

Understanding and Measuring eGovernment: *International Benchmarking Studies*

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Abstract

This paper is aimed at those involved – in planning, in undertaking, in using or in evaluating – the benchmarking or measurement of e-government. It draws on models of e-government and experience of benchmarking to answer four questions: why benchmark e-government? what to benchmark? how to benchmark? how to report? It provides a series of recommendations based on good practice or innovative practice, backed up by a set of conceptual frameworks and statistical findings. There is a particular sensitivity to benchmarking e-government in the "majority world": the developing countries that are home to 80% of the world's population but, as yet, just 20% of e-government users.

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A. Why Benchmark?

eGovernment benchmarking means undertaking a review of comparative performance of e-government between nations or agencies. eGovernment benchmarking studies have two purposes: internal and external. The internal purpose is the benefit achieved for the individual or organisation undertaking the benchmarking study. The external purpose is the benefit achieved for users of the study.

Little or nothing is made explicit about internal purpose in benchmarking studies. It could be synonymous with the external purpose but equally it could relate to a desire to raise the profile or perceived expertise and legitimacy of the individual or organisation in e-government, or it could relate to a desire to attract funds or win additional e-government business. Where a benchmarking report has a sales and marketing function, this could be in tension with development goals. At the very least, it makes sense to ensure that study implementers are themselves clear about their internal purpose even if this is not publicised.

Recommendation 1: Clarify The Internal Purpose Of Benchmarking

External purpose is a more complex issue to deal with and will involve an iterative identification of demand (or need) for e-government benchmarking information, identification of the audience for the study, and evidence about the use to which study findings will be or are being put (see Figure 1, developed from Janssen et al 2004).

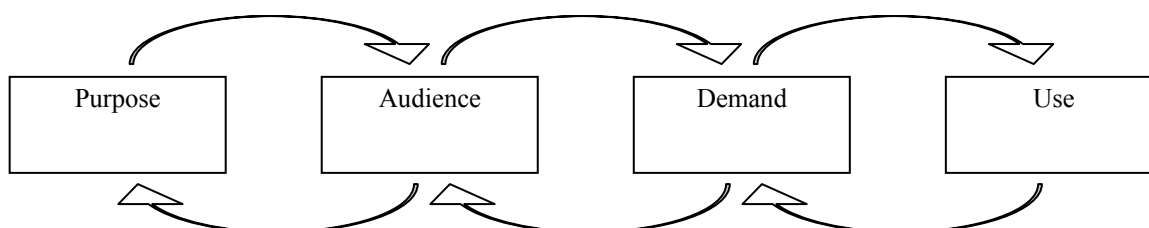


Figure 1: Determining the External Purpose of eGovernment Benchmarking

The main audience for e-government benchmarking is e-government policy makers: this is sometimes explicit (e.g. UN 2005), sometimes only implicit (e.g. Accenture 2005), and sometimes absent (e.g. West 2005). Typical sub-audiences may include other e-government practitioners such as consultants, private IT firms and lower-level public officials; and academics (UN 2005).

Deriving from the main audience, the main purpose of benchmarking is typically either:

- a) *retrospective achievement*: letting policy makers know in comparative terms how their country or agency has performed in some e-government ranking (e.g. "It is a useful tool ... to gain a deeper understanding of the relative position of a country vis-à-vis the rest of the world economies" (UN 2005:13)); and/or
- b) *prospective direction/priorities*: assisting policy makers with strategic decision-making about e-government (e.g. "we aim to help governments identify the course of action that will most likely deliver high performance in eGovernment." (Accenture 2004:2)). For some studies, prospective guidance may be more at the

tactical level of individual e-government projects; for example, offering lessons learned or best practices for such projects (e.g. OeE 2001); and/or

There is also an audience hardly ever mentioned – citizens and civil society organisations – for whom benchmarking may provide a purpose of:

c) *accountability*: enabling governments and agencies to be held to account for the resources they have invested in e-government. Ministries of Finance/Treasuries may share an interest in this purpose. For all these groups, e-government officials may have their own purpose of using benchmarking in order to justify politically their investments in e-government.

There is little explicit evidence about the demand for benchmarking studies, though in some cases they arise out of e-government practitioner forums (e.g. Capgemini 2004) or are conducted by e-government agencies (e.g. OeE 2001). One can make an assumption in such cases that benchmarking has been demand-driven. However, in general, there is a knowledge gap around the demand for benchmarking data; particularly around demand among e-government and other officials in developing countries: we know very little about what data these senior civil servants want.

This issue is of particular relevance to benchmarking readiness for e-government because a Euro-centric perspective might suggest that the time for such studies is past. As e-government activity grows over time, the key issues – and, hence, the demand for benchmarking data – are felt to change over time, as illustrated in Figure 2 (adapted from OECD 1999, ESCWA 2005).

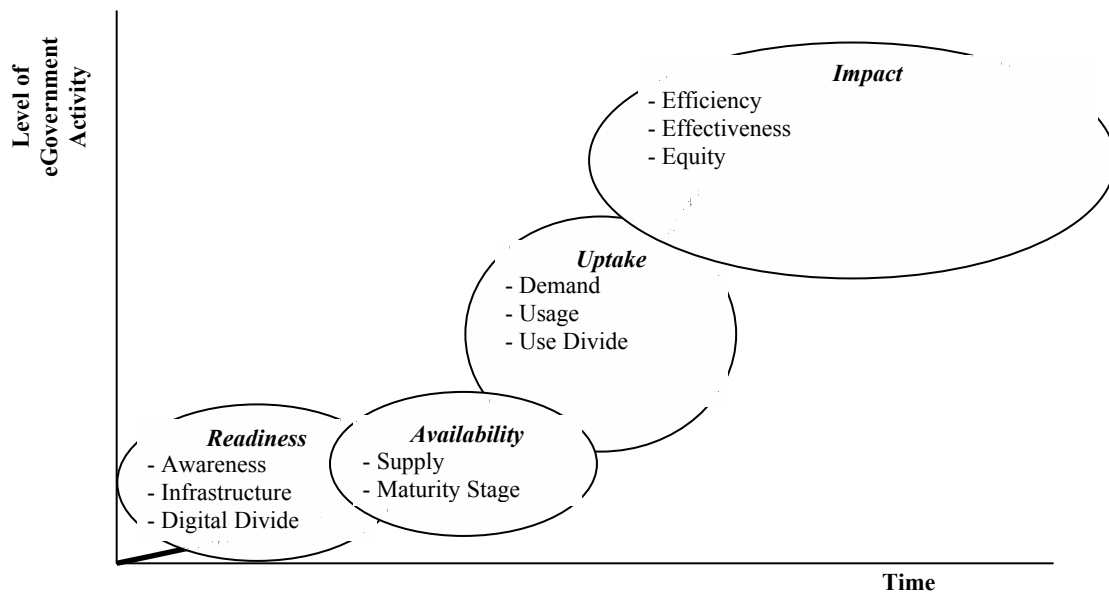


Figure 2: Changing eGovernment Issues Over Time

In part these changes could be ascribed to the policy lifecycle, illustrated in Figure 3 (adapted from Stone 2001, Janssen et al 2004).

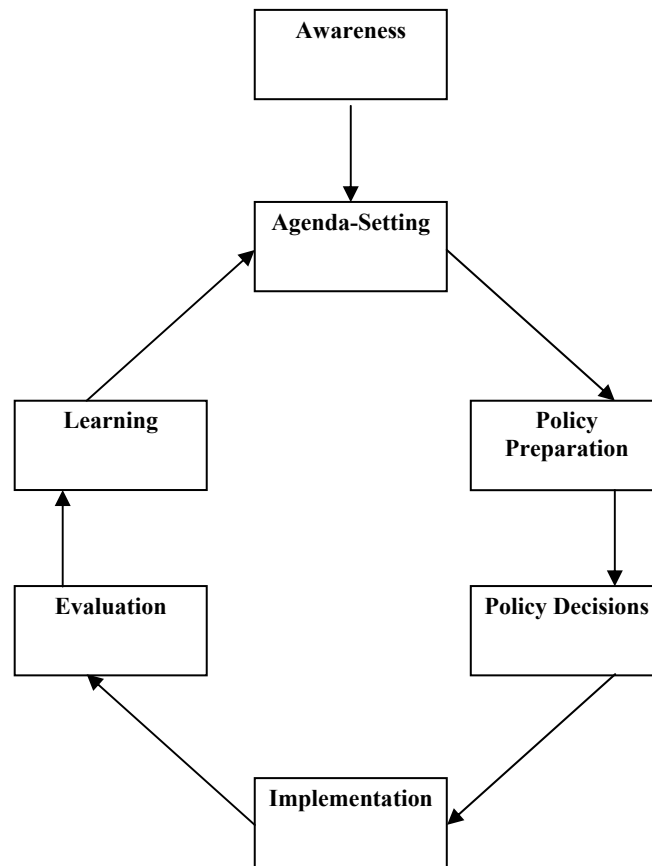


Figure 3: The Policy Lifecycle

The demand (and thus external purpose) for e-government benchmarking is likely to change as policy makers move through the cycle:

- For policy makers entering the *awareness stage*, the demand might simply be for help in understanding what e-government is.
- For policy makers at the *agenda-setting stage*, demand might come more from those seeking to encourage adoption of e-government onto the policy agenda, focusing on the carrot of good news/benefits stories and the stick of poor comparative benchmark performance.
- At the *policy preparation stage*, policy makers will likely demand an understanding of alternatives and priorities, comparisons with other countries and best/worst practices.
- Finally, at the *evaluation stage*, they may demand both comparative performance data and the reasons behind that comparative performance in order to move to *learning*.

At a broader level, however, one may see that, once a policy cycle is completed, policy makers move on to a new cycle, with a new issue. One can therefore hypothesise a set of e-government policy cycles that move through the Figure 2 issues: a readiness cycle giving way to an availability cycle, then an uptake cycle and so forth. In the industrialised countries, there might be a sense of this from the

changing nature of studies (see also EAG 2005). Table 1 shows the main focus of 64 e-government benchmarking reports (developed from eGEP 2006a), where there has been a change of modal interest from readiness to availability to uptake to impact over time.

<i>Year</i>	<i>Readiness</i>	<i>Availability</i>	<i>Uptake</i>	<i>Impact</i>
2006				X
2005			X	XXXXXXXX
2004	X	XXXXXXXX	XXXX	XXXXX
2003	XXXXX	XXXXXXXX	XXXXXXXX	XXXXXX
2002	XXX	XXXX	X	XX
2001	XX	XXXXXX		
2000	XXXXX	XXX	XXXX	

Table 1: Main Focus of eGovernment Benchmarking Studies Over Time

So, is the era of concern about readiness already gone? Arguably not because of the Euro-centricity of the points just made. Industrialised country governments and some benchmarking reports written for those governments may be moving to a level of e-government activity and a policy cycle beyond issues of readiness. But that is not necessarily true of the majority of the world's nations, in which the seven core elements of readiness for e-government still appear to be part of current agenda and policy discussions (Heeks 2002, UNESCO 2005):

- Data systems infrastructure
- Legal infrastructure
- Institutional infrastructure
- Human infrastructure
- Technological infrastructure
- Leadership and strategic thinking
- eGovernment drivers

Note, though, the word "appear" since we do have so little evidence about that state of e-government policy-making in developing countries, and about the data demands of policy makers.¹

Recommendation 2: Clarify The External Purpose And Audience For Benchmarking

Recommendation 3: Commission A Quick Study On Demand For Benchmarking Data

¹ UNICTTF (2005) undertook a survey of national statistical organisations which include questions about demand for general ICT indicators; this demand was generally perceived to be high. It acknowledges, however, that assessing demand from the producer rather than user perspective is a limitation of its survey and notes "The existence of national ICT policies would indicate demand for indicators, however no information on indicators used in the national policies is available yet." (p6)

Box 1: Beyond eGovernment?

