Think Paper 3: Trends in Technology for Citizen Centricity

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Version No. 5.0

http://www.ccegov.eu/

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Frank Wilson, 24th October 2006

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"Think Papers" aim to present strategic issues that will be explored with stakeholders and researchers. They are intended to be high-level summaries both of the issues and challenges, and of the ongoing work undertaken by the project team. They will be updated on the project web site http://www.ccegov.eu/ where registered participants can contribute to interactive explorations of definitions and issues.

This report is aimed at planners concerned with deployment of eGovernment solutions, and addresses technology and its relation to 'organisations, citizens and governance'.
In particular this report aims to emphasise the ways in which technologies are being consumed by citizens, and are being 'reproduced' by organisations in the delivery of their services. We look at how technology assists or hinders service and relationship opportunities, focusing the relationship between technology, organisations, governance and citizen involvement. Concluding remarks note the challenges for eGovernment in the context of rapid technological convergence.

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1 Key Messages

Technology involves tools for that are used to build services and relationships in societal governance. The organisational adoption of technologies is subject to uncertainty, the complexities of defining cost-benefit models, especially the measurement of 'public value' and return on investment.

The **ownership of the ICT strategy** in an organisation is sometimes not well linked to the responsibilities for its operational delivery. Experience from the business sector shows that IT strategy often is separate from organisational strategy, and that IT strategy does not directly lead to organisational change – indeed organisational strategy often directs technical strategy.

Information: ICT infrastructures need to be better linked to the information infrastructures. Services in safety critical areas require joined-up information systems and services that increasingly are dependent on National and European level interoperability and interchange. Attention is needed to privacy and security in data sharing and integration, and to the natural oligopoly (i.e. single dominant sources of information) that exists with public sector information providers.

Citizen-relevant channels: There should be a clearer focus on technologies that use citizen-relevant channels to deliver citizen/public value, rather than just to deliver efficiency gains and cost savings. The technology component of e-Governance services should aim to use 'everyday' and commonplace technologies to maximise inclusion and utility, and to avoid unnecessary demands (skills, device purchase etc.) on citizens. Governments must monitor and understand citizen technology competencies so as to prepare for continuous technology exploitation as the ICT landscape changes. A 'vision' of emerging technologies needs to be rapidly and effectively tested in a citizen context.

Interoperability and interchange are optimised when existing 'communities of practice' collectively agree metadata schemes for semantics, and for content encoding to suit user-community needs. European level 'communities of practice' need to be identified and supported to ensure European level interoperability and interchange.

EU Heterogeneity: The uneven ICT landscape across the EU, and within individual states, requires a policy environment for eGovernment service delivery that is attuned to, and continually monitors, the different needs - and the emerging changes in those needs.

2 Technology landscapes

Continuous changes in the technology landscape bring new ways that ICT can affect governance and services, and so impact organisations, citizens and business. However, the increasing rate of technological innovation, and the rapid convergence of devices, makes it ever more challenging for government to plan eGovernment services. The medium to long term planning horizons for government services have to cope with short-term uncertainties in the public consumption of technologies.

Technology can therefore benefit, or can interrupt the intended processes and outcomes. While strategies and policies plan for linear expected outcomes, they seldom model unexpected outcomes such as 'function creep' in 'surveillance' due to reactions to global terrorism.

Developments in eGovernment can now engage with rapidly developing, and challenging technologies including:

- Digital Television – with increasingly interactive capabilities.
- Smart phones – with convergence of PC, entertainment and location-based services, and the development of 'smart wallets'.
- Web-logs (blogs) – with peer-to-peer organisation of personal space, social space, social opinion, collective expression, and political milieu (organic democracy).
- Wiki-type information resources – encyclopaedic collectives of shared resources, shared views, shared understanding, and shared opinion.
- eVoting – and other participatory/opinion-gathering techniques operated by statutory, non-governmental, voluntary and membership organisations.

