Think Paper 8: Technology Futures - and why Government should Care

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Frank Wilson and Michael Blakemore, May 2007

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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.

cceGov Think paper 8 examines the complex relationship between rapidly emerging technologies, their adoption and impact, and the attention given to technology progress by eGovernment and Information Society policies.

Think paper series editors: Trond Arne Undheim and Michael Blakemore

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1. Key Messages

- Technological innovation speed is faster than policy development cycles. It is difficult for governments to engage and promote particular devices or technologies.

- Focus on everyday technologies that are being (or are becoming) used routinely by citizens, where citizen engagement with government can be maximised.

- Focus on mechanisms and policies to maximise service accessibility and citizen engagement, through maximum communication channels.

- While there is a valid role for the EU to stimulate and provide leadership in technological innovation, there are risks involved in trying to embed future devices into policies related to service delivery for citizens.

2. Technology requires a Societal Context

The acceleration of technology development is challenging governments[1]. It took 100 years for the telephone to approach 100% penetration of homes in western society, 40 years for the TV set, twenty years for the PC, and ten years for mobile phones. All those time-spans were comfortable relative to the life-span of government policy development. However, the current rate of innovation and adoption of new technologies is even more rapid: only three years for mobile media devices such as iPod for example with its significant challenge to Intellectual Property Rights for music[2], and less for the rapid development of RFID. Policy on technology platforms and channel distribution may be destabilised by a high turnover of technologies. A focus on robotics and health sensing may need debates about rights and liabilities if autonomous robots cause harm to the humans they are caring[3] for.

Therefore there is a strong emphasis on the technological new. There is at least a yearly emphasis in consumer literature on new and advanced technology trends[4], and new devices for Christmas presents[5]. The IT industry encourages us to discard technologies faster in

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[1] LAMOUCHE, D. (2006). *There are 3 major technological trends that are of fundamental importance to tomorrow's connected world.* (October 28) World eGovernment Forum, [cited October 25 2006]. http://www.worldegovforum.com/article.php3?id_article=1288

[2] HOLAHAN, C. (2007). *Music Fans: Dismantle DRM.* (January 5) Business Week, [cited January 6 2007]. http://www.businessweek.com/print/technology/content/jan2007/tc20070105_896787.htm

[3] HENDERSON, M. (2007). *Human rights for robots? We're getting carried away.* (April 24) Times (London), [cited April 26 2007]. http://www.timesonline.co.uk/tol/news/uk/science/article1695546.ece

[4] BBC. (2006a). *Hot picks: the best tech of 2006.* (December 25) BBC, [cited December 30 2006]. http://news.bbc.co.uk/1/hi/technology/6199303.stm

[5] HOLAHAN, C. (2006). *Giving the Gift of Technology.* (December 18) Business Week, [cited December 22 2006]. http://www.businessweek.com/print/technology/content/dec2006/tc20061214_368113.htm

favour of new ones[6], something that Richard Sennett argues is where we consume by "abandonment", not "accumulation" of possessions as was the case in the past[7].

Key drivers in the acceleration scenario include the parallel processes of both differentiation (for example from fixed line Internet access to Wifi) and unification (protocols that link the variegation and allow interoperability) of networks, a focus of the EU eGovernment and eTen agendas. Then there is the rapid growth of access opportunities through new devices, a focus of the EU eInclusion agenda, the phenomenal increase in information processing power and storage capacity, and the potential benefits for business and government. The last process creates a form of ballet between information overload and information reduction.

We can access more types of networks than before, and they are increasingly accessible in a global communication scenario. Previously local community debates now resonate globally on eDemocracy sites. What were previously messages between close friends and family now are visible on blogs, virtual communities, through webcams and photo-sharing sites. We can use our computer and the Skype service, communicate with a person on a traditional landline through a third party intermediary which sorts out the charging and interoperability issues.