Aside from the particular benchmarking issues, is it time to stop focusing on e-government? Strategy in government moves through four stages of relations between information and communication technologies (ICTs) and public sector reform (Heeks & Davies 2001):

- *Ignore*: ICTs are entirely disregarded in considering reform.
- *Isolate*: ICTs are included but disconnected from the reform process.
- *Idolise*: ICTs become a centrepiece of reform, seen as the transformative lever.
- *Integrate*: Reform goals are the ends, and ICTs are an integral means to achieve those ends.

The peak of interest in e-government occurs when groups of officials enter the "idolise" phase, creating a demand spike for data from studies and reports. But what happens after this? In some cases, there is a post-hype bursting of the dot.gov bubble, with officials simply falling out of love with e-gov and moving on to seek the next silver bullet. In other cases, there is a move to the "integrate" approach, with ICTs subsumed within a broader vision of and interest in transformation. In either situation, there will be a fall-off in demand for e-government data.

Evidence for this analysis is scanty but we can claim a few straws in the wind:

- The US National Academy of Public Administration's ending of its e-government programme and the absence of e-government from its 2006 "big ideas" list.
- 2003 being the peak year for number of e-government benchmarking studies reported by eGEP (2006a).
- The virtual "without a trace" disappearance of the once much-publicised e-government targets in the UK.
- Accenture's 2005 refocusing and rebranding of its annual e-government survey to centre on customer service.

However, as per the main text discussion, such signs from the industrialised world (and one might be able to cite counter-signs) do not reflect demand in the majority world where interest in e-government still appears to be growing; but absence of demand studies makes any conclusions on this tentative.

Evidence on demand for e-government benchmarking data can help guide the purpose and content of a study. Evidence on use of e-government benchmarking data can help guide evaluation of a study, and the purpose and content of any subsequent studies. Governments performing well in e-government rankings certainly do make use of that fact in press releases and other publicity (see e.g. TBCS 2004, FirstGov 2006). And there is an assumed use of data to guide e-government strategy (e.g. Janssen et al 2004). As per demand, though, there seems to be very little evidence about key usage issues: Do policy makers and others make use of the data provided by benchmarking studies? If so, what data do they use? And how exactly do they use it? Without such evidence we are limited in our ability to evaluate the impact and value of e-government benchmarking studies, and in our ability to guide future studies.

Recommendation 4: Commission A Quick Study On Usage Of Benchmarking Data
Recommendation 5: For Regular Benchmarking Series, Create A User Panel To Provide Feedback

B. What To Benchmark?

B1. Scope of eGovernment

Components of eGovernment

We can readily categorise the nature of e-government, as per Figure 4 (adapted from Heeks 2002).

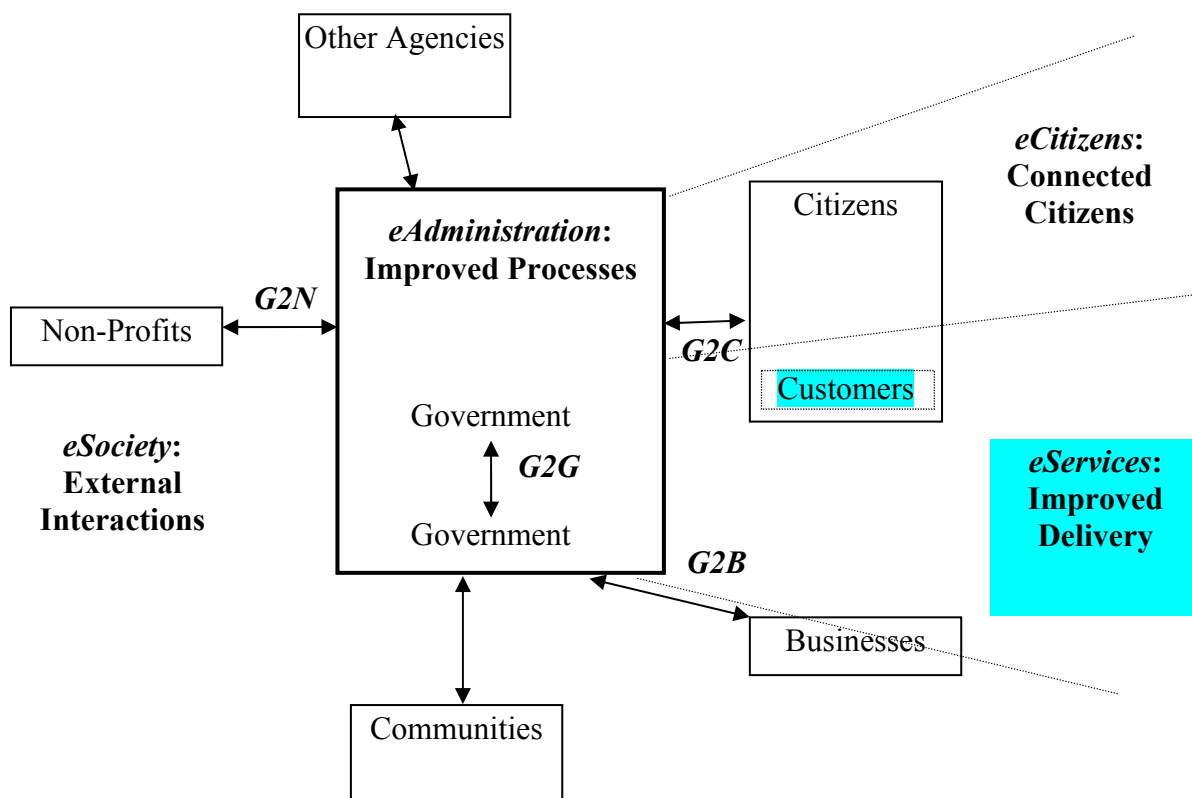


Figure 4: The Components of eGovernment

Within this potentially broad scope of e-government, the majority of benchmarking studies have focused on citizen-related e-services (Janssen 2003, Kunstelj & Vintar 2004). One may see acknowledgement of the constraints this places on benchmarking as good practice (see, e.g., UN 2005:14). Nonetheless, these are constraints that – within the time and cost boundaries that all benchmarking studies must work to – one might try to break free from.

Why? In an overall sense, because there are question marks over citizen-related e-government:

- Citizen contact with government is relatively rare. In the US, for example, only half of survey respondents had contacted any level of government in the previous year and, of those, two thirds rated their contact rate as less than every few months (Horrigan 2005). Likewise, use of e-government by citizens is relatively rare – the number of citizens accessing e-government in the past one year is about one-half to one-third the number who have ever accessed e-government, suggesting up

to two-thirds of those using government Web sites do so less than once a year (Accenture 2005).

- The total number of citizens ever making use of e-government worldwide is relatively small. Figures for the majority world of developing countries are lacking but we can estimate these, given we have an estimate of the number of Internet users in developing countries (e.g. ITU 2006 for 2004 estimates). We then need an estimate of the proportion of Internet users who have ever accessed e-government. In industrialised countries, this figure is approximately two-thirds (TNS 2003, Accenture 2004, Horrigan 2005). However, it is likely to be much less in developing countries given the far more limited availability of e-government services. Figures from TNS (2001, 2002, 2003) provide figures ranging from 10% of Internet users ever using e-government at the lowest end of developing/transitional economies to around 40% (for Malaysia) at the highest end. This is a significant range so, in taking 25% of Internet users as an average figure it must be recognised that this is a very rough average. We can use it, though, to provide estimates for the apparently very small fraction of citizens in developing countries that has ever accessed e-government: see Table 2. Figures for other countries (Europe including Russia and other transitional economies, Japan, Israel, Canada, USA, Australia, New Zealand) use an average 60% of Internet users ever accessing e-government. Put together, these show that developing countries provide 80% of the world's population but 20% of its e-government users.

<i>Region</i>	<i>Ever Accessed eGovernment</i>	
	<i>Absolute</i>	<i>% Population</i>
Africa	5.6m	0.7%
Americas	16.3m	3.0%
Asia	60.0m	1.6%
Oceania	0.12m	1.4%
<i>DCs Total</i>	<i>82m</i>	<i>1.6%</i>
Middle- and high-income countries	320m	25%
<i>World Total</i>	<i>402m</i>	<i>6.3%</i>

Table 2: Very Rough Estimate of Citizen Use of eGovernment in Developing and Other Countries

- There appears to be a negative relationship between citizen attitudes to e-government and usage rates/sophistication of e-government for citizens: attitudes are most positive in those countries with the lowest rates of e-government use/sophistication, and vice versa (Graafland-Essers & Etedgui 2003, Accenture 2005). One (small) study of disadvantaged users in the US found that, following training, two-thirds had visited a government Web site but that not a single one intended to do so again (Sipior & Ward 2005).
- By far the main use of e-services by citizens is to access information from government Web sites rather than actual services (only 10-25% of e-government users undertake transactions (TNS 2003, Accenture 2004), and even for e-government "front-runner" services only 5-10% of transactions are undertaken online: the remainder still occur offline (Ramboll Management 2004)). But this acquisition of data is just the first step in an information chain (see Figure 5) that requires the presence of many other resources if it is to lead to a developmental

impact on citizens' lives. To turn that e-government-based data into an impact requires that the data be assessed, applied and then acted upon. This requires money, skills, knowledge, motivation, confidence, empowerment and trust among other resources. Yet e-government itself does nothing to impact these other resources. It is therefore only one small part of a much bigger picture required to make an impact on citizens' livelihoods.

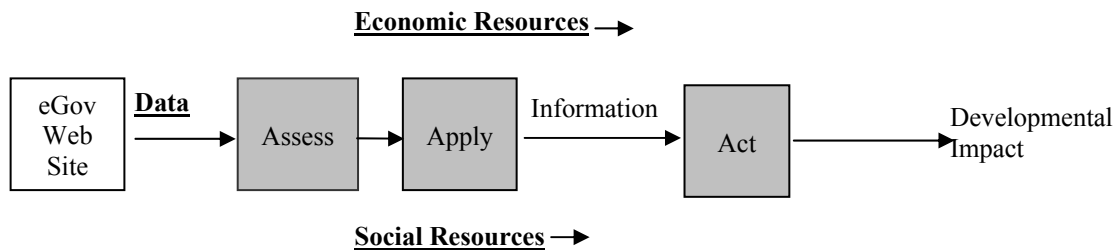


Figure 5: Citizen Use of eGovernment Data – The Information Chain

We can also frame an argument for the necessity of benchmarking beyond just citizen e-services in terms of the other e-government components. First, **G2B** – with the goal of improving public service to business – should not be ignored. Of those benchmarking reports that do encompass e-services, most focus only on citizens and ignore businesses as users; yet there is evidence of a need to reverse this emphasis:

- In 2002 in the EU, the most popular e-government service for citizens (library book search) was used by less than 10% of citizens; the most popular e-government service for businesses (online submission of statistical data) was used by 23% of businesses (Graafland-Essers & Ettegui 2003).
- In 2003 in the UK, 18% of citizens had some online interaction with government (TNS 2003) but 35% of UK businesses did so (DTI 2004).
- Economic return on investment in e-government can be calculated via its impact on three cost stages of interacting with government: finding relevant government procedures, understanding government procedures; and complying with government procedures (Deloitte 2004). From this approach, it is government interactions with businesses much more than citizens which delivers e-government ROI.
- Perhaps reflecting this notion of higher demand and higher returns plus higher IT readiness among businesses, G2B services are more developed. In 2004, in the EU, 68% of sampled e-government-for-business sites offered full electronic case handling compared to just 31% of e-government-for-citizens sites (Capgemini 2005).