The above allow increased and varied contact between citizens, and between citizens and organisations. However, governance requires more than simple contact, and needs to turn contact opportunities into citizen engagement and real involvement.

These emerging modalities for interacting with citizens can help to both drive and pull-through improvements in public sector service provision only if public authorities can manage the changing expectations of citizens with real satisfiers rather than simple technical devices. Satisfaction requires measurable public value, but 'value' metrics in eGovernment have generally emphasised two areas: first, cost savings through ICT usage; second, volume of take-up. Quality of service impact (public value) is less developed and requires examination of real-world events.

Public administrations aim to ensure continuance of democratic process on behalf of the citizens they represent, while fulfilling statutory obligations resulting from such processes through creation and delivery of numerous forms of societal support via specific services.

Information and Communications Technologies (ICT) both cause, and require, organisational change and skills development to enhance governance, service delivery, and democratic

process. An important current emphasis in ICT strategy is to support 'open' access. Open access means using multiple technologies that are commonplace, everyday or even banal[1] to ensure that they can become important forces for social and economic change.

First, aim to select well understood and well used technologies to deliver public services, but understand also the paradox this presents – by the time a service is delivered the technology could be approaching obsolescence. Therefore, if a technology is very new, assess and model its likely societal take-up in a self-critical manner, rather than assuming that the technology can be 'pushed' onto citizens. This ensures maximum access (numbers of people) and optimum capability (citizen skills).

Second, ensure that technologies deliver public value through channels that are relevant to citizens, including multi-channel strategies that involve human interaction.

Third, identify, and critically evaluate, 'near ready' technologies offering significant future potential value to public services and accelerate uptake and wider deployment (preparation).

Much of the recent attention to channels has been in areas such as access to electronic networks (Universal Service obligations), technological inclusion (eInclusion), and smarter devices (eTen) to strengthen the service brand (eGovernment). A citizen-centric focus needs to work with technologies and channels that will really deliver public value.

3 Technology Assistance to Government

Technologies being deployed in eGovernment include; Internet and Web; extension into Semantic Web; creation of Interactive Services for citizens and business; linking of service-enabling applications; exploitation of Public Sector Information; and, participatory approaches such as eVoting and eDemocracy[2]. Each shows benefits and challenges for administrative agility, adaptation and transformation. The examples here are non-exhaustive and aim to illustrate strategic issues for organisation, citizens and governance.

3.1 Information provision to users – administrators, citizens and business

A common entry point to eGovernment is provision of smart access to information both internally (e.g. inter-departmental), and towards citizens and business (external). The shift to

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[1] 'Banal' does not mean simple, or trivial, but implies that a technology has now reached general acceptance, and is not regarded as being 'special' any more. Television, telephones, mobile phones, CD players are examples of banal technologies.

[2] See the DEMONET Network of Excellence http://www.demo-net.org/demo , which aims to build networks in that domain which are more knowledge-rich, focused and sustainable. See also the EU eParticipation programme at http://europa.eu.int/information_society/activities/egovernment_research/eparticipation/index_en.htm

shared electronic information exposes problems in duplication, version control, multiple formats, and identification of content.

3.1.1 Control of Content

Should information from the various information silos across different departments or units, be centralised (integrated), or shared through interoperability (standards and interfaced)? Centralisation, while being operationally logical, can result in an 'information monopoly' controlled either by a single eGovernment team, or an IT department.

In a service landscape with multiple data producers, owners, standards and metadata practices, the tension between centralised control and the need to use distributed experts for verifiable accuracy/inclusiveness, has led to shared content management of public information and services. For example, the 'Ask[3]' agency supports parents and carers in Wiltshire, UK, and has deployed a Content Management System (CMS) to help organise its information and services by deploying the 'Easysite[4]' package for use by collaborating agencies.

Content management systems ensure that core information is administered by suitable experts, but organisational users need to know where and how to find suitable information objects, and be able to fully understand what they contain.