A key observation here is that the mechanisms through which the devices and functions are interoperated are mostly transparent to the user. Vincent Mosco applies the term banality, meaning used routinely everyday, arguing that "technology ceases to be a sublime icon when it becomes banal". Furthermore, when they become banal they are "important forces for social and economic change"[8]. A policy challenge therefore is to monitor emerging technologies and understand whether and how they will become banal. This has been the recent case with everyday use of GPS navigation technologies, which transcended the challenges of expense, complexity of use, and cost of geographic information to become available and affordable everyday use. And there has been uncertainty of consequence in mass usage, for example the unquestioning following of instructions by users who take dangerous routes, or who all take a recommended diversion that causes a new traffic jam[9].

We utilise more networks via increasing numbers of devices linked to information and service channels, and these are increasingly interoperable. The new devices have increasing technical power that allows often unexpected service innovation. Functional interoperability is commonplace when we engage with commercial services: we can book travel online for family members (while speaking to them on a mobile phone) when we are ourselves travelling around the world, paying with a credit card, choosing where tickets should be delivered. Such a process in the past would have involved significant efforts to contact travel intermediaries over a long period of time. The visible aspects of this experience are the communication, and online booking. However, the real empowerment comes from the security, verification, and the feeling of trust that the transaction is safe.

[6] GREENE, K. (2007a). *IBM's Software Predictions.* (January 3) Technology Review, [cited January 3 2007]. http://www.techreview.com/BizTech/17967/, WATERS, D. (2007). *Technology 'embraced by public'.* (January 7) BBC, [cited January 8 2007]. http://news.bbc.co.uk/1/hi/technology/6238309.stm

[7] SENNETT, R. (2006) *The Culture of the New Capitalism,* New Haven, Yale University Press.

[8] MOSCO, V. (2004) *The Digital Sublime: Myth, Power and Cyberspace,* Cambridge, MA, MIT Press.

[9] BBC. (2006b). *Sat-nav blamed for village jams.* (April 7) BBC, [cited April 21 2006]. http://news.bbc.co.uk/1/hi/england/gloucestershire/4781350.stm

Therefore, we could focus more on the business processes that produce security, verification, trust, and on how these processes allow us to functionally interoperate between devices. This, however, does not make a good sound-bite, and ignores what makes people accept and trust the underlying technologies. David Beer argues "it is essential that the everyday is not abandoned in favour of detached accounts of function and use"[10].

 It is not surprising that governments should have focused heavily on new, advanced devices. The media heavily promote new, advanced, hi-tech, and state-of-the-art, as part of the business process where old devices are demonised as being obsolete, so encouraging continuous reinvestment in new devices whose functionalities are often beyond the needs of the consumers. Richard Sennett talks, for example, of the process of "gold plating" with the iPod, where tens of thousands of tunes can be stored, yet research shows that most people listen mostly to 30 familiar tunes. Technology encourages us to possess information overload as a prize, yet we often do not develop strategies to proceed beyond our existing behaviours.

Governments therefore need to carefully examine opportunities for service improvement, as well as guard against being diverted by over-attention to gold-plated devices. Intelligent and connected services can help transform and maintain public perception of the high importance of Government-led service and social organisation and the remainder of this Think Paper examines technology-related themes that speak directly to the task of staying citizen-centred in an increasingly technology-oriented society that requires different forms of service delivery.

3. What Technologies are beyond the Web?

The World Wide Web (WWW) has dominated eGovernment thinking until now. Public Internet was built on traditional telephony networks, but still-emerging trends show more and more interconnected networks providing a basis for further evolution and opportunity. Network innovation generates instability for businesses, both in areas of infrastructure with the maintenance of fixed-line telephony versus the virtual infrastructures of Skype, and price: if the cost of a call is nothing, how can telecoms businesses maintain investment and profits? While these innovations are highly disruptive to business models and plans, it seems paradoxical that they also have the potential to contribute to delivering stable citizen-relevant services.

Voice over Internet Protocol (Voice over IP, VoIP) showed how to reduce telephony costs by passing calls from PC over Internet. This was extended by plug-in boxes to allow fixed phones in the home to do the same, and mobile PC and PDA users moved VoIP to WiFi. Now companies like JaJah and The Cloud[11] pass calls from mobile phones via WiFi to Internet. Voice and data connections may soon be possible from any device, and any place that has any kind of network. Universal service seems possible, where entry and usage costs of telephony are very low: so what role do governments have in promoting universal service?