Second, because **G2G** – with goals such as cutting costs, decentralising power, managing performance, and improving strategic decision-making – should not be ignored. eAdministration has not been addressed by global benchmarking but it has a key role to play:

- In terms of most e-government stage models, the final stage (be it called integration, transformation, sharing, etc) requires back office changes; in other words significant G2G developments (Goldkuhl & Persson 2006).
- In practice, the most successful approaches to e-government are characterised by a "dual focus on back office integration and front office service delivery" (BAH

2002:18) so that "backoffice changes are required to achieve results" (Capgemini 2004:3; see also Kunstelj & Vintar 2004).

- Benefits of e-government are perceived mainly to relate to change in internal government agency processes (NOIE 2003, Capgemini 2004).

Third, because **e-citizens** applications – with goals of talking to citizens and listening to citizens – should not be ignored:

- eCitizens applications cover issues of e-accountability, e-participation and e-democracy, the goals of which are fundamental to good governance (Kaufmann et al 2005). Concern about delivery of good governance therefore requires concern about e-citizens.
- Without a focus on e-citizens applications, there is a danger of digital exclusion; in other words of the inequalities between the "haves" and "have nots" being exacerbated by e-government (EAG 2005).

Fourth, because **e-society** applications – with goals such as working better with business, developing communities, and building partnerships – should not be ignored.

- Reform based on new public management attempts to shrink the role of the state to "steering not rowing", thus requiring a stronger partnership role with private and civil society organisations (CSOs) that will join the state as service providers (Heeks 2001).
- For developing countries particularly the state's capacity is much less than necessary to deliver on its roles. It is therefore obliged to rely on other organisations – largely those of civil society – particularly for service provision (Edwards 2003).

Recommendation 6: Seek Ways To Incorporate The Breadth Of eGovernment Components Within Benchmarking

Levels of eGovernment

We can categorise at least five potential levels of e-government, as per Figure 6.

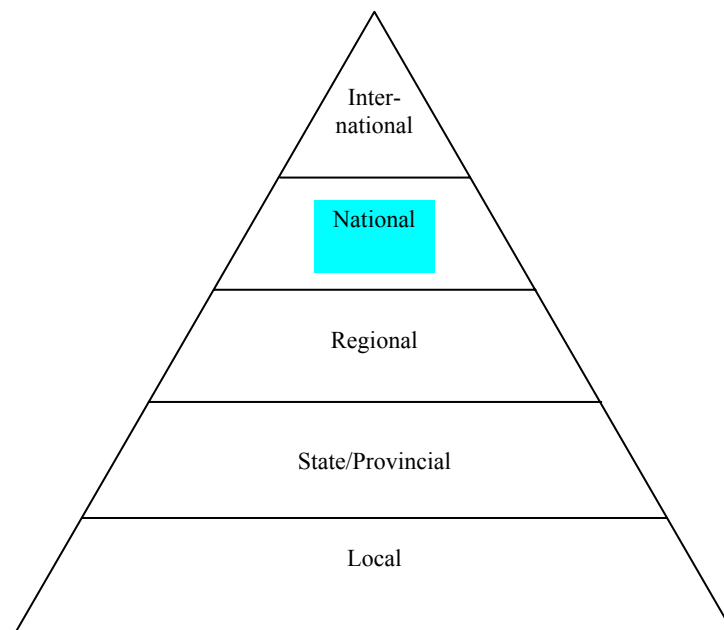


Figure 6: Levels of eGovernment

The majority of benchmarking studies have focused on national e-government. National e-government provides, of course, an appropriate basis for cross-national benchmarking. For some developing countries, it represents the only location for e-government. However, this does bring with it some limitations:

- In industrialised countries between one-half and fourth-fifths of government contacts are at sub-national level (Carbo & Williams 2004, AGIMO 2005, Horrigan 2005). In developing countries, it is local governments particularly that are the main point of contact for delivery of services and for delivery of national programmes (Amis 2001, Page 2006). Hence they are a critical location for applying ICTs in pursuit of national development goals (Jensen 2002).
- Lower tiers of government may be more innovative in e-government than the national level due to lower barriers to change (e.g. Paquet & Roy 2000). In many countries, this may be more than counter-balanced by the severe resource constraints, leading to diffusion graphs similar to that portrayed in Figure 7. Even in this situation, though, e-government at lower tiers is of increasing importance over time: one straw in the wind is the e-government case studies listed at the World Bank e-government web site (World Bank 2006a): more than half are at state and local level.

Recommendation 7: Seek Ways To Incorporate Appropriate Levels Of eGovernment Within Benchmarking

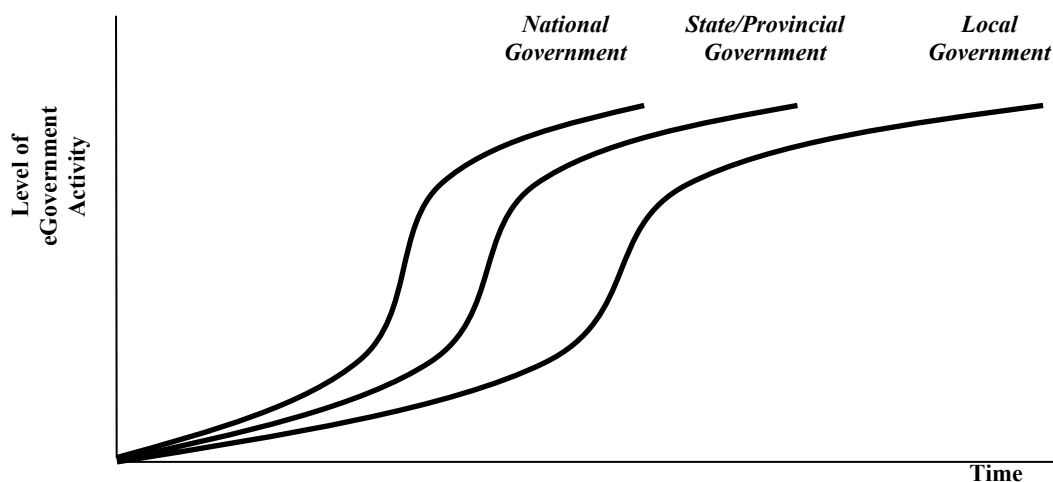


Figure 7: Hypothesised Diffusion of eGovernment at Different Levels of Government in Developing Countries

Channels of eGovernment

eGovernment can be defined as the use of information and communication technologies by public sector organisations. As such it encompasses a variety of potential delivery channels (see Figure 8, adapted from Cabinet Office 2000).

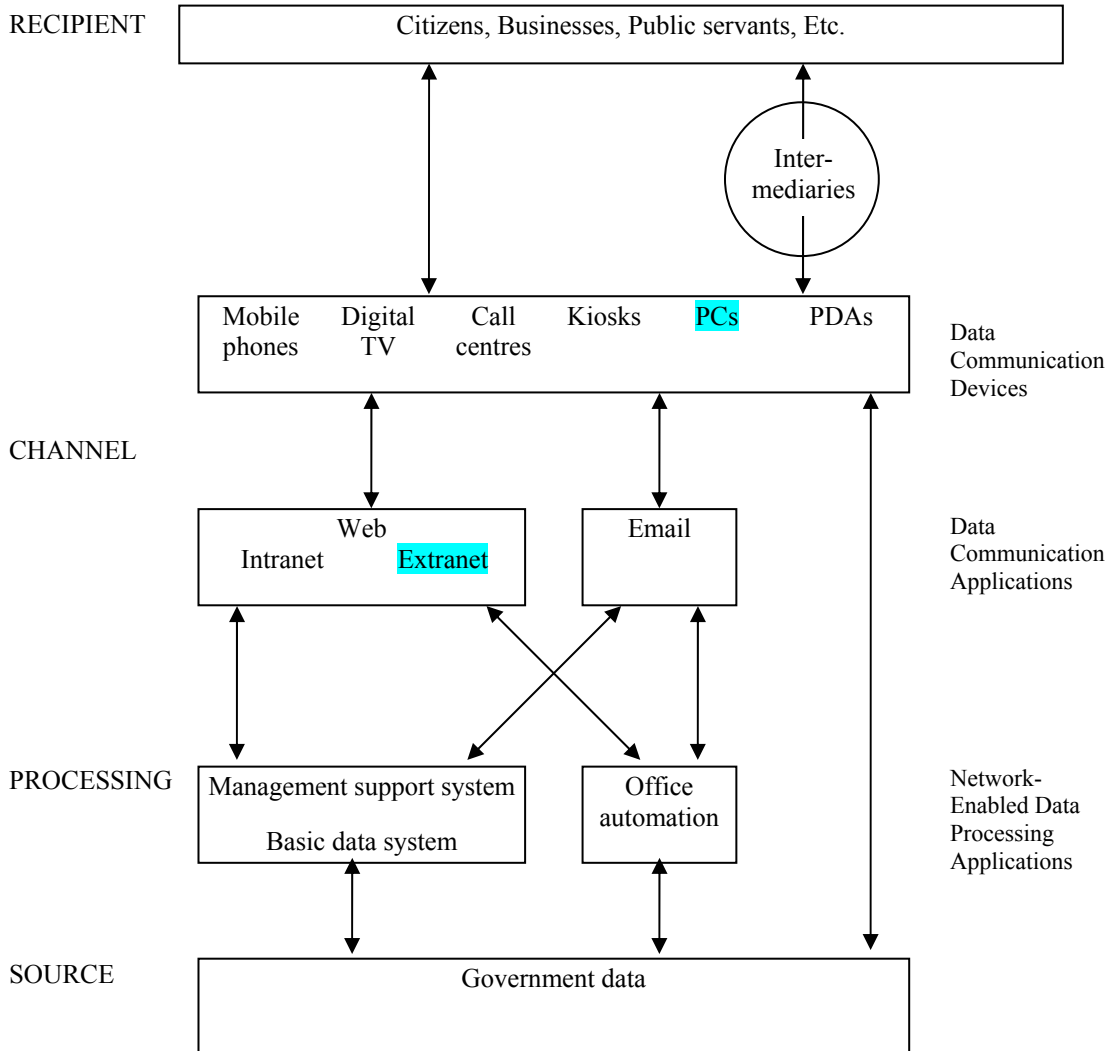


Figure 8: The Architecture of eGovernment

By and large, the focus of benchmarking studies has been Web-based communication delivered via a PC. The assumption – explicit within industrialised country-focused studies; implicit otherwise – is that the PC will be directly accessed by the recipient. However, even in industrialised economies this reflects neither practice nor preference in interaction with government:

- Telephony dominates channel usage in some situations: Accenture (2005) reports 63% of industrialised country respondents contacting government by telephone; compared to 31% using the Internet over a 12-month period.
- In-person visits dominate in other situations: an Australian survey reports half of government contacts to be face-to-face compared to one-fifth undertaken via the Internet (AGIMO 2005).

- Survey data also reflects an ongoing preference for telephone or in-person channels especially for transactional, problem-solving, urgent and complex interactions (AGIMO 2005, Horrigan 2005).

These figures are changing over time – visits to government web sites are growing; the profile among Internet users (a grouping which has only plateaued in size in a few of the industrialised economies) is more pro-Internet; and there seems to be a fairly ready incorporation of government Web sites into citizens' information searches (Graafland-Essers & Etedgui 2003, Accenture 2004). However, we should not seek to deny the reality of current usage and preference patterns.