3.1.2 Accessing Content

Public authorities have been quick to recognise that in sharing information between departments and service actors the internal users have to deal with a huge amount of information, much of which is not directly required for their own service tasks. Structuring and searching information now involves techniques such as 'information markup' (such as XML, an extensible mark-up language), also known generically as 'metadata', which encodes content so that external users and processes may know what is contained there.

New mark-up schemes are emerging to cope with new ICT modalities (such as digital television, Wiki repositories, rule-based systems, geographical information systems), and we already see new 'communities of practice' (e.g. XBRL[5] is the European standard for company financial public reporting, Metalex[6] is a framework for encoding of 'legal' documents). Groups of experts share and develop knowledge to support a common strategic purpose even though they may not necessarily work in the same department or organization. A key strategic challenge for public authorities is to engage their service teams in appropriate communities of practice both within a specific government, and between governments.

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[3] http://www.askwiltshire.org/
[4] http://www.eibs.co.uk/content-management-solutions/cms-for-government/government-case-studies/
[5] http://www.xbrl.org/
[6] http://www.metalex.nl/

3.1.3   Exchanging Content

Strategies for exchange of content must confront two issues. The first concerns agreement of suitable metadata schemes within specialist application domains (by representative communities of practice) to enable sharing of content within automated eGovernment service processes. The second concerns interoperability which is enabled by 'frameworks' addressing the ways in which organisations and/or systems can collaborate or inter-operate. Interoperability requires agreed technical policies and specifications governing information flows across government and the public sector.

Publicised examples of failure to integrate content through interoperability include the UK's 'Soham Murder Enquiry[7]'– an instance of existing information not being joined-up in ways between police forces, which allowed a child-abuser to re-offend. Agreement about metadata schemes may require collaboration with higher level initiatives dealing with regulatory harmonisation. This need for collaboration highlights an increasingly important issue for information exchange and interoperability of eGovernment processes[8]. That is the need to better deal with the 'meaning' – the semantics.

3.1.4   Understanding Content (semantic web)

eGovernment interoperability frameworks are close to being achieved in numerous Member States, and also at European level (the EIF-European Interoperability Framework is in progress under the IDABC initiative). Such frameworks provide the fixed core architecture for service realisation based on collaboration of public authorities. However, since future service development will also involve non-governmental organisations, such as business, or citizen representation groups, there is scope for consideration of how interchange and use of information can be made more fluid. The need to access 'meaning' in remote content is now supported by the 'semantic web' initiative[9] which aims to produce a universal medium for information exchange through access to content (e.g. documents) with computer-processable meaning (semantics).

A common framework allows data to be shared and reused across application, enterprise, and community boundaries, and will develop various standards, mark-up languages and related processing tools to allow access to the 'meaning' of content. This shifts emphasis from taxonomies (e.g. government category lists) to ontologies (meanings across applications areas), and from fixed information models to more flexible and open schemes addressing meaning (semantics).

A critical area for strategic intervention is that of ontology development[10]. Ontologies are common vocabularies and maps that allow document creators to help other agents use the

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[7] http://image.guardian.co.uk/sys-files/Society/documents/2004/06/22/HMIC_Soham_Report.pdf

[8] See IDABC - http://europa.eu.int/idabc/en/document/3761

[9] http://www.w3.org/2001/sw/

[10] See the EU funded projects related to ontology - ONTOGOV, TERREGOV, USEMEGOV, ONESTOPGOV, PICTURE, IWEBCARE, ACCESSEGOV - at
:http://europa.eu.int/information_society/activities/egovernment_research/projects/egovernment_projects/index_en.htm#terregov

information (e.g. in automated eGovernment processes). Common ontologies across organisations, regions or states require common underlying concepts and ideas in the operational domain in question. This level of harmonisation can be facilitated by technical developments, but developers require parallel agreements between domain experts – technology cannot replace the normal process of public affairs management.