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[10] BEER, D. (2005). *Sooner or later we will melt together: Framing the digital in the everyday.* (volume 10, number 8 (August)) First Monday, [cited August 15 2005]. http://www.firstmonday.org/issues/issue10_8/beer/index.html
[11] http://www.jajah.com/   http://www.thecloud.net/

Some municipalities arrange wireless (WiFi) networks in town centres, cities, and rural areas, to provide free or low-cost citizen access[12]. There is also a trend for citizens and organisations to allow domestic WiFi to all within reach[13]. In future there will be more wireless connection opportunities than now, and services will exploit mobile, geo-located, and on-demand opportunities. We can already transmit the location of available car parking spaces to a driver approaching a parking area, or allow booking and receiving a rail ticket using a mobile phone[14]. This also has implications for value added services because new charging models may be needed, mainly to provide maintenance and re-investment resource, yet on balance the potential for very low-cost delivery improves prospects of inclusive service design.

Trends such as MS Xbox 360, Apple Mac Mini, and now Apple TV, show how all networks and media content in "smart homes"[15] can be integrated. People near any media device can access all content and channels made available to members of that household under local control. Via rapidly emerging peer-to-peer systems, they can also make any of that opportunity available to friends and colleagues nearby via WiFi, or at distance via Internet. The distinction at home between work versus leisure applications and services is blurring, and citizens themselves make such choices. Government service design must take account of these rapid changes from push to pull consumption patterns.

Broadband will be delivered to mobile devices such as phone, PDA, and navigator[16]. Beyond this, there is scope to connect devices which are embedded processors in anything from a refrigerator to a car, from a domestic power meter to a public bus. In future cars may be called for service when their management systems show it is needed, power consumption will be monitored on a daily basis, and elderly people may be subjected to automatic domestic monitoring. Governments can look to further exploit connection possibilities beyond fleet management, transport monitoring and home care. . Some forward-looking authorities already beam car-park availability information to drivers on the move, or alert for school zones and danger areas. Citizens will have multi-service terminals in their cars and on their persons – so we can prepare for new service opportunities if we can learn about the principles of usage in such scenarios rather than being too focused on the details of specific, and often transient, devices. New possibilities will emerge wherever intelligence, connectedness, on-demand-service, and high-quality content can be used for service improvement and transformation. However, the process of "locating the person(al)" through such services does also generate issues of power demand, dignity and surveillance[17].

[12] GREENE, K. (2007b). *A Wireless Sensor City.* (April 13) Technology Review, [cited April 13 2007]. http://www.techreview.com/Infotech/18533/, WILLIAMS, I. (2007). *City of London goes Wi-Fi.* (April 16) iT Week, [cited April 17 2007]. http://www.itweek.co.uk/vnunet/news/2187858/london-goes-wi

[13] IDABC. (2007). *New on-line services for Greek enterprises through the Citizen Service Centres (KEP).* (February 6) European Commission, [cited February 19 2007]. http://ec.europa.eu/idabc/en/document/6556/194

[14] BBC. (2007b). *Hot picks: Future mobile trends.* (February 12) BBC, [cited February 12 2007]. http://news.bbc.co.uk/2/hi/technology/6340103.stm

[15] http://www.dwrc.surrey.ac.uk/SmartHome/tabid/64/Default.aspx

[16] PEW. (2006). *The Future of the Internet.* (September 24) Pew Internet & American Life Project, [cited September 25 2006]. http://www.pewinternet.org/PPF/r/131/press_release.asp

[17] MILES, I., GREEN, L., POPPER, R., KING, G. & GALSWORTHY, J. (2004). *Locating the Personal. Report of a workshop (29th June 2004) designed to explore the social and technological opportunities and challenges associated with emerging personal location systems.* Manchester: PREST, University of Manchester, 65 p. http://www.pinpoint-faraday.org.uk/downloads/prest_29062004_workshop_report.pdf#search=%22%22Locating%20the%20Personal%22%20%22

Networks are increasingly access agnostic. Different types of devices can be attached. These will include the increasingly sophisticated devices already considered, plus simpler devices such as RFID (identification tags), near field communication chips (e.g. for smart card payments), and embedded processors. Integration is not confined to the home and office, but is apparent already in networks where access is possible from many device types. Significant benefits can accrue where real-time collection of health information is cross-linked to RFID identification of a patient to the records[18], or information is achieved through minimally invasive procedures such as sensors that can be swallowed[19]. There are potential surveillance and privacy issues with technologies that are all but invisible, and the European Commission is providing leadership in this area through the RFID Consultation[20].