Recommendation 8: Encompass The Multi-Channel Realities Of Government Interactions, For Example, By Investigating Channel Integration

Data from developing countries is very limited but suggests a "same but more so" picture. For example, Accenture (2005) reports that in emerging economies 67% of those with a home phone (a sample significantly skewed towards higher-income groups) had used in-person interactions with government compared to 11% using online channels in the past year. To this, we can add two further issues:

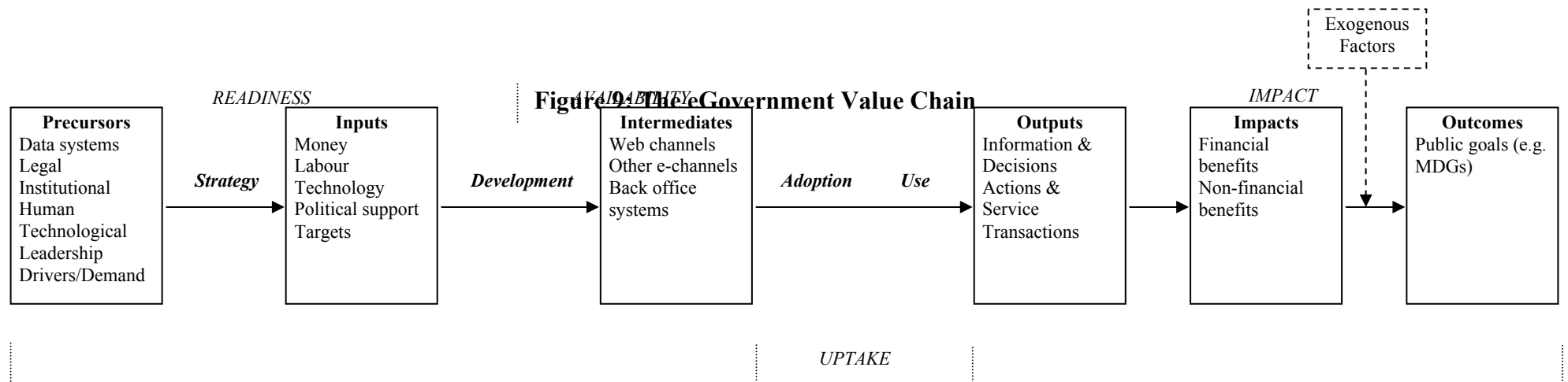
- Given Internet usage rates of, for example, less than 3 per 100 population in Africa (and with that use heavily skewed towards a small high-income fraction of the population), models of e-government anticipating direct use of the Web by citizens are inappropriate for the majority of the world's population for the foreseeable future (Heeks 1999, ITU 2006). If e-government services are to impact this group, it will be through intermediated models: for example, assisted use at a village kiosk or town telecentre.
- Developing country governments and related international actors during the final years of the 20th century and first years of the 21st have been telecentre-focused. As a result they have, to some extent, been blindsided by the growth of mobile telephony in developing countries. Yet, for example, there are now over five times more mobile phones than PCs in Africa, with growth rates for the former being over 50% per annum, while the latter grows at just over 10% per annum (ITU 2006). Even in Europe, cell phone usage outstrips that of PCs and there is intense interest in m-government: delivery of government information and services to phones (e.g. Cross & MacGregor 2006)

Recommendation 9: For Global Or Developing Country Benchmarking, Take Account Of Intermediated Access To eGovernment

Recommendation 10: Investigate Ways To Incorporate mGovernment Into Benchmarking

B2. eGovernment Value Chain

Figure 9 illustrates the "e-government value chain" – a summary of the way in which e-government turns inputs into outcomes (developed from Flynn 2002, Janssen et al 2004, Capgemini 2005). Benchmarking studies can choose to measure simple indicators from this chain, as described in Table 3, or calculated indicators, as discussed later.



<i>Value Chain Stage</i>	<i>Sample Measure</i>	<i>Sample Indicator</i>	<i>Sample Data-Gathering Method</i>
<i>Precursors</i>	Telecommunications infrastructure	Mainline phones per 1000 population (UN 2005) Internet users per 1000 population (UN 2005)	Official statistics: international agency (UN 2005)
	Human resource infrastructure	UNDP education index (UN 2005)	
<i>Strategy</i>	Presence of eGovernment Strategy		
<i>Inputs</i>	Money	Annual government expenditure on IT (Heath 2000)	Official statistics: government (Heath 2000)
<i>Development</i>	Development best practices	Extent of use of public-private partnerships (OECD 2004) Lessons learned (OeE 2001)	Internal self-assessment (OeE 2001, OECD 2004)
<i>Intermediates</i>	Quality of government Web sites	Navigability rating for Web site (Moore et al 2005, Petricek et al 2006) Nodality of Web site (Petricek et al 2006) Bobby/W3C accessibility of Web site (Choudrie et al 2004, Cabinet Office 2005, UN 2005) Privacy rating for Web site (Choudrie et al 2004) Connectivity of e-government sites to NGO sector (Kuk 2004)	Third-party Web assessment (BAH 2002, Accenture 2005, Cabinet Office 2005, Capgemini 2005, Moore et al 2005, UN 2005, West 2005) Web metrics and crawlers (Choudrie et al 2004, Kuk 2004, Cabinet Office 2005, UN 2005, Petricek et al 2006) Internal self-assessment (BAH 2002)
	General features of government Web sites	Presence/absence of email address (West 2005) Presence/absence of credit card payment system (West 2005)	
	Participation-specific features of government Web sites	% of countries explaining e-consultation, and informing citizens of ways to provide input (UN 2005)	
	Government Web site maturity	Level of Web site on three-stage model (Accenture 2005) Level of Web site on four-stage model (Capgemini 2005) Level of Web site on five-stage model (UN 2005)	
	Government-specific infrastructure	% government staff with a PC (BAH 2002) % government services available online (BAH 2002)	
<i>Adoption</i>	Prospective attitude towards use of e-government by citizens	Awareness of specific e-government services (Graafland-Essers & Ettegui 2003) % adults feeling safe to transmit personal data to	Mass citizen survey (Graafland-Essers & Ettegui 2003, TNS 2003, Accenture 2004, 2005, Horrihan 2005)

	Adoption best practices	<p>government via Internet (TNS 2003) Channel preferences of citizens – phone, online, mail, in person (Graafland-Essers & Ettegui 2003, Accenture 2005, Horrigan 2005) Likely benefits of e-government perceived by citizens (Graafland-Essers & Ettegui 2003) Barriers to e-government use perceived by citizens (NOIE 2003, Accenture 2004) Expectations of e-government perceived by citizens (Freed 2006)</p> <p>Presence/absence of incentives for e-government uptake (OECD 2004)</p>	<p>Focus group (NOIE 2003) Internal self-assessment (OECD 2004) Pop-up survey (Freed 2006)</p>
<i>Use</i>	<p>Use of e-government by citizens</p> <p>Use of e-government by businesses</p> <p>Experience of e-government use by citizens</p>	<p>% adults using online services in past year (Graafland-Essers & Ettegui 2003, TNS 2003) % e-government users getting information about welfare benefits (Horrigan 2005)</p> <p>% businesses making online payments to government (DTI 2004)</p> <p>% contacts in which previous contact was recalled (Accenture 2005)</p>	<p>Mass citizen survey (Graafland-Essers & Ettegui 2003, TNS 2003, Accenture 2005, Horrigan 2005)</p> <p>Mass business survey (DTI 2004)</p>
<i>Outputs</i>	Retrospective attitude towards use of e-government by citizens	<p>Satisfaction rating with particular e-government services (Accenture 2004, Ramboll Management 2004, Horrigan 2005, Freed 2006) Level of citizen complaints about e-government service (Freed 2006) Perceived improvement to information access (NOIE 2003)</p>	<p>Mass citizen survey (Accenture 2003, Horrigan 2005)</p> <p>Pop-up survey (NOIE 2003, Ramboll Management 2004, Freed 2006)</p>
<i>Impacts</i>	<p>Citizen benefits</p> <p>Financial benefit</p> <p>Back office changes</p>	<p>Time saved (Capgemini 2004, Ramboll Management 2004)</p> <p>Financial savings perceived by officials (NOIE 2003)</p> <p>Nature of changes to government processes (BAH 2002) Changes in process time (Capgemini 2004)</p>	<p>Interview: internal self-assessment/ internal administrative records (NOIE 2003) Interview: internal self-assessment (BAH 2002) Questionnaire: internal self-assessment (Capgemini 2004)</p> <p>Pop-up survey (Ramboll Management 2004)</p>
<i>Outcomes</i>	Employment levels		

Table 3: eGovernment Measures, Indicators and Methods Used in Benchmarking Studies

Table 3 is not intended to be statistically representative. However, its profile does reflect other evidence (e.g. Janssen 2003, Kunstelj & Vintar 2004, eGEP 2006a) that benchmarking tends to focus on the core of the value chain – intermediates, adoption and use – rather than the main upstream (precursors, inputs) or downstream (impacts, outcomes, to some degree outputs) elements. As summarised in Figure 10, this probably occurs because the core measures are a compromise between ease/cost of measurement and developmental/comparative value. However, this does create limitations in that most critical of benchmarking activities: understanding the value of e-government. The particular emphasis on intermediates is also problematic because it is not a proxy for the further-downstream measures of adoption and use: in other words, countries/agencies with very sophisticated Web sites can have low levels of use and vice versa (BAH 2002, Wattegama 2005).

Recommendation 11: Where Feasible Incorporate More Downstream (Outputs, Impacts) Measures Into eGovernment Benchmarking

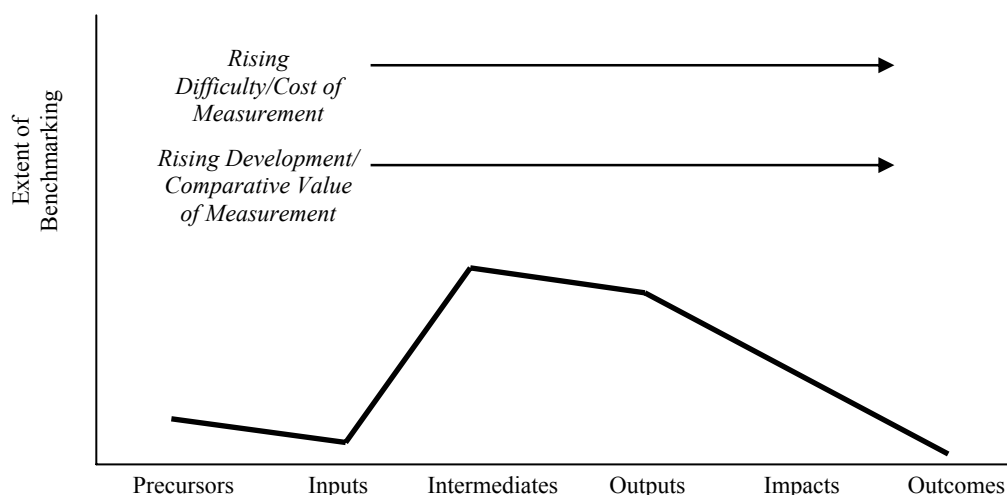


Figure 10: Usage of Different Indicators in eGovernment Benchmarking

There are related indicator sets for at least three of the underemphasised measures – demand precursors, impacts, and outcomes – that are relatively easily available for a large spread of countries (see Table 4). Unfortunately, there are many additional factors involved in the relation between these general indicators (of attitudes, governance and development) and core e-government indicators. Certainly, any correlation exercise involving outcomes would be fairly pointless: the causal path from e-government to outcomes is too indistinct. For the other indicator sets – demand and impacts – correlation is also of questionable value given the likely limited impact of these more general demand indicators on e-government, and of e-government on general governance indicators of corruption, trust, perceptions of accountability and bureaucracy, etc. Nonetheless it may be worth undertaking some exploratory correlations to see if any patterns emerge.