3.2   Interactive services for citizens

Services for citizens range from simple information provision to interactive services such as bookings, payments, records extraction, and permit applications. The trend is towards interactive quality comparable with commercial offerings, and meets the increasing expectations of citizens. But in trying to accelerate service development and delivery in this way, public authorities increasingly recognise that 'front end' improvements often require more 'back end' support. They also recognise that not all citizens are advanced technology users. Indeed, some feel that the fetish with 'advanced' services and technologies sometimes overlooks opportunities for creativity using common technologies[11].

3.2.1   Planning and Development Support

Citizen access to planning information also requires explanation of terms, and access to planning history (e.g. what has been allowed or disallowed in the past). Traditionally this kind of support is provided via discussions and/or consultations with professionals or specialists (e.g. in considering building a house or adapting an existing house). Putting support online has required authorities to develop strategies for integrating different sources of data in a single interface[12]. Citizens can access maps to find out what regulations apply in what geographical areas, while at the same time exploring proximity of schools, traffic levels on adjacent roads, etc. Achieving such data integration requires re-engineering of back-end processes and impacts several departments whose traditional way of working has to change. These changes are supported by the approaches and standards mentioned previously.

3.2.2   Booking Systems

Local authorities operate venues where public services are offered, including medical service, sports facilities, entertainment, etc. Some progressive cities such as Bologna (IT) allow citizens to access medical booking terminals from pharmacies whereby they can arrange to see a specialist as soon as possible at the most convenient location[13]. This needed integration of sub-regional booking facilities so that a citizen can find their nearest opportunity, or soonest opportunity (in another area), and reduces service complexity and work tasks by experts who would previously have personally dealt with referrals. The collaboration between specialist groups has generated significant increases in service quality for citizens. The savings in time and effort, coupled with citizen facilitation and satisfaction, provide a significant return on investment. Such systems try to match the satisfaction obtained by citizens using face-to-face

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[11] BARRY, A. (2001) *Political Machines - Governing in a Technological Society,* London, Athlone Press.
[12] For example, the AddWijzer project http://www.addwijzer.info
[13] http://www.comune.bologna.it/ - "tessera sanitaria" (health card) - AUSL – local health service - http://www.ausl-cesena.emr.it/

booking, and so include supporting information and online access to help staff in case of problems.

3.2.3   Vital Records Extracts

Online access to vital records (birth, death, marriage, addresses, census, etc.) is easiest for genealogical research where confidentiality is less sensitive (for example, family history[14]), but is increasingly being implemented for recent data which is of wider interest for citizens and business. Ordering copies of missing documents online will save significant time and effort through avoiding queues and visits to public offices, but authorities have concerns about misuse of data and have different rules concerning access. So long as verification of recipients can be ascertained, the online ordering process can be made simple and safe. The scope for achieving a common European approach relies on harmonisation in the regulatory domain addressing identity management.

3.3   Interactive services for business

Authorities provide business support services, some of which are aimed to improve the economic viability of their region.

3.3.1   Access to Environmental Regulations

Companies wishing to locate new industrial facilities such as liquid petroleum gas stations (LPG) previously had to engage local agents to collaborate with public authorities in ascertaining likely sites for such a high-risk activity. Automation of such planning support has been assisted in regions such as the province of South Holland[15]. Experimental services have allowed business operators to access geographical data, regulations, and societal data in combination to facilitate online planning. For example, operators could identify sites where the land type, zoning plans, proximity to housing, traffic densities and overhead power etc. were all within the necessary boundaries for installation of the kind of industrial plant in question. This kind of service required collaboration of several agencies and extensions of national standards for planning data. This service could not be offered by commercial operators without the collaboration of public authorities, and illustrates the role of public authorities either as creators of innovative services to business, or as facilitators of commercial services relying on public information and standards.