Technologies have become so reliable, and citizens so technology-aware, that appropriate technologies spread much more quickly than before. Citizens are forming new ways to communicate with each other and using these opportunities to share intelligence through blogs, VoiP, and social networks. In counterpoint, we should note that appropriate technology is not always the most advanced. For example, in Brazil 180 million people used electronic voting without Internet[21]. Voting terminals were deployed in remote locations, and a mixture of telephony and satellite links used to collect results. So, some banal technologies can be utilised to exploit latest services while infrastructure catches up. It is the principles that really matter, while the device level features remain transient and ever changing.

Our vision of the Internet is rapidly evolving due to massive changes in network technologies, their interconnection, the integration both within networks, and at service/device level that make the whole evolution both possible and attractive. For a time the concept of Web (the big application) displaced our vision of what really drives applications, which is an increasingly networked society. The future prospect of citizens being connected any time, in any place, means that we can make use of massive interconnection opportunities. Massive amounts of information that may pass in both directions in service channels. A major challenge is how to make sense of it all, how to give it meaning, both to citizens and to service designers. Citizens have tried to give meaning to the Internet and Web by self-organising. Hence the term Web 2.0, which originally referred to a perceived second-generation of Web-based service, including social networking sites, Wikis, communication tools, and folksonomies, all of which emphasise online collaboration and sharing among users. It has been expanded to include business and government, but experts such as Tim Berners Lee propose it no longer has coherence because there is no core organised approach, and it is still a talking shop[22].

The Semantic Web is an evolving extension of the World Wide Web in which content can be expressed in natural language, and in a form that can be understood, interpreted and used by software agents, thus permitting them to find, share and integrate information more easily. For

[18] BBC. (2007a). *Hospitals pick hi-tech clipboard.* (February 21) BBC, [cited February 21 2007]. http://news.bbc.co.uk/2/hi/technology/6383035.stm

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

[20] http://www.rfidconsultation.eu/

[21] MIRA, L. M. (2004). *For Brazil Voters, Machines Rule.* (January 24) Wired.com, [cited January 26 2004]. http://www.wired.com/news/business/0,1367,61654,00.html

[22] http://www-128.ibm.com/developerworks/podcast/dwi/cm-int082206.txt

example, "*a computer might be instructed to list the prices of flat screen HDTVs larger than 40 inches with 1080p resolution at shops in the nearest town that are open until 8pm on Tuesday evenings. To do this today requires search engines that are individually tailored to every website being searched. The semantic web provides a common standard (RDF) for websites to publish the relevant information in a more readily machine-processable and integratable form*"[23]. For example, the openness of collective efforts such as Wikipedia means the quality (error rate) is problematical[24], and by developing a semantic-Wiki[25], and marking up content for meaning, facts can be cross checked.

In attempting to exploit semantic web many governmental organisations initially generated models of society from a service provider viewpoint, and we have to better engage citizens to expose the deeper meaning of service domains of interest to government. Semantic Web approaches may enable joined-up government without central-control of the devices or channels. A challenge for governments is to model rules and information domains of interest, and to model citizen groups in meaningful and useful ways - then deploy such models is the core of new applications and services.

In addition to generating reliable models to underpin service content and operation, government also increasingly looks outward to model citizens not just as user-data but also as useful reference points for service design. User modelling as a basis for service design is well accepted[26], and is being extended by creating typologies and reference personas[27]. For example, the municipality of Aarhus in Denmark makes use of a set of personas in service design and, for each department and service category, the design team can consider each persona in turn and examine, in relation to that persona, how the service operates and whether it meets needs[28]. Using personas is one way of getting closer to matching service needs of all users through a reference system, and governments can find further ways to approach the ideal of personalised services.