Recommendation 12: Conduct Exploratory Correlations Between Demand, Impact And Core eGovernment Indicators

<i>Value Chain Element</i>	<i>Sample Indicators</i>
<i>Precursors: Demand</i>	Relative importance of security, democracy and economy (WVS 2005) Level of political activity (WVS 2005) Contribution of technology (WVS 2005)
<i>Impacts</i>	Trust/confidence in government (GI 2005, WVS 2005) Level of corruption (Kaufmann et al 2005, TI 2005) Perceptions of democracy (GI 2005) Governmental effectiveness (Kaufmann et al 2005, IMD 2006)
<i>Outcomes</i>	Millennium development goals (UNSD 2006) National development indicators (World Bank 2006b)

Table 4: Demand, Impact and Outcome Data from Non-eGovernment Sources

Using Calculated Indicators

The discussion above relates to simple indicators, which form by far the majority of those reported. A number of benchmarking studies use composite indicators, e.g. for the purposes of national rankings. Composites have been criticised (e.g. UIS 2003) for their subjectivity and inaccuracy; some also lack transparency – it is unclear how they are researched or calculated. A guide to good practice in use of composites would include (eGEP 2006a:45):

- "Developing a theoretical framework for the composite.
- Identifying and developing relevant variables.
- Standardising variables to allow comparisons.
- Weighting variables and groups of variables.
- Conducting sensitivity tests on the robustness of aggregated variables."

Recommendation 13: Follow Good Practice Procedures When Using Composite Indicators

<i>Calculated Indicator</i>	<i>Example</i>	<i>Method</i>
<i>Benefit/Cost Ratio</i>	Expected financial benefit (impact) / Financial cost (input) (NOIE 2003)	Interview (internal self-assessment/ internal administrative records)
<i>Demand/Supply Match</i>	Preference for online channel in particular services vs. Online sophistication of that service (Graafland-Essers & Ettegui 2003)	Mass citizen survey
<i>Comparative Service Development</i>	Stage model level of citizen services vs. business services (Capgemini 2005) Stage model level of different service cluster areas (Capgemini 2005)	Third-party Web assessment
<i>National Ranking</i>	Composite of features and stage model level for national Web sites (West 2005) Composite of ICT and human infrastructure with stage model level for national/other Web sites (UN 2005) Composite of stage model level, integration and personalisation of national Web sites (Accenture 2005)	Third-party Web assessment

Table 5: Calculated Indicators Used in eGovernment Benchmarking

Other than the composite calculation of national rankings, there appears to be relatively little use of calculated indicators in the benchmarking of e-government (see Table 5). Some of these existing indicators could usefully be extended.

Benefit/Cost Ratio. Ways of measuring benefits are discussed later. However, there is a notable black hole in e-government benchmarking of relevance to benefits: e-government failure. Partial failures – e-government projects in which major goals are unattained and/or in which there are significant undesirable impacts – do produce a workable system which typically would be included within benchmarking. However, total failures – e-government projects that are never implemented or are implemented but immediately abandoned – will, by definition, not be included in normal benchmarking. Yet one can estimate that between one-fifth and one-third of all e-government projects fall into the total failure category (Heeks 2000, Heeks 2003). Such all-cost, no-benefit projects need to be included in overall benefit/cost calculations for e-government.

Demand/Supply Match. There is a significant bank of data on e-services supply measures such as web site maturity and quality. This can be compared to demand data: either country-specific ratings of demand from a commissioned survey, or more generic data gathered from other sources. In case of the latter, evidence from poor citizens in the majority world suggests a quite different set of demand priorities from those expressed by industrialised world users. Priorities of the former may relate to agriculture (supply sources, innovations, market prices, weather), health, employment and other information/services directly related to livelihoods, particularly incomes and welfare (Colle 2005, UNESCAP 2005).

Comparative Service Development. Comparisons of the maturity of different service clusters gives an insight into government priorities. For example, in Europe, government-centred applications (tax gathering, registration by citizens/businesses) have a greater maturity than more citizen-centred applications (service delivery, provision of permits/licences) (Capgemini 2005). One could see this as evidence of a lack of citizen-centricity in government. This idea – of comparing government-centred and citizen-/user-centred application maturity – can be utilised in other benchmarking studies. One could combine this basic demand understanding to compare maturity of, for instance, applications aimed more at traditionally male interests/roles vs. traditionally female interests/roles; or to compare applications prioritised more by poor citizens vs. those prioritised more by wealthy citizens.

National Ranking: Stage Models. All the national ranking models listed here rely centrally on a stage model of e-government. Stage models vary somewhat but a typical formulation runs from Information (static information) to Interaction (information searches and form downloads) to Transaction (completing transactions online) to Integration (joining-up of online services between agencies) (Goldkuhl & Persson 2006). There are at least two problems with this approach, caused partly by the fact that stage models have their origins in private sector e-commerce models. First, they assume online transaction to be the "nirvana" of e-government, yet nirvana might actually be the proactive completion of the transaction within government or even its elimination (Janssen 2003). Second, having a single stage model conflates two separate dimensions: the sophistication of a service (a front-office measure of how much can be accomplished online) and the integration of a service (a back-office

measure of the degree to which elements of a user-focused process are dispersed or integrated) (Kunstelj & Vintar 2004). The latter authors therefore propose a revised conceptualisation of stage models, as illustrated in Figure 11. Accenture's moves to build a two-dimensional ranking system based on service maturity (a basic sophistication model) and customer service maturity (incorporating aspects of integration but also further customer-centric ideas) can be seen as innovative in this regard.

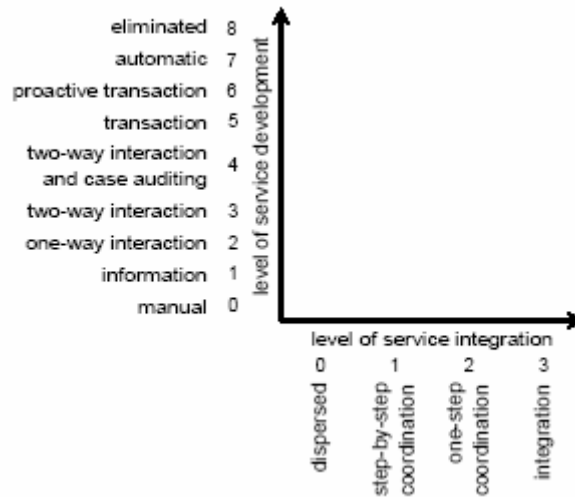


Figure 11: Two-Dimensional eGovernment Web Stage Model

National Ranking: Precursors. National e-government rankings undertaken by the UN are virtually unique in including some precursors (telecommunications infrastructure indicator and human development indicator). This could be extended to correlate e-government maturity levels or usage levels with a full set of the precursor indicators identified above (data systems, legal, institutional, human, technological, leadership, drivers/demand) via analysis of variance to see which precursors appear more or less important. (See also the idea of "pathway diagrams" in Section D.)

Recommendation 14: Investigate Extended Use of Calculated Benchmarking Indicators

Using Standard Public Sector Indicators

We can also compare Table 5 with a standard indicator set for public sector performance (see Table 6 (adapted from Flynn 2002): the examples chosen here are G2C e-services given its domination of benchmarking, but they could equally be applied to other components of e-government).

From the comparison we can see that only one calculated standard indicator was found in the review of benchmarking; benefit/cost ratio which is one external efficiency measure, but undermined at least in the cited case because it is a) self-reported only, and b) refers only to expectations, not reality. The only other typical indicator used is quality, as reflected in relation to both intermediates (e.g. stage maturity or navigability of e-government Web sites) and outputs (e.g. citizen satisfaction with e-government services).

<i>Indicator</i>	<i>Explanation</i>	<i>eGovernment Example</i>	<i>Benchmark</i>
<i>Economy</i>	The amount of inputs used	Expenditure per capita on IT in government	None
<i>Internal efficiency</i>	The ratio of inputs:intermediates	Cost per Web site produced per year	Minimisation
<i>External efficiency</i>	The ratio of inputs:outputs (use)	Cost per citizen user of government Web sites per year	Minimisation
<i>Internal effectiveness</i>	The fit between actual outputs (use) and organisational objectives or other set targets	The extent to which underserved communities are users of e-government services	Maximisation
<i>External effectiveness</i>	The fit between actual impacts and organisational objectives or other set targets	The extent to which citizens are gaining employment due to use of an e-government job search service	Maximisation
<i>Quality</i>	The quality of intermediates or, more typically, outputs (use)	The quality of e-government services as perceived by citizen users	Maximisation
<i>Equity</i>	The equitability of distribution of outputs or impacts	The equality of time/money saved by e-government service use between rich and poor citizens	Maximisation

Table 6: Standard Indicators for Government and eGovernment Performance

The first three standard indicators listed in Table 6 would be potentially usable only if figures on government IT spending are available. Per-application figures would be most useful but they appear very rarely (Nicoll et al 2004 is an exception, providing an estimate of US\$12,000 to US\$750,000 redesign costs per e-government Web site; and US\$150,000 to US\$800,000 annual recurrent costs per e-government Web site). More general figures on ICT spending in government are available for some countries (see World Bank 2006c) but one must then grapple with the limitation of relation between this figure and available intermediate or output measures: how appropriate is it, for example, to relate total ICT spending solely to Web sites, when that spending likely covers many other areas of computerisation?

Effectiveness measures can and are used for benchmarking e-government, though hampered by the relatively limited attention they have received to date. Finally, equity measures are relatively easy to adopt, at least for those benchmarking activities relying on surveys since equity-related questions – about the income, education, age, location, etc of respondents – are often included in the survey. As discussed later, one may also proxy these with general Internet use demographics.

Recommendation 15: Investigate Greater Use Of Standard Indicators, But Recognise Barriers To Their Use

Benchmarking Change

Many benchmarking studies of e-government are one-offs and rely on one-time, cross sectional measures. Even regular benchmarking studies tend to focus mainly on their static data with somewhat perfunctory consideration of change in indicators over time. Yet it is the ability to bring about change that, presumably, policy makers and other audience members are particularly interested in. National or agency rankings, for example, might look very different if based on degree of change over one-, two- or three-year timescales rather than based on static measures.² One could then investigate top performers further via quantitative correlational and qualitative causal analysis to try to understand what explains their performance; providing important lessons. From this perspective, one likely causal component – missing from almost all e-government benchmarking – is the capacity of government agencies to enact a learning cycle of evaluation, reflection, planning and action (IAB 2003).

Recommendation 16: Give Equal Emphasis Where Possible To Measures Of Change Over Time

Matching e-government supply to demand is one of the main likely priorities for change. Given this, adoption data is of especial interest. It is not particularly appropriate for benchmarking: comparing perceived pros and cons of e-government or channel preferences across countries is of limited value. But for individual countries or agencies a sense of why their target users do and do not use e-government provides valuable guidance for change (see, for example, Graafland-Essers & Ettegui 2003, Accenture 2004). This is part of a slightly broader point that it is the processes within the e-government value chain – adoption to some extent but strategy and development much more – that are the activities of change which most benchmarking study users are actually engaged in. Yet these activities are rarely the subject of benchmarking, tending more to form a patchy qualitative background from which readers must draw their own conclusions and only occasionally (e.g. OeE 2001) being placed centre-stage³. One proposed approach to address – given the complexities of measuring qualitative processes such as change – is "bench-learning": a peer-to-peer exchange of change-related lessons and practices requiring less standardisation and fewer "public relations biases" than the typical top-down/external form of benchmarking (eGEP 2006b).

Recommendation 17: Recognise The Importance Of Change Practices In Benchmarking

Recommendation 18: Consider The Relevance Of A Benchlearning Approach

² eGEP (2006b) proposes relying solely on the annual change in an indicator as the benchmarking measure for e-government because this circumvents the problem of standardising indicators across countries.

³ Another exception is the Balanced E-Government Index (Begix), which incorporates a well-balanced set of indicators around benefits, efficiency, participation, transparency and change management (Bertelsmann Foundation 2002). Unfortunately its actual content and implementation methods are unclear. See: <http://www.begix.net>

Benchmarking Public Value

"Public value" has become something of a buzz term invoked in relation to e-government benchmarking, though sometimes without a clear connection to what is actually measured (e.g. Accenture 2004). Public value is intended to be the equivalent for the public sector of private value: the returns that businesses deliver for their shareholders. In general, public value can be defined as "the value created by government through services, laws, regulation and other actions." (Kelly et al 2001:4). It is therefore in tune with the "integrate" approach described in Box 1 and a reminder that we should not really be interested in measuring e-government *per se*, but in measuring what e-government achieves: a message not understood by many governments in setting their techno-centric initial targets for e-government.