3.3.2   Electronic Procurement

A typical business-to-business (B2B) application is that of online procurement, where a company bids to supply services or goods to another, secures a contract, and fulfils the requirements to secure payment. In most regions a major employer and purchaser of goods and services is the public authority. So it is hardly surprising that public authorities have begun to experiment with online public eProcurement (ePP). The process must conform to the

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[14] www.scotlandspeople.gov.uk
[15] www.pzh.nl

regulations in public authority procurement, yet can greatly reduce costs, and can facilitate access to the tender process by small and medium sized firms (SMEs) who may previously have been excluded. All public eProcurement services conform to the European Public Procurement Directive (2004/18/EC) and so make use of common standards for defining supplies, processes and security – for example in France[16].

3.3.3 Use of Citizen Data

Public authorities gather and hold substantial citizen-centric data from census, registries, electoral listings and other instruments. The data are used in different kinds of services for business (e.g. market studies, demographic analysis, etc.), or for 'address verification' (e.g. the RISER[17] project). Companies with significant spend in customer contact, needing to send catalogues or product information, can make huge savings by submitting their customer database to a verification service. Any items with errors are flagged for deletion (e.g. people have moved, address has errors, etc.). This kind of approach retains security and confidentiality yet allows commerce to benefit from public data in a safe way. Such services show how public authorities can enable commerce while protecting citizen rights. Future IST strategies must make fuller use of the potential of citizen data while protecting citizen security and confidentiality.

3.4 Enabling democratic process

ICT can help enable more flexible communications and better (secure and verifiable) voting methods, and so public authorities can in principle seek citizen views on a wider range of subjects. Projects such as e-Poll[18] clearly show how technologies such as voter-fingerprint validated smart cards, coupled with secure mobile and fixed networks plus secure kiosks, can allow secure and verifiable polling processes. The approach has been proven in France and Italy. In addition, methods such as 'webcasting' have been used in projects like eParticipate[19] whereby live audio and video of events is made available to citizens over Internet. This is cheaper than digital television, easier to manage, ubiquitous (any browser can view), and allows access to live presentations, debates and discussions.

A key challenge for future eDemocracy strategies is demonstrating how technologies can also encourage citizens to be not only interested, informed, but really 'engaged'. Engagement requires more complex interactions. Online forums, petitions and other techniques are being tried for 'consultation' yet often suffer from an inability to verify citizen identities or to ensure equality of access and representation. Forums and chat rooms can become dominated by the 'loudest voice'. Online surgeries and/or petitions can be used to 'skew' opinion by repeatedly inserting statements or opinions. Future research strategies must distinguish trustworthy practices, and ways to increase rigour.

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[16] examples at http://www.achatpublic.com/
[17] http://www.riser.eu.com/
[18] http://www.e-poll-project.net/
[19] http://www.eparticipate.org/

3.5   Exploiting public sector information

Authorities create and maintain large amounts of information. Maps, regulations, service descriptions, plans, historical texts, and other information objects are generated for and on behalf of the public. The European public sector information[20] (PSI) directive has started a process of harmonising how Member States provide access to PSI so as to facilitate firms that aggregate information resources into added-value information products (see for example the e-Contentplus programme). Practices vary in Member States and some monopolies in data still exist, such as national geographical information. Although the data is sometimes 'accessible', control and pricing do not yet reflect an open market. Future strategies need to ensure availability and accessibility, along with fair and transparent usage conditions for public sector information.

3.6   Citizen Competencies

Government expects citizens to know about the technologies, and to understand their 'uses, consequences and effects[21]'. However, citizens may or may not conform to government expectations and so the risks of failure in user-system matching are frequently not properly accounted for. Future strategies must address provision of reliable data to governments concerning citizen competencies relative to any or all technologies which are candidate for use in eGovernment services. Governments must also ensure that new eService initiatives are mindful of the most recent results of work on accessibility and user-orientation. For example, the eUSER approach[22] where "the focus will be on the needs of citizens as users of online public services in their interactions with public administrations, in the management of their health and in furthering their education and developing their skills".