4. Government, Citizens and Intelligent Services

In the original Web scenario, searching for a service meant typing the exact terms the designer had used. Now, using semantic technologies, we can find information and services using terms that do not appear in target documents at all. Emerging services such as those used by supermarkets can profile a user and match consumption behaviours to offers, for example promoting Spanish wine to a buyer of Spanish food. This is not done manually,

[23] http://en.wikipedia.org/wiki/Semantic_Web
[24] THOMPSON, B. (2006). *Not as wiki as it used to be.* (August 25) BBC, [cited August 25 2006]. http://news.bbc.co.uk/2/hi/technology/5286458.stm
[25] http://en.wikipedia.org/wiki/Semantic_wiki
[26] NIELSEN, J. & LORANGER, H. (2006). *Eight Problems That Haven't Changed.* (June 13) Wired.com, [cited June 13 2006]. http://www.webmonkey.com/06/24/index4a.html
[27] COOPER, A. (1999) *The Inmates Are Running the Asylum: Why High-tech Products Drive Us Crazy and How to Restore the Sanity,* Indianapolis, SAMS.
[28] http://www.ccegov.eu/Downloads/Anders%20case.doc

instead smart semantic technology analyses relevant texts and product descriptions and generates the relationships, so our technology is beginning to understand us. Profiling individuals, groups, and trends is becoming commonplace.

Products like Autonomy[29] and Fastsearch are used for knowledge management and knowledge mining. Autonomy emerged from previous work on matching fingerprints. Fastsearch has been used to discern relevant research results between non-communicating departments in the District of Columbia[30]. Technologies exploiting meaningful patterns will increasingly be used to drive service scenarios such as offering relevant services to customers, and there are parallels with the development of citizen-centric service delivery.

Closely related to the use of semantics and automated pattern recognition are rule-based systems. Using semantic web methods to represent rules is already established for specialist applications, for example testing Belgian bank financial services and products against Dutch fiscal policy and laws prior to opening of financial markets[31]. This technology is already being used in developing standards for exchange of rules and legal content[32], and giving rise to future-oriented projects developing ways to interchange rule-based knowledge for government process improvement, and for citizen application development in the ESTRELLA project[33].

In Budapest, the Tax and Finance Administration are already experimenting with modelling VAT legislation and using these models to automatically generate citizen and small business applications where data are gathered according to rules, and explanations are given according to rules. This example exploits technology developed by RuleBurst[34], using rule-based and knowledge-based systems to model and explain Social Security regulations in Australia for the benefit of marginalised citizens. Similar pilots are happening in many countries where harvesting of knowledge and rules can provide a reliable and verifiable basis for service design where rules, service process, and knowledge management are key themes.

In addition to citizen modelling there is significant progress already in citizen identification to support improved service design. We already have smart cards that allow service usage in many countries, where the contentious assumption is that card=citizen. Biometric identification, for example iris scanning, smart cards, near field chips in phones and PDAs, will allow public authorities to have greater confidence in who they are serving. Machine translation and real-time language translation, as it improves, may assist in maintaining culture and individuality without suffering from the nsquared-n rule of translation services.

Geographically sensitive information can be gained from GPS enabled handheld devices, and from fixed devices with known location, and so services will become increasingly location sensitive. Citizens could be advised directly of parking availability, and Government could proactively deal with geo-relevant events and data. For example, outbreaks of mugging or civil unrest can be advised to citizens who opt for such data feeds, and health and environmental

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[29] http://www.autonomy.com/content/home/
[30] http://www.fastsearch.com/ see also http://www.fastsearch.com/success.aspx?m=36&amid=1219
[31] http://www.lri.jur.uva.nl/~epower/
[32] http://www.metalex.nl/
[33] http://www.estrellaproject.org/
[34] http://www.ruleburst.com/

alerts such as pollen levels can also be advised. Governments can increasingly make use of location information to both understand who is using what services where, and who could make use of what information where. Governments are increasingly turning to maps as vehicles for social information and for citizen interaction.