But how can this rather vague concept be translated for measurement of e-government? Here, two ideas are offered. First, we could break the public value of e-government down into three main areas, as described in Figure 12 (developed from Kearns 2004).

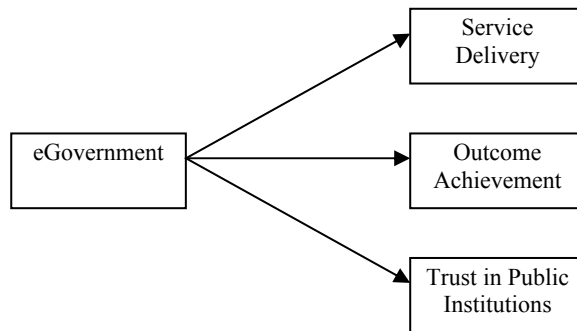


Figure 12: The Public Value of eGovernment (Kearns Approach)

These can be developed into a set of indicators, as shown in Table 7 (developed from Kearns 2004).

<i>Value Domain</i>	<i>Indicator</i>	<i>Description</i>
<i>Service Delivery</i>	Take-up	The extent to which e-government is used
	Satisfaction	The level of user satisfaction with e-government
	Information	The level of information provided to users by e-government
	Choice	The level of choice provided to users by e-government
	Importance	The extent to which e-government is focused on user priorities
	Fairness	The extent to which e-government is focused on those most in need
	Cost	The cost of e-government information/service provision
<i>Outcome Achievement</i>	Outcome	eGovernment's contribution to delivery of outcomes
<i>Trust in Public Institutions</i>	Trust	eGovernment's contribution to public trust

Table 7: Indicators for eGovernment's Public Value (Kearns Approach)

Public value can thus be seen as a new perspective since none of these indicators is covered by standard e-services G2C benchmarking (even though this interpretation of public value is largely focused on e-services rather than, say, e-administration or e-citizens). Take-up, satisfaction and cost have all been part of some benchmarking studies, and the importance measure is very similar to demand/supply match. As noted, the causal distance between e-government and outcomes is too great, so outcomes must be measured by proxies such as outputs or impacts which some benchmarking does cover. The indicators of information, choice, fairness, and trust do not appear to have been covered by any mainstream e-government benchmark studies.

A second approach takes a rather broader perspective that could potentially encompass all components of e-government, again with three main areas as described in Figure 13 (developed from eGEP 2006b).

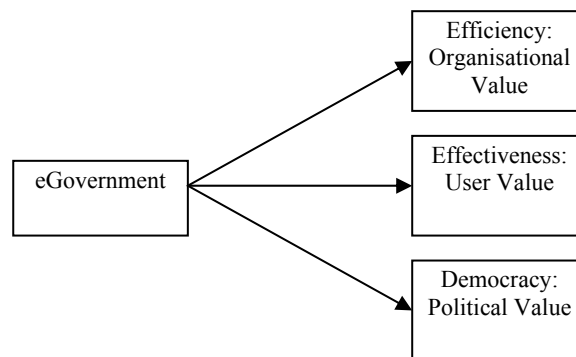


Figure 13: The Public Value of eGovernment (eGEP Approach)

Again, these can be developed into a set of indicators, as shown in Table 8 (developed from eGEP 2006b). There is still some bias here against e-administration, with no inclusion of user impact related to improvements in decision- and policy-making, and against e-society, with no inclusion of government's e-enabling of civil society and communities. This is because the framework is based on an understanding of e-government users only as taxpayers (efficiency), consumers (effectiveness), and citizens/voters (democracy). However, eGEP's work combines a significant depth of analysis with an understanding of real-world limitations to produce a valuable set of ideas on benchmarking indicators.

Recommendation 19: Consider New Indicators Of eGovernment Public Value Which May Be Of Use In Benchmarking

<i>Value Domain</i>	<i>Indicator</i>	<i>Sample Measures</i>
<i>Efficiency: Organisational Value</i>	Financial Flows	Reduction in overhead costs Staff time saving per case handled
	Staff Empowerment	% staff with ICT skills Staff satisfaction rating
	Organisation/IT Architecture	Number of re-designed business processes Volume of authenticated digital documents exchanged
<i>Effectiveness: User Value</i>	Administrative Burden	Time saved per transaction for citizens Overhead cost saving for businesses (travel, postage, fees)
	User Value/Satisfaction	Number of out-of-hours usages of e-government User satisfaction rating
	Inclusivity of Service	eGovernment usage by disadvantaged groups Number of SMEs bidding for public tenders online
<i>Democracy: Political Value</i>	Openness	Number of policy drafts available online Response time to online queries
	Transparency and Accountability	Number of processes traceable online Number of agencies reporting budgets online
	Participation	Accessibility rating of e-government sites Number of contributions to online discussion forums

Table 8: Indicators for eGovernment's Public Value (eGEP Approach)

C. How to Benchmark?

C1. Selecting Data-Gathering Methods

We can identify from the review and Table 3 given above a series of different data-gathering methods for e-government benchmarking and can summarise three features of each method (as shown in Table 9, adapted from eGEP 2006b:20):

- *Cost*: the time and financial cost of the method.
- *Value*: the value of the method in producing data capable of assessing the downstream value of e-government.
- *Comparability*: the ease with which data produced can be compared across nations or agencies.

<i>Method</i>	<i>Cost</i>	<i>Value</i>	<i>Comparability</i>
Official statistics	Low	Low	High
Internal self-assessment	Low-Medium	Medium	Low
Third-party Web assessment	Medium	Medium	High
Web metrics and crawlers	Medium	Medium	Medium-High
Pop-up survey	Medium	Medium-High	Medium-High
Focus group	Medium	High	Low-Medium
Internal administrative records	Medium-High	Medium-High	Low-Medium
Mass user survey	Medium-High	High	Medium-High

Table 9: Comparing eGovernment Benchmarking Data Sources

There is a fourth issue that should also be included when considering data-gathering methods: data quality. This is an issue hardly addressed by most benchmarking studies, and there seems to be an implicit assumption that the quality of benchmarking data is high. However, this is not always the case with apparently "solid" indicators in fact being based on subjective and partial original data (see Janssen 2003, UIS 2003, Minges 2005). If the data quality of methods does need to be assessed or compared, the CARTA checklist can be used (Heeks 2006):

- How *complete* is the benchmarking data provided by this method?
- How *accurate* is the benchmarking data provided?
- How *relevant* is the benchmarking data provided?
- How *timely* is the benchmarking data provided?
- How *appropriately presented* is the benchmarking data provided?

Recommendation 20: Select Data-Gathering Methods On The Basis Of Their Cost, Value, Comparability and Quality

C2. Other General Methods Issues

Measurement Transparency. In some benchmarking studies (e.g. Bertelsmann Foundation 2002) it is not possible to understand either how the benchmarking data was gathered, nor how it was analysed, nor how it was used to calculate any indices or rankings. Other studies (e.g. UN 2005) are very clear about all these elements. The problem with the former approach is that it raises suspicions that researchers either do not wish their methods to be understood (and, hence, criticised) or that they seek to

extract rents from proprietary methods that others cannot reuse. In either case this devalues the benchmarking findings.

Recommendation 21: Be Transparent About Benchmarking Methods

Output/Impact Measurement. Measures beyond adoption in the e-government value chain are needed to judge the value of e-government. Most of the impact examples given in Table 3 were measured by self-assessment; a method with distinct drawbacks, as noted below. As also discussed later, there may be emerging opportunities to use Web metrics/crawlers to assess some outputs/impacts but only in certain situations. In general, then, output and impact measurements require some form of survey. Surveys have been used for this but survey data to date seems to have concentrated mainly on adoption and use, so there is obvious potential for change.

Recommendation 22: Make Greater Use Of Survey Methods To Assess eGovernment Outputs And Impacts

Partnerships in Data-Gathering. As can be seen from Table 3 and from the reference list, there are many e-government benchmarking studies at global, regional and national level. This inevitably means there is duplication of data-gathering activity. For example, annual global third-party Web assessment is undertaken by West (e.g. 2005) and the UN (e.g. 2005). Consulting firms Accenture, Capgemini and Deloitte have all undertaken similar regular third-party Web assessments for e-government sites in Europe and beyond. There are also studies repeating this activity for individual nations (e.g. Abanumy et al 2005). Likewise there are a number of apparently-similar, apparently-simultaneous mass surveys in various countries encompassing e-government. The opportunities for greater partnership in gathering data for benchmarking would seem to be significant.

Recommendation 23: Investigate Opportunities For Partnering With Other Data Gatherers

C3. Specific Methods In Use

We can offer a commentary on each of the identified data-gathering methods.

Official statistics are used relatively little because they tend to be non e-government-specific and (see commentary on Table 4) it can thus be hard to make the connection with e-government. Probably their most appropriate use is in detailing the precursors to e-government; something that only one major benchmarking study currently does (UN 2005). As noted above, there could be investigation of correlating e-government indicators with governance indicators such as those collated by the World Bank (Kaufmann et al 2005).

Internal self-assessment works well for some things, such as reporting of lessons learned. It works less well for others where there can be a "public relations bias": the respondent is aware that their response will be publicly reported and will thus produce a good or bad reflection, such as in self-reporting the presence or absence of e-government best practices. It works worst of all for items that are outside the respondents' evidence base, yet there do seem to be potential examples of this, such as questions to IT managers about citizen experiences of e-government. However,

internal self-assessment does reach places that other methods do not: it is one of the few methods for gathering data to benchmark G2G e-government.

Recommendation 24: Ensure Internal Self-Assessment Is Used Appropriately With Minimal Bias Incentives

Third-party Web assessment divides into three different types:

- Categorisation: simple presence/absence measures, and classification from presence/absence into stage model ratings (UN 2005, West 2005). This approach is quite widely known and used.
- Quality assessment: evaluation via Web usage criteria such as content, functionality and design (Moore et al 2005).
- Mystery user: replicating the user experience (Accenture 2005). This is potentially a more subjective approach than the others but does come closest to reality since the assessor takes on the role of a user who, say, wishes to participate in an online debate or apply for a license renewal.

Recommendation 25: Investigate The Utility Of Mystery User Techniques

Web metrics and crawlers may be a growth area for benchmarking given the relative ease with which they can be used. To date, they appear to be used mainly for e-services site quality assessment; for example, assessing the accessibility of sites to users with disabilities or assessing site privacy levels (see, e.g., Choudrie et al 2004, UN 2005).

One area for further development may be the assessment of hyperlinks. These can be used to measure the quality (navigability, centralisation) of an individual site. They can also be used to measure the "nodality" of an e-government site: both its authority/visibility (the number of inlinks to that site) and its hubness (the number of outlinks from that site) (Petricek et al 2006). (A quick and dirty version of the former is to type consistent keywords into major search engines to see if the site appears on the top 10 hits: see Holliday 2002). Authority could be seen as one measure of value of external-facing e-government. One could also look at the nature of nodality – for example, the number and proportion of links to and from civil society organisations as some measure of either G2N or of the recognised role of CSOs as intermediaries in delivery of government information and services in most countries (see Kuk 2004).

To date almost all benchmarking using Web metrics/crawlers has involved the use of externally-applied tools. However, internally-applied Web metrics (i.e. those available to e-government Webmasters) offer an even richer source if they can be objectively reported. This includes not merely usage indicators such as number of page hits or completed transactions but also proxies of outputs (e.g. measuring satisfaction in terms of repeat usage or cross-usage (usage of other information/services on a portal)) and even impacts (e.g. measuring benefits in terms of the extent of site use outside normal government office hours) (eGEP 2006b).

