the extent to which the relevant information is held on a web site that appears high up in search engine results. So optimisation for search engines, via the creation of links and data-tags for example, is an essential part of web site development. Third, organisations of all kinds have experienced major difficulties with internal search engines, which often return irrelevant or spurious results, even where (for example) the application is 'powered by Google'. Research suggests that search algorithms that work well for the Internet as a whole do not work well when used within sites, as pages cannot be ranked so effectively (Dmitriev et al. 2006). Internal search engines must be custom built for the organisation whose web site is being searched, and can require a good deal of extremely skilled resources, so good internal search engines are expensive.

These are some examples of successful initiatives where the focus was on the web-front end with limited changes to organisational structures or where effective search and subsequent 'joining-up' of information provision has been prioritised.

- Austrian customs declaration for out-of-EU trade where there was digitisation of existing workflows and architectures and the addition of a web-based front-end;

[2] See http://www.ushmm.org/googleearth/projects/darfur/

- Public libraries in Denmark where new flexible and highly compatible eSystems have been laid on top of existing software which varies from library to library;
- The US federal government portal, usa.gov (formerly firstgov.gov) has developed a reputation as a world leader in internal search. It search engine, custom built by MSN and Vizimo, searches the entire federal, state and local governments of the US[3] in contrast to many other government sites (such as the UK www.direct.gov) which searches only its own content).

Recommendation: Most of the solutions involving chaotic co-ordination are a question of 'best practice' web development which should be a normal part of an organisation's strategy. It is difficult therefore, for the Commission to offer guidance in this area. However, the specific issue of internal search engines (or 'enterprise search' as they are known in the industry) emerges as a particular problem for governments. The European Commission could consider commissioning some best practice research into this particular issue, possibly drawing on the experience of the usa.gov site in the US. Effective search engines are vital enablers for eGovernment development.

Workplace and organizational inflexibility

Resistance to innovation by public administration management and staff can slow down, impair or prevent the necessary redesign of organizations and their processes required to deliver effective eGovernment. Such inflexibility can set up barriers to the creation and delivery of efficient and effective eGovernment services that could meet changing citizen and business needs (Margetts and Dunleavy 2002; Remmen 2006). Indeed, the dominant media-substitution paradigm in eGovernment is a likely reason for the relatively limited diffusion and impact of eGovernment compared to the equivalent network-enabled transformations in eCommerce. Instead of concentrating on the 'substitution' of electronic for paper-based services, governments need to focus on facilitating the transformation of organizations in ways enabled by ICTs like the Internet. This often entails moving away from traditional 'stove-pipe' hierarchical organizational structures towards more networked organizational forms. It is during this transition that the major barriers to organizational change become major barriers to eGovernment (Eynon and Dutton 2007).

Prevailing practices can be difficult to change as they are designed to support certain patterns of communication and information exchange, while discouraging others. eGovernment initiatives often blur these boundaries and require appropriate changes to take account of the new methods of operating and managing public services. Key barriers relating to workplace and organizational inflexibility identified in our survey were the lack of ICT skills among government officials (considered an important or very important barrier by 61% of project survey participants) and resistance to change by government officials (considered an important or very important barrier by 80% of project survey participants).

Government organizations need to be agile in the way they deal with new technologies and face the resistance of those staff who have considerable organizational learning invested in off-line channels.

Key Solution: Encouraging an 'eLiterate' Workforce

The Internet and related technologies and their widespread societal use have brought a major change to government; an injection of technology into areas of bureaucracy traditionally viewed as 'technology free'. This change has taken place at all levels of government, as even policy-makers accustomed to view information technology as a policy-neutral administrative tool are realising that policy innovation often rests on some kind of technological innovation. eGovernment development therefore will be greatly aided by a workforce trained and practised in building electronic solutions into everyday working life. This can involve training in Internet and web-related issues, as well as more innovative solutions to ensure that staff are encouraged to incorporate technological innovation into all aspects of their work. Even

[3] Please see http://en.wikipedia.org/wiki/USA.gov

encouraging staff to 'play' with the Internet can have an important effect on cultural resistance to eGovernment, but can also be a difficult concept for organizational cultures rooted in hierarchy and solemnity (see Margetts and Dunleavy 2002, for a full discussion of cultural barriers to eGovernment). As noted above, the creation of networks of CIOs across governmental organizations can play a role in encouraging training and professionalism in IT, but changing the organisational culture will involve lower level initiatives that penetrate areas traditionally viewed as non-technical. Some examples of attempts to bring about cultural change are as follows:

- In 2003 the French government launched an eChallenge where all government employees were invited to assess their degree of understanding of ICTs. The eChallenge website (Démarche d'Evaluation du Fonctionnaire Internaute, DEFI) contained an eAssessment which tested practical skills including Internet navigation, e-mail, online discussions and web publishing and their understanding of issues such as information systems security or data protection .