Some innovative work on participatory-government in Norway has encouraged active citizens to capture geographic information of interest and to contribute this to a common pool of knowledge[35]. The AddWijzer programme[36] developed a method for linking GIS and laws to allow planners and citizens to explore their environment, and to understand how laws and regulations relate to location. This supported the standardisation of how public authorities exchange GIS information, and the linking to rules and regulations is being further developed at national level (NL) by the Legal Atlas programme[37]. Rapid developments in citizen-held technologies and network access means that Governments envisage how new services can really exploit more than the surface layer of mapping technology in more interactive services.

Citizens also have been creating innovative applications, developing their own web sites, publishing blogs (web-logs), and interlinking such communication spaces via web-rings and other linking devices to create communities and constituencies of interest online. Commerce already pays attention to and analyses these phenomena as access routes to understanding customers, and some Governments already recognise that face-to-face consultation and opinion formation can be supported by analysing readily available online public opinion and collective intelligence. Added to the self-generated spaces, we now see the rapid growth of shared-managed-spaces such as YouTube, FunkySexyCool and MySpace where shared content is generated by other users.

Taking things a step further, citizens now also actively participate in local politics by using Internet in creative ways. For example, people living near Schiphol airport (NL) were not happy that legal judgements were made on the basis of calculated noise rather than measured noise, so they set up noise measurement devices on houses, linked them to Internet, flight track information, and Google Earth, and showed that reality demanded attention because the prediction was wrong[38]. A similar situation occurred in London where citizen groups, having failed to convince public authorities to use GIS as a way of modelling civil society activities, went ahead and developed their own data for Google Mapping. This approach as later adopted by the public sector when they saw how useful it really was, and it was used to identify the optimum location for a home-study support centre for migrant children.

Governments can support citizens putting themselves online and can even use active-citizens as agents for change. Some public authorities encourage citizens to report faults in local infrastructure using post codes and addresses as location markers, or even illegal activities, and other incidents, using Internet connections, or local kiosks. Citizens will increasingly learn how to exploit the public space of Internet, so Governments can learn how to engage with communities of active citizens and new constituencies online, both to learn from them about citizen needs, and to use the opportunities afforded by collective intelligence.

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[35] http://egov.hive.no/
[36] http://www/addwijzer.info
[37] http://www.leibnizcenter.org/general/legal-atlas
[38] http://radar.vlieghinder.nl , and www.geluids.net

5.Smart Devices for Smart Users and Uses

The evolving Internet, the widening range of access opportunities, knowledge management techniques for mass content, and the inclusion of semantic technologies for knowledge processing, are soft technologies that contribute to the opportunities for increasingly citizen-centred services. In their interactions with new service opportunities, the rapidly evolving hard technologies will play a key role in re-shaping how services are both deployed and used. This section explores why governments are excited by new technology devices, and argues that government should not fund device discovery with an assumption that it can then be embedded in policy, but should understand how new technologies are being consumed by citizens. Much investment by government has been in the production of devices, often in the absence of serious attention to how citizens are consuming those devices as technologies.

Hard disks are getting very large, and in line with Moores Law[39] the cost/power ratio continues to decrease[40]. However, these devices consume power, generate heat, and are hard to manage as personal storage, so will be replaced with solid state memory, such as flash, as price decreases and capacity increases. When coupled to domestic networks, personal archives, and shared intelligence strategies by citizens, there will be more collective intelligence and available content. The need for semantic encoding, tagging, and processing, will increase, as will opportunities for knowledge based systems underpinning services. We currently rely on screens and keyboards as the basis of interaction, but high powered LCDs are already enabling small-scale projection and are predicted to replace large projectors within five years (Sony already have a palm-sized unit[41]).That means a PDA or Phone can in future carry a projection capability to show maps, graphics and documents on any suitable surface in large scale. This technology is already being used to project virtual keyboards[42] for full scale typing into small personal devices (storage and/or communication). Add to this the thin-film roll-up screens already emerging, and new technologies such as re-usable paper and it is clear that in future citizens will have a whole new range of interaction opportunities.