Recommendation 26: Investigate Relevance Of Automated Assessment Of Site Accessibility And Nodality

Recommendation 27: Investigate Potential For Access To Internally-Applied Web Metrics

Pop-up surveys, or some equivalent automated method of questioning a random selection of site users, are generally seen as the preserve of site owners. However,

there are examples of e-government sites allowing "foreign" pop-ups from a third-party organisation in order to enable independent comparative benchmarking (see Freed 2006). Given the value of survey methods, this is worth further investigation though seems likely to be more acceptable to officials at national level, comparing across agencies, than at international level, comparing across countries (see, e.g., Ramboll Management 2004). As pointed out by those using these surveys, they provide a somewhat skewed response profile: non-users and potential users of e-government are excluded; busy, less-confident, and less-opinionated users tend to be under-represented. However, they do offer a fairly quick and easy way to gather e-government data on use, outputs and impacts.

Recommendation 28: Investigate Use Of "Foreign" Pop-Up Surveys

Focus group methods are very helpful at really understanding e-government usage in depth. However, their strength is in development of qualitative data and they rarely present data with the quantitative validity to allow cross-agency or cross-country comparisons.

Internal administrative records are rarely accessible directly by benchmarkers, and so they tend to suffer some of the shortcomings of internal self-assessment. Their variability also means they have little to offer cross-country benchmarking.

Mass user surveys can do things no other method can; for example, reach out to that vast majority of the world's population that has not yet been touched by e-government. They are less skewed and allow for greater depth of questioning than pop-up surveys. They provide the statistically-valid sample sizes that focus groups do not. Their main disadvantage is cost. However, given the large number of mass surveys currently undertaken, benchmarking studies can be built around the addition of a small number of questions into existing mass surveys. Some surveys specifically invite this (e.g. GI 2005).

Recommendation 29: Piggy-Back eGovernment Questions Onto Existing Mass Surveys

C4. Less-Used Methods

Public Domain Statistics. While not quite falling into the category of "official statistics", a number of benchmarking studies re-use e-government statistics from publicly-accessible e-government or related reports. There is also public domain data from non-e-government sources that could be of use in benchmarking either for direct use or as the basis for further calculations. For example, country-level data on:

- Internet access in schools (WEF Global Competitiveness Report)
- Extent of business Internet use (WEF Global Competitiveness Report)
- ICT expenditure as % GDP (accessible via World Bank Knowledge Assessment Methodology site)
- Government prioritisation of ICT (WEF Global IT Report)
- Government procurement of ICT (WEF Global IT Report)
- Presence of ICT in government offices (WEF Global IT Report)
- Percentage of localities with public Internet access centres (proposed UN basic core ICT indicator that may become available)
- Percentage of individuals dealing with government/public authorities via Internet in last 12 months (proposed UN basic core ICT indicator that may become available though at present only about 15% of developing countries gather data on specific uses of the Internet (UNICTTF 2005))
- Percentage of businesses dealing with government/public authorities via Internet (proposed UN extended core ICT indicator; data for some countries is available on the current UNCTAD e-business database)

Recommendation 30: Ensure Reuse Of Any Appropriate Public Domain eGovernment Or Related Statistics

In addition, e-government has really begun to take off as an area for academic study in the past year or so, seeing an explosion in the amount of research being undertaken and outlets for that research. The outlets have risen from just two journals in 2002 with some remit to cover e-government (*Information Polity, Government Information Quarterly*) to at least four more directly focusing on e-government by 2006 (*Electronic Journal of e-Government, Journal of E-Government, International Journal of Electronic Government Research, Transforming Government*) plus several annual e-government conferences plus all the other information systems, public administration and e-business journal and conference outlets covering e-government. Much of the written material is not of value to benchmarking being secondary research or focused on conceptualisation or reporting case studies. However, there is relevant primary research reported, including evidence from the most data-poor locations: developing countries (e.g. Kaaya 2004, Abanumy et al 2005).

Recommendation 31: Identify A National Or Regional Collator To Draw Together All Public Domain Research Data On eGovernment In Their Area

Intranet Assessment. If access can be granted, then the techniques of third-party Web assessment can be applied to a sample of intranets within government, allowing the incorporation of G2G e-government into benchmarking. Internally-applied Web metrics and pop-up surveys can supplement this to provide data on use, outputs and impacts.

Recommendation 32: Seek Access To Intranet Data

Public Servant and Politician Surveys. Even a basic stakeholder analysis of e-government (see Figure 14 for the DOCTORS stakeholder checklist) would identify two stakeholder groups almost entirely absent from data-gathering for e-government benchmarking: government staff and politicians. Yet government staff are central to the operation and data sourcing for most e-government applications, and to the construction and receipt of output for many e-government applications. Where they are included as sources of data for benchmarking, they provide a properly triangulated view of e-government, and they deliver insights absent from other studies (see, e.g., Jones & Williams 2005).

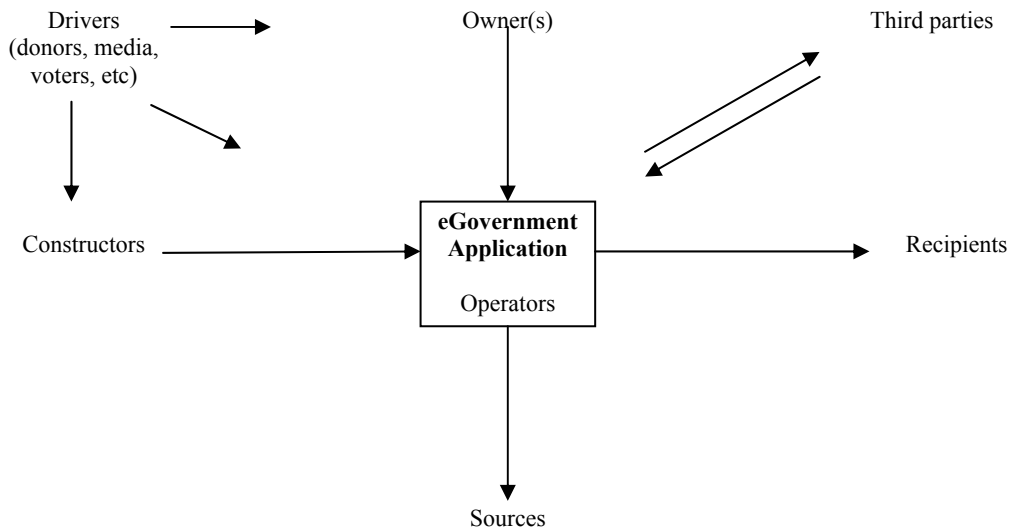


Figure 14: Generic eGovernment Stakeholder Map

Equally, politicians are often the main owners or drivers (or third-party resisters) for e-government. They are significant determinants of whether or not e-government is providing public value (Horner & Hazel 2005). And political legitimacy/support is seen alongside public value and operational capabilities as part of the "strategic triangle" that determines the overall value and viability of public sector projects such as e-government (see Figure 15: Moore & Khagram 2004). Political legitimacy/support can therefore be surveyed both as an input and as an impact of e-government projects. Yet politics and politicians – a central feature of public sector life – warrant hardly a mention in e-government benchmarking studies.

Recommendation 33: Make Greater Use Of Public Servant And Politician Surveys
Recommendation 34: Measure Political Legitimacy/Support As Both An Input And Impact Of eGovernment

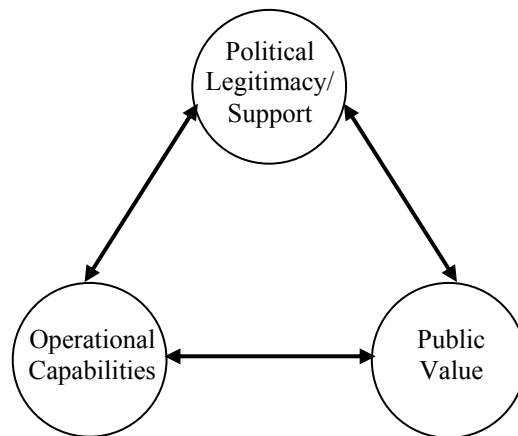


Figure 15: The Public Sector Strategic Triangle

Intermediary Surveys. In developing countries and in the disadvantaged communities of industrialised countries, access to e-government is often intermediated; for example, occurring for citizens via a community- or privately-owned PC in a local telecentre, cybercafé or similar. These intermediary organisations are thus vital to e-government – they form another part of the Figure 14 stakeholder map – yet have so far been overlooked in benchmarking. They could be included through direct surveys or through agreement to host pop-up surveys. For those intermediaries that have their own Web sites, these could be supplemented by either Web metrics/crawlers or third-party Web assessment. As noted above, automated measures of government Web site nodality can also be used to assess the extent of connectivity to service intermediaries.

Recommendation 35: Make Greater Use Of Intermediary (e.g. Telecentre) Surveys

C5. Methods for Specific Issues

Here, we reflect back on some of the priorities identified earlier, and look at ways to address those priorities. Rather than provide a specific recommendation for each issue, this section comes with a general point:

Recommendation 36: Adopt Methods Appropriate To Particular Benchmarking Interests

G2B. Most benchmarking exercises seem to fail G2B simply because it does not form part of the mental map of those commissioning or planning the research. It can fairly easily be added to third-party Web assessment and Web metrics by ensuring the inclusion of enterprise-relevant government agencies (e.g. Ministry of Industry, or Department of Enterprise) and services (e.g. company registration, business development services, export support, public procurement, etc.) (see, for example, Capgemini 2005). It can fairly easily be added to surveys by including a specific survey of entrepreneurs (see, for example, Graafland-Essers & Etedgui 2003).

G2G. Third-party Web assessment of intranets, cautious use of self-assessment and surveys of civil servants were identified above as key techniques for gathering data to

benchmark G2G. A model questionnaire combining both front office and back office questions is available from NCM (2003).

eCitizens: eDemocracy. The UN's (2005) e-participation approach provides a basis for measuring some elements of e-democracy using third-party Web assessment that focuses on citizen ability to influence policy-making. This is based on a three-stage model of e-information (web sites provide information on policies), e-consultation (presence of policy-related discussion forums), and e-decision-making (evidence of influence of citizen inputs such as presence of government feedback). Beyond this, there is potential for a "mystery citizen" approach of assessing a test attempt to provide policy input or other forms of e-participation for each nation or agency being benchmarked. Third-party assessment can also involve content analysis of online discussion forums; for example, measuring the deliberative equality, rationality and interactivity of such discussions (Lyu 2006). Real depth of understanding, though, can only come from survey work. This shows, for example, that the motivations of participants in e-democracy forums may relate much more to their desire to form and broadcast their own opinion to peers rather than to a desire to influence government policy (Lyu *ibid*).

eCitizens: eTransparency. eTransparency has five levels (Heeks 2004):

1. Publication: just providing basic information about a particular area of government.
2. Transaction: automating some public sector process and reporting on that process.
3. Reporting: providing specific details of public sector decisions and actions (e.g. via performance indicators).
4. Openness: allowing users to compare public servant performance against pre-set benchmarks.
5. Accountability: allowing users some mechanism of control (e.g. reward or punishment) over public servants.

This can be used as the basis for third-party Web assessment of those areas of government which are felt to be most important for transparency, such as budgets and other finances, procurement and contracts, and permits/licensing. Other methods that could be relevant include Web metrics/crawlers (assessing government nodality vis-à-vis key rights, anti-corruption and transparency CSOs) and citizen/entrepreneur surveys.

eSociety. Partnerships and linkages are probably best assessed by surveys of community, civil society and private sector organisations. Assessment via Web metrics/crawlers of nodality/linkages of government Web sites to sites of these organisations are a supplemental possibility.

Sub-National Tiers. The typical situation of state and local government in developing countries is one where "most departments still use manual typewriters to record information" (Helegbe 2006:1), reflecting the staggered e-government graphs shown in Figure 7. However, change is occurring and growing numbers of sub-national governments in developing countries are building web sites that are assessable:

- Simple visibility tests can be undertaken: what appears in the first ten or twenty search engine entries when typing in "*Country* "state government"" or "*Country* "provincial government"" or "*Country* "district government"".