4 Future Technologies

Some areas of "emerging future technology[23]" have seen rapid progress and may be ready offer support for future citizen-centric services. These include digital home, smart security, nanotechnology, where technology changes may influence service design. eGovernment strategies need to be carefully informed about the societal adoption of such technologies, and influence and lead on the adoption of technologies so that public services are readily adopted by citizens.

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[20] http://europa.eu.int/information_society/policy/psi/psi_benchmarking_study/index_en.htm
[21] BARRY, A. (2001) *Political Machines - Governing in a Technological Society,* London, Athlone Press.
[22] See http://www.euser-eu.org/Document.asp?MenuID=170
[23] There are many excellent sources of information for technology futures. There is a quarterly technology survey in the Economist (www.economist.com), and the MIT Technology Review http://www.techreview.com regularly examines trends and innovation.

4.1 Personal Monitoring

Wireless sensors small enough to swallow are now effective in monitoring the human body. Tiny devices such as the 'SmartPill' gather data about the digestive system while travelling through it and transmit information for real-time usage or for recording. Other capsules contain tiny cameras and can view the oesophagus and intestine for visualization within the body, as well as collecting pressure and temperature data. These technologies are not yet perfect but are at a stage of maturity and stability that makes them ready for examination of benefits of services exploiting personal internal monitoring[24].

4.2 Smart Security – Need to Know

Personal data files hold data items relating to many aspects of our lives yet professionals who access our records only need to know specific data items. A doctor needs access to all medical data in a file, but you may not want the insurance clerks seeing all your results. Exposing certain items could also violate various privacy laws. Palo Alto Research Centre (PARC) have developed a technology that protects and 'selectively reveals' information contained in documents, without creating multiple versions or hogging processor memory. Such approaches address the 'need to know' principle and offer ways to compartmentalise personal information in an 'integrated data scenario[25].

4.3 Digital Homes – Wireless Broadband Islands

New releases such as the Apple Mac Mini act as the interface between the person and all home devices (TV, stereo, etc.) and interlink all media on the home network to provide a single point of control. Although streaming of high-bandwidth such as video over wireless is still some way off, interconnection of devices such as PC, Xbox, Hi-fi, TV, MP3 player, cameras, etc. is so potentially useful that future strategies for delivery of services into the home must surely take account of them, as well as monitoring the development landscape and timeline to be sure to be ready for exploitation. Exploitation in this area also needs preparation of roadmaps for service delivery to ensure engagement of citizens within the 'preferred' environment as it incrementally develops[26].

4.4 Internet Evolution

The integration of devices and services via Internet poses many interesting future scenarios. One might include a patient being met at an operating theatre by nurses who are alerted by the RFID technology attached to the patient, while doctors have all vital data via the 'smart pill'

[24] HUMPHRIES, C. (2006). *Swallowable Sensors.* (September 7) Technical Review, [cited September 11 2006]. http://www.techreview.com/read_article.aspx?id=17470&ch=biotech

[25] MASHBERG, T. (2006). *Smart Pages: Xerox technology protects sensitive digital information.* (September 7) Technical Review, [cited September 11 2006]. http://www.techreview.com/read_article.aspx?id=17403&ch=infotech

[26] WATERS, D. (2006). *Digital home 'still 10 years off'.* (July 18) BBC, [cited July 18 2006]. http://news.bbc.co.uk/1/hi/technology/5187382.stm

and other internalised sensor technology[27]. At the same moment the anaesthetist is calming the patient over the wireless voice link located behind his ear. All professionals involved in this patient's care have access to relevant histories and current sensor data. Technology gurus such as Vint Cerf, interviewed by Red Herring[28], offer realistic and convincing portrayals of 'embedded technology' – embedded not just in the body, but also in the environment.