- In 2006 the Hungarian government organised eGovernment training courses for 4 500 civil servants from 700 offices. The online course taken over 3 months was organised by the Ministry of Informatics and Communications and covered various eGovernment topics, such as eAdministration, electronic signatures, certification, client portals, tools for improving the e-efficiency of local government, communication, monitoring, negotiation techniques and broadband. The design of the course was informed by prior needs analysis and learner preferences. The success rate among students who completed the course was more than 90%.

- The 'Plan Concilia' was an attempt to reconcile personal, work and family life in Spanish central administration. It was also adopted as a pilot-project including tele-working with a selected group of senior civil servants[4].

Recommendation: An eLiterate workforce is going to vital in the future to maximise the benefits of eGovernment and make efficiency and effectiveness a reality. It can only really happen at organizational level, but if guidance is being issued by the Commission, the need for staff to have Internet access and be encouraged to use up-to-date applications in an unrestricted way should be built into any organizational best practice.

Lack of Trust

A lack of trust is a crucial element in the take-up and effectiveness of eGovernment services. At the heart of these concerns is a 'trust tension' (Guerra et al. 2003) between the need to collect data on individuals as the basis for providing services, such as health records and voter registration, and fears of data surveillance or the inappropriate secondary use of personal information in computer databases. Although increasing experience with the Internet and eCommerce in the private sector is establishing more general trust in the use of ICT-enabled networks (Dutton and Shepherd 2003); eGovernment raises particular trust concerns as so many public services require the handling of highly sensitive personal information in digital forms. Take up can be also be affected by general trends in perceptions of trust in government, such as those caused by the attitude of a public administration to transparency and openness issues. Lack of trust can be exacerbated by a 'Big Brother' fear of unwarranted government intrusion into private lives and business operations through the growing use of networked or integrated digital databases and intrinsic 'cybertrust tensions' (Dutton et al. 2005), as shown in the general desire for both privacy and security even though a degree of disclosure or loss of privacy is typically necessary (e.g. to identify the user of an online tax or welfare service).

Where possible, users of eGovernment need to be provided with 'low trust' options, where authentication requirements are minimised.

[4] See the evaluation report (in Spanish) at: http://www.map.es/iniciativas/mejora_de_la_administracion_general_del_estado/funcion_publica/concilia/medidas/libro_electronico/document_es/libro_electronico.pdf

Key Solution 1: Matching eGovernment to Trust Requirements (low trust where possible)

The most successful eGovernment initiatives tend to be where low levels of trust are required of both users and the providing agency; that is, authentication and identification requirements are low. Of course, for some governmental transactions (obtaining a passport or driving license, for example) 'full strength' authentication and identification procedures are necessary and citizens are required to have high levels of trust in the arrangements (in terms of security) and the agencies carrying them out (in terms of the types of information they will require). But for some transactions – paying a parking fine or a road fee, for example – only one-off transactions with low levels of authentication may be required. If citizens are assured that on-line transactions take place on a 'one off' basis, without any sharing of information with other agencies, then they may be perfectly willing to carry them out on-line.

Transactions need to be assessed for authentication requirements in a realistic way. It is unlikely, for example, that someone is going to fraudulently pay a parking fine or income tax on your behalf (indeed, when high levels of authentication using DigiD were introduced by the Dutch Tax and Customs Administration and not all citizens received their personal DigiD in time for the taxfiling deadline, the Tax Administration actually suggested that citizens use the DigiD of their neighbour!).

The history of eGovernment, however, is littered with examples of where government agencies have used inappropriate levels of authentication. In the UK, for example, during the early 2000s, HM Customs and Excise required all businesses wishing to file their sales tax (VAT) returns on-line to purchase a digital certificate to do so, a decision whose legacy probably still impacts upon very low levels of electronic filing of sales tax in the UK. Meanwhile, the then Inland Revenue agency adopted a username/password system that was much easier and cheaper to use, resulting in higher rates of electronic filing for the payment of personal income tax than that recorded for sales tax. Agencies need to think about where they need to use high levels of authentication and to share information across agencies – and where one-off low authentication transactions are possible. It can be a trade-off – with higher usage levels off-setting the inferior information collection fulfilments of such applications.