There have been predictions of the disappearing computer and in each 5-year cycle researchers have created a new vision of how they will disappear. The market is now showing how, and we see games consoles with more power than the average PC running advanced 3-D graphics rendering, and at the same time acting as Internet channels and integrators for home entertainment. The message is clear: the PC as we know it will continue to transform, and citizen needs for interaction, storage, and processing will be serviced by an increasingly diverse range of devices and services. Governmental services will have to continually adapt to such changes and so should concentrate on service and content, and ensure the final delivery and interaction components are flexible and easily replaceable.

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[39] http://en.wikipedia.org/wiki/Moore's_law
[40] This is also encouraging email providers, such as Yahoo, to offer 'unlimited' storage for users. By encouraging that process the email providers will be able to offer new services in organising, visualising, and communicating the resultant information overload.
[41] http://ledsmagazine.com/news/3/6/17/1
[42] http://www.gizmag.co.uk/go/2864/

Widespread use of RFID, micro-sized transmitters, nanotechnology, and near field chips will allow inter-device communications, tracking, security and intelligent survey. In March 2006 Philips (NL) launched a world-wide initiative on Near Field Communications (NFC), a short range wireless technology designed for proximity applications such as payment and ticketing simply with the swipe of your mobile phone[43]. This kind of technology is moving so rapidly that high penetration of markets is expected in only a couple of years. Citizens will be using mobile phones equipped with this kind of chip, and banks, transport companies and other supply chain partners will quickly capitalise on new commercial service opportunities. Interoperability will see phones replacing smart-card and other travel and payment control methods[44]. Along side this high-end service technology, passive or semi passive chips such as RFID (stuck to products and items such as books for scanning) and small transmitters will rapidly change our approach to retailing, marking for security, tracking and surveillance. The scope for identifying and interacting with citizens will be greatly expanded.

Navigation, GPS, GIS and other related technologies are converging rapidly. Already we are seeing early versions of such devices adapted for blind people, including links to speech to guide a person in an unknown area. It will not be long before the average mobile phone, PDA, is equipped as standard with car-quality navigation linked to other service processing features. Not only will citizens be able to ask where the nearest cinema is, browse its films, and book instantly, but they will be able to sign up for alerts that are geo sensitive (e.g. there is a shoe sale opening 100 meters away from you right now)[45]. In this kind of situation Citizens expectations will change very rapidly and Government services may both exploit the new opportunities, and be expected to operate in the same flexible, geo-relevant and immediate way. On that basis there is a clear leadership role for the EU in effectively mediating experience, practice, and knowledge through the European Good Practice Exchange[46].

This Think Paper has explored the paradoxical relationship between citizens and technology. Zygmunt Bauman asks whether we risk becoming redundant through smart devices that think for us[47], and he presents a critical challenge: "Can public space be made once more a place of lasting engagement, rather than of casual and fleeting encounters? A space of dialogue, discussion, confrontation, and agreement"[48]. We should choose and use technologies that have relevance to citizens, but also be aware of the most advanced so they are not bypassed: the semantic trend will continue, and built-in interoperability will be critical. We should study, evaluate, and continuously understand citizens and their needs. Overall, if we are to recapture real and virtual public space as a place of engagement, then we should refocus Governmental thinking from the specifics of devices towards the general trends and principles emerging in the new technology landscape.

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[43] http://www.usa.philips.com/themes/themesarchive/section-13557/mt_theme_2005_42_smartcards_large.html

[44] HOGG, C. (2006). *Cashing in on mobile-crazy Japan.* (June 1) BBC, [cited June 5 2006]. http://news.bbc.co.uk/1/hi/world/asia-pacific/5033942.stm

[45] SYLVERS, E. (2007). *Wireless: Tracking what people do on their cellphones.* (March 25) International Herald Tribune, [cited April 22 2007]. http://www.iht.com/articles/2007/03/25/business/wireless26.php

[46] The European good practice exchange, www.ePractice.eu, is a service to the professional community of eGovernment, eInclusion and eHealth practitioners and shall be an interactive initiative that empowers its users to discuss and influence open government, policy-making and the way public administrations operate and deliver services. The service will be a platform for good practice advice and news, which are timely, relevant, and contribute to growth and jobs in Europe. In particular, it will enhance efficiency and effectiveness in public service delivery.

[47] BAUMAN, Z. (2005) *Liquid Life,* Cambridge, Polity Press.

[48] Ibid.