People may have personal alarms to declare when children are being dropped off from a school bus connected to the Internet, and already in 2006 we see cars that can declare fault conditions to dealerships who call the owners to arrange servicing. Although the omnipresent Internet may be modelled as 'plumbing' for society, it will be even more critical in social terms, and so governments must prepare a strategic response to preserve the necessary creativity that is enabled, while dealing with any chaotic or undesirable activities in a 'sensor network' that touches every aspect of life[29].

The combination of tags (e.g. RFID) with geo-location will mean that services can be used to locate friends, places, and events of interest. However, privacy, security and IPR will also be threatened more than ever before. At OECD considerations for managing a potentially chaotic future are already underway, and need key service agencies to participate and contribute strategic thinking. Malicious service disruption, viruses, and Internet fragility are issues of importance to the global economy and people's lives.

4.5 Social Software

A significant area of development at the moment is what can be termed social software. Until recently, services were provided in a more hierarchic way, with users pointing upstream to a service provider who could 'mediate' user interactions (e.g. AOL forums etc.). The shift is now towards peer-to-peer technologies where groups of citizens organise their own 'social space' using Internet as a free field.

BLOGS – are 'web logs' where users post personal diaries, discussions and illustrations of hobbies, personal politics, and culture. Bloggers link to other bloggers with shared tastes and so create 'tribes' around specific social and cultural themes. Government must recognise that such new communities are part of the new 'constituency' and so must be addressed, included, and consulted as any other informal citizen group.

WIKIs - are a type of website that allow the visitors themselves to easily add, remove and otherwise edit and change some available content. They are used by communities of interest to jointly develop and maintain information resources, and so also represent new types of groupings within the constituencies administered by eGovernment services. Governments must maintain knowledge of relevant citizen groupings, and must also take account of the views and opinions expressed within such communities if the concepts of 'inclusion',

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[27] HUMPHRIES, C. (2006). *Swallowable Sensors.* (September 7) Technical Review, [cited September 11 2006].
    http://www.techreview.com/read_article.aspx?id=17470&ch=biotech
[28] ANON. (2006). *The Future of the Internet.* (April 10) Red Herring, [cited April 21 2006].
    http://www.redherring.com/article.aspx?a=16391#
[29] Ibid.[cited.

'democracy' and 'consultation' are to be fully exploited. The problem is that since these phenomena are quite new, nobody has yet developed an appropriate strategy for dealing with this or any other 'social software'.

Managed Arenas – are virtual spaces where citizens are allowed to claim their own piece of 'Internet Terrain' and set up their own activities. Facilities such as 'MySpace' have grown so rapidly and have attracted such attention that they have developed into highly valuable real-estate (purchased by News Corp as advertising opportunity). Similarly, YouTube created a shared space model where citizens could post and share video and other media, and have been bought out by Google. MySpace and YouTube will continue to grow and to be joined by other shared spaces which, like town squares, will be adopted by citizens as the new tools for social interaction, social grouping, attitude formation, information sharing, and collective identification with new social values and actions.

Comparable arenas such as LimeWire also exist but do not set up a 'digital commons'. Instead, each user hosts their own space on their own PC and only the interconnection of these is managed. This kind of virtual space is even harder to monitor, and its users may be even more resistant to observation. This is partly due to the fact of its usage to trade music and media files (sometimes in breach of copyright) as well as personal creations (poems, essays, writings), and in part because of the originating ethos which is focused on younger people seeking personal space out of 'authority' control (e.g. parents, teachers, etc.). Nonetheless, such spaces are formative arenas and developing grounds for citizen opinions and new sub-cultures, and so any initiative aimed at citizen engagement must investigate how to approach, observe, understand and engage with groupings within its constituency who form and operate via digital arenas of different kinds.

In conclusion, there should be a clearer focus on technologies that use citizen-relevant channels to deliver citizen/public value, rather than just to deliver efficiency gains and cost savings. The technology component of e-Governance services should aim to use 'everyday' and commonplace technologies to maximise inclusion and utility, and to avoid unnecessary demands (skills, device purchase etc.) on citizens.