Moreover, technological developments mean that the "trust level decision" does not need to be a static, one-size-fits all approach: a number of technologies now allow very low levels of initial authentication, but use smart systems to adjust in real-time to high risk situations or patterns of customer behaviour. Pioneered in the financial services sector, these technologies have the potential to maintain high levels of security while not presenting high "trust hurdles" for the great majority of citizens to overcome.

Examples of successful low trust applications:

- Many municipalities across Europe successfully collect payments for parking tickets online with a simple one off credit/debit card payment, on a system which does not link up with any other eGovernment applications.
- Payment of the congestion charge for all vehicles entering central London from 2003 onwards is another example of a successful low-trust eGovernment application
- The government of New Zealand have issued an Evidence of Identity Standard to provide guidance for government agencies about the required process for initial establishment of an individual's identity, which starts with the premise that 'Many online services delivered by government agencies are anonymous and require no evidence of identity. Other online services have low levels of identity requirements and a username and password for ongoing confirmation of identity. PKI-based authentication is desirable only for a smaller class of services' (see www.dia.govt.nz).

Recommendation: Matching trust requirements to applications could be a key way of 'Making efficiency and effectiveness a reality', contributing to high user satisfaction and transparency and a lighter administrative burden. Identifying applications where trust requirements can be minimised – and have been in other countries or contexts - should be a built into the 'sharing of experience' (EC 2006: 6), a key element of the Commission's Action Plan (together with member states) for 2008 (EC 2006: 7). In addition, the Commission should consider

commissioning research into the applicability of the risk-based smart authentications systems which are being used by some financial services companies to eGovernment.

Key Solution 2: giving the citizen "ownership" of their own data (where low trust is not viable)

Despite the points made above about the need to match eGovernment to trust requirements on a risk-based approach, there will be some transactions where strong levels of authentication are required, and where the citizen needs to entrust significant levels of sensitive personal data to the government. One emerging best practice for building trust in such situations is to establish a "shared space" between the citizen and government for such data to be managed, in which the citizen's trust concerns are addressed directly by giving them high levels of transparency and control over their data: for example, enabling them to see what data is held on them by the government, to track which parts of government are accessing their data and for which purposes, and to update key aspects of their data (e.g. change of address or circumstances). A number of governments are implementing elements at least of such an approach, and the Estonian case study undertaken as part of this project (see project deliverable 2 case study report) highlights the success of this "citizen-centric" approach to trust management there.

Recommendation: the Commission should consider commissioning research into "citizen-centric trust management" approaches, including an evaluation of the extent to which giving citizens visibility and control over key data held on them by government increases their likelihood to use eGovernment services.

Poor Technical Design

eGovernment systems and services frequently fail or perform poorly because of the inadequate design and poor technical interoperability. Difficulties caused by inappropriate user interfaces to eGovernment systems can seriously hamper relations between public agencies and citizens and businesses. Such operational problems can sabotage even potentially successful services and discourage those experiencing them from trying other eGovernment opportunities. Incompatibilities in hardware, software or networking infrastructures within and between public agencies can also cause significant problems, particularly in terms of providing pan-European services. A key barrier we identified relating to poor technical design is lack of innovation in comparison with other sectors: eGovernment technologies tend to lag behind societal use of the Internet and related technologies

Government needs to put the same resources into the design of web sites as private corporations. Government's on-line presence is the new 'window' on government, the only bit that a significant subsection of the population see – so is as important as buildings.

Key Solution: Using 'user-generated' content in eGovernment applications

New technologies and applications provide the possibility to overcome traditional design problems with eGovernment. Indeed, societal use of such technologies places pressure on government organisations to 'innovate or die' in terms of take-up of online services, because citizens are only likely to want to interact with government online using the kind of technologies they are accustomed to use in other aspects of their lives. In particular so-called 'Web 2.0' applications, involving user-generated content, 'rich' (rather than text-based) information and loosely connected information sharing communities have offered major potential for innovation in private sector organisations, bringing customers into the 'front office' of product design, and offer similar potential to government. Government organisations tend to be cautious about using such applications, which can involve the use of part-authenticated information, the 'mashing up' of public and private sector applications and the creation of 'para-organisational' forms. All these characteristics blur boundaries between public and private organisations, which may invoke resistance within public organisational culture. But if such resistance can be overcome, Web 2.0 technologies could facilitate

dramatic change in government-citizen online interactions, just as, for example, social networking technologies have offered new possibilities for the creation and sustaining of social relations more generally.

Government use of Web 2.0 applications is extremely sparse at the time of writing, so for this solution we have to cast a wide net to find examples, across the private and voluntary sectors.

- Use of User Testimonials: There have been hitherto virtually no government equivalents of the popular private sector travel sites which provide opportunity for users to detail their own experience of travel and holiday products. But in the UK, a successful social enterprise site (www.patientopinion.org) provides users with the opportunity to rate hospitals, treatments and even doctors they have experienced and the UK Department of Health are now planning to incorporate a version of the site into the new 'Choices' web site. In the private sector, the controversial www.ratemyteachers.com which allows pupils and parents to rate schools and teachers has over ten million users in the US and local versions have now been established in Ireland (with nearly eight and a half million ratings), the UK, Australia, New Zealand and Canada. Government sites that provide similar opportunities for citizens to rate government services could be an important part of eGovernment in the future, particularly in countries like the UK planning to build choice into the public services, where they will be vital sources of information.

- Example of mashups: League table data on the Department for Education and Skills website uses Google Maps. Users can enter their postcode and can access a Google Map showing the location, and all the primary schools in the immediate vicinity, as pointers on the map. Users can then click through to view details about the school. The same information can be accessed in other forms (e.g. comparison tables by region). See http://www.dfes.gov.uk/performancetables/. The US Holocaust museum also offers a mashup of Google Earth and on-the-ground information from the crisis-stricken Dafur region, including photographs, eyewitness accounts and a range of data from local sources and NGOs (see www.ushmm.org/googleearth).

- Examples of RSS feeds and podcasts: RSS feeds are available to access information from: the Australian Tax Office, the Australian Government Media Release Service and the Parliament of Australia (see http://www.australia.gov.au/rss). In the US users can access RSS feeds and podcasts from the whitehouse (see http://www.whitehouse.gov/rss/) and numerous RSS feeds from usa.gov (http://www.usa.gov/rss/index.shtml).

- Examples of blogs: In 2006 the Federal Trade Commission created a blog to chronicle a series of FTC hearings about "Protecting Consumers in the Next Tech-ade" (see http://ftcchat.us/blog/).

- Examples of use of second life: the National Oceanic and Atmospheric Administration have an island in second life where visitors can, for example, view the under water world from a submarine for visitors to learn about cutting edge research in this field.

- Examples of wikis: the Defense Intelligence Agency (DIA) in the US utilises a number of web 2.0 applications such as wikis, blogs, RSS feeds and "mashups". Such tools assist with pulling together all data from human intelligence in addition to data from the Internet into one source enhancing analysis of data, improving collaboration and facilitating timely information sending and dissemination[5]. A second example is Intellipedia (a copy of wikipedia) is used by the 16 US intelligence agencies to share and assess all available information more effectively than was possible previously. It is a classified hierarchy of wiki sites on intranets. (see http://en.wikipedia.org/wiki/Intellipedia)

[5] See Feb 2007 article in computerworld http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=9011671.

Recommendation: Innovation should be rewarded in any attempt to benchmark eGovernment services, rather than relying on the availability of services or the sometimes non-demanding measures of sophistication used in earlier studies. Indeed, in the seventh measurement of online availability of public services a composite indicator for user-centricity was piloted and the need to define and deliver the Gov 2.0 user experience was recognised (Cap Gemini 2007). The Commission should consider building developing this kind of assessment of the extent to which services are innovative or reflect current trends in societal Internet use into benchmarking studies.

Conclusion

This short paper has identified possible solutions to the key barriers to progress in eGovernment. As noted upfront, we have not tried to solve all potential barriers to eGovernment progress, but rather have put forward what we hope are feasible, specific proposals that have been tried in one or more contexts. It is worth noting that some of the solutions put forward could be used to tackle more than one barrier. For example, some of the 'web 2.0' solutions proposed to tackle lack of innovation in eGovernment might also be used to overcome the coordination problems identified earlier. Wikis, for example, can be an excellent way to communicate information across individuals in multi-organizational contexts (across tiers of government, for example), while a mashup can be a good way to draw in and disseminate information from a range of sources (such as from some combination of public, private and voluntary sectors). Likewise, giving sustained attention to eGovernment issues by creating a network of Chief Information Officers is also likely to engender cultural change, a good way to tackle workplace inflexibility. In this way, implementation of the proposed solutions can reinforce each other and have a generalised effect in promoting IT-enabled business change across a range of government activities.

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