- Automated hyperlink assessment can measure the nodality of key local government sites such as the national Ministry/Department responsible for local government.
- More directed searching can be undertaken – taking, say, the tiers of government for the largest city or for the most rural state/province – and assessing any Web sites that can be found using third-party Web assessment. Informant-based guidance can be used for identification of such sites, as per the approach used by Capgemini (2005).

Alternative Channels Including mGovernment. Third-party Web assessment of provision for alternative digital channels can be used to assess these channels. For example, assessors can check for the presence/absence of WAP, SMS and PDA services on e-government sites, and for reference to digital TV interfaces. Mystery user techniques can be applied to test out the utility of m-government interfaces. For m-government, this could be combined with public domain statistics on accessibility and use of mobile telephony to build an mGovernment Index. Telephony can be assessed through means such as presence/absence of a phone contact number on government Web sites, use of phone contacts by mystery citizen researchers, and by user survey. Integration between telephony and e-government could be assessed by mystery citizen studies that investigate, say, whether a partially-completed online transaction can be facilitated by subsequent phone contact.

Benefits. The benefits of e-government fall into one or more of five categories (Heeks 2001):

- *Cheaper*: producing outputs at lower total cost.
- *More*: producing more outputs.
- *Quicker*: producing outputs in less time.
- *Better*: producing outputs to a higher quality.
- *New*: producing new outputs.

The last two relate to effectiveness measures (see Table 6 indicators) and must generally be measured qualitatively. The first three relate to efficiency measures and may offer opportunities for quantitative, even financial, measurement. Where e-government is cheaper, internal self-assessment may point to staff and other resource savings; user surveys may point to resource savings (e.g. postage, travel and intermediary fees) (Deloitte 2004).

Where e-government is quicker (and that is certainly the main benefit users seek from e-government: Accenture 2004), financial benefits are not so immediately obvious. One approach – usable for any assessment of the user-side benefits of e-government – is to assess how much users would be willing to pay for the benefits they perceive e-government to deliver. This can produce an overall sense of e-government's social value.

Alternatively, figures on usage levels and/or Web sophistication can be combined with evidence on user-side time savings to produce an estimate of the social benefits due to e-government. For example, the proportion of citizens using transactional e-government services in a country and their frequency of use of such services (estimates extrapolated from similar e-readiness countries can be used) can create an estimate of total number of transactions per year in a country. This can be multiplied by case study data on the amount of time saved per transaction in moving from the

most-used traditional channel (typically telephone or in person) to create a total national annual time saving from e-government citizen services. This can be valued in simple terms using average annual wage/income data. See Ramboll Management (2004) for an example of baseline figures (user time savings average just over one hour per transaction comparing online vs. offline) and calculation methods for European nations.

Equity and eInclusion. There is a danger that e-government will increase inequities in society, with US evidence that it "helps people who already can help themselves" (Horrihan 2005:34). Hence the interest in "e-inclusion", which means:

- "Preventing digital exclusion, i.e. preventing disadvantaged people and groups from being left behind in the development of the information society. Here the focus is on access and basic ICT skills (digital literacy).
- Exploiting new digital opportunities, i.e. reducing existing disadvantages, providing new opportunities in terms of employability, quality of life, access to knowledge, etc.
- Fostering participation and empowerment, i.e. facilitating the use of ICT in order to allow individuals and groups to express themselves, to deepen and widen their social capital, to participate in democratic processes on a local as well as a wider scale." (EAG 2005:9)

Access rates can be determined by precursor studies looking at availability of ICT infrastructure, skills and other relevant resources within disadvantaged groups. Availability measures can also be used such as Web metric/crawler-based measures of e-government site accessibility for the disabled, or third-party assessment of minority language availability (see West 2001, Choudrie et al 2004, UN 2005). One can also look at the comparative maturity of e-government domains of particular relevance to the socially-disadvantaged, which are often held to be education, health, labour and social welfare (OECD 2005; see UN 2005 for use of this focus). These can be compared with generic domains or those appealing to non-disadvantaged groups (e.g. travel advisory, higher education). Ultimately, though, benchmarking the second two elements of e-inclusion listed above will require some form of survey work. It will also require recognition of the information chain (see Figure 5), which acts as a reminder of the non-e-government-related resources that disadvantaged groups need in order to gain full benefit from e-government.

As noted above, one can ask demographic questions in pop-up and mass user surveys. These provide an understanding of the equity of access and use of e-government which, when related to income, can be presented in the form of Gini coefficient calculations and graphs. At present, though, there are relatively few statistics on the demographics of e-government users, but there are a greater range of data on the demographics of Internet users indicating various divides of gender, age, education, income, etc. A question then arises: can Internet user demographics be taken as an appropriate proxy for e-government user demographics?

In relation to gender (see Table 10), there may be some sense of a greater tendency for male than female Internet users to access e-government but there is no statistical validity to this sense from the data presented here.

<i>Source</i>	<i>Female Internet users using e-government</i>	<i>Male Internet users using e-government</i>
<i>Multi-country (TNS 2001)</i>	89%	78%
<i>Multi-country (TNS 2003)</i>	65%	69%
<i>Singapore (Li et al 2004)</i>	67%	73%
<i>South Korea (Lyu 2006)</i>	21%	34%

Table 10: Internet User Gender and eGovernment Usage Rates

The same can be said for age, education and income (see Table 11): there is some slight skew towards e-government users being older, more educated and richer than the general Internet-using population but there is no statistical basis for making any differentiation.

<i>Indicator</i>		<i>Internet Users</i>	<i>eGovernment Users</i>
<i>Average age</i>	Multi-country (TNS 2001)	<20 years (modal age)	25-34 years (modal age)
	Multi-country (TNS 2003)	<25 years (modal age)	25-34 years (modal age)
	Singapore (Li et al 2004)	34.1 years	33.6 years
	South Korea (Lyu 2006)	32.4 years	33.5 years
<i>% University educated</i>	Singapore (Li et al 2004)	23%	27%
	South Korea (Lyu 2006)	61%	75%
<i>Average monthly household income</i>	Singapore (Li et al 2004)	S\$4,246	S\$4,390

Table 11: Comparative Internet User and eGovernment User Demographics

On this evidence at least, there is no basis for differentiating between the demographics of Internet users and the demographics of e-government users. Data for the former can therefore be used as a proxy for the latter in benchmarking issues such as equity and e-inclusion.

It was also noted earlier that data on Internet user numbers could be used to calculate the number of users of e-government in a country or region. To do this, though, one requires a conversion factor on the percentage of Internet users who are e-government users. Those conversion factors were used in the calculations for Table 2 but they were based on very limited data for developing countries; this area of evidence therefore requires strengthening, for example via more sample surveys of Internet users.

Public Value. eGEP's approach to public value indicators for e-government is rich and would require incorporation of many of the elements already described – public servant surveys, intermediary surveys, e-democracy and e-transparency measures,

benefit and equity measures. Kearn's approach would also require a combination of methods to cover its nine indicators:

- Take-up: measure via user surveys (proxy via conversions from Internet user statistics).
- Satisfaction: measure via user or pop-surveys (proxy via internal Web metrics on repeat and cross-usage).
- Information: requires a new scale of information value, probably measured by third-party Web assessment (could be read as similar to e-government site maturity).
- Choice: measure by third-party Web assessment or internal self-assessment in relation to choice of channels, may require internal self-assessment or survey to identify situations of choice of provider.
- Importance: requires a survey of user priorities (demand), matched against investment or availability (supply) of e-government.
- Fairness: requires a survey of disadvantaged/excluded citizen priorities, matched against investment or availability (supply of e-government); could also use survey figures on profile of use or outputs across disadvantaged vs. non-disadvantaged groups.
- Cost: measured by internal-self assessment.
- Outcome: as argued above, needs to be proxied by impact or output measures, which are typically measured by survey.
- Trust: measured by user survey.

However, all discussions of public value agree that it is citizen preferences that determine the components of public value rather than one-size-fits-all approaches. As with other issues, there is some sense of these preferences and, hence, the meaning of public value for industrialised countries but much less sense of whether public value would mean something different for the majority, poor citizens of developing countries.

One area, for instance, of particular concern to citizens in developing countries – and part of the good governance agenda – relates to personal security and the rule of law (Kaufmann et al 2005). ICTs admittedly appear to have relatively little contribution here. However, it would certainly be appropriate to consider two areas that have not appeared in any mainstream benchmarking study – e-government in the judiciary, and e-government in the police. There are certainly e-government applications in both sectors in developing countries (e.g. IRMT 2002, Anonymous 2003).

D. How to Report?

It may be that much of the focus of benchmarking goes into the data gathering and analysis without considering in any detail how to then report and disseminate the benchmarking information. Such issues are rarely written about. Maugis et al (2005) provide a discussion of innovative ways to report, and they make use of "pathway diagrams". These select particular cases – agencies or countries – that have some important feature; this could be high levels of e-government use or high levels of e-government impact (or low levels). The precursors, inputs and intermediates for these particular cases are then plotted on a pathway diagram (see Figure 16, which provides an example for e-banking rather than e-government, and focuses more on precursors and inputs than on use or impact). This allows analysts and decision-makers to visualise patterns fairly quickly and then identify what is and is not important in high (or low) e-government performers. (Of course, this visual patterning is best checked statistically through analysis of variance techniques.)

Recommendation 37: Investigate Use Of Innovative Visualisation Techniques To Display Benchmarking Data

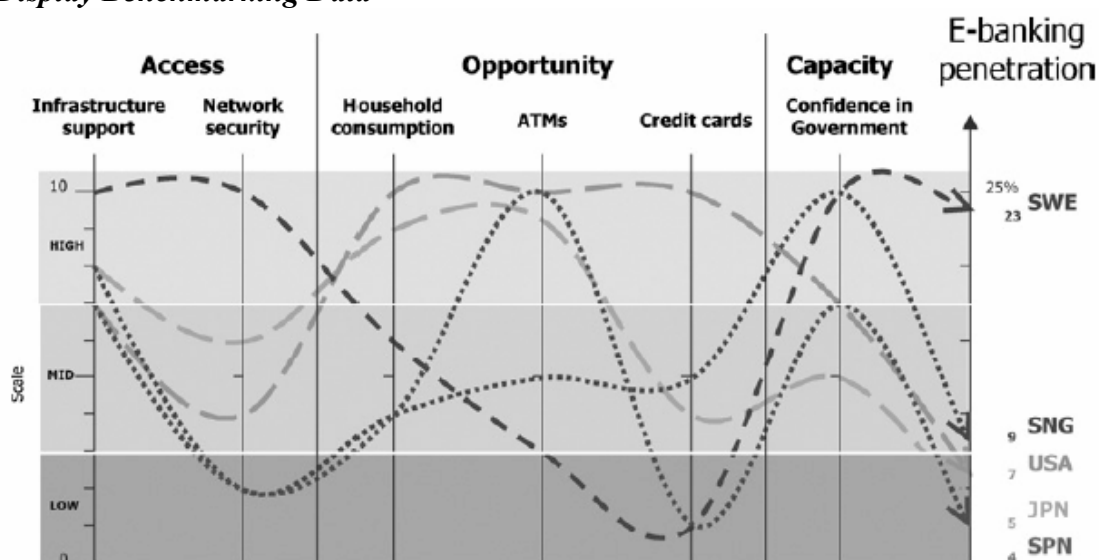


Figure 16: Pathway Diagram Illustrating Upstream—Downstream Relationship

Discussion about dissemination of e-government benchmarking is provided in Regional-IST (2004). This identifies three main "pillars" for such dissemination:

- Panels, seminars and other physical meetings that attempt to connect with as many appropriate decision-makers as possible.
- Electronic discussion forums (though they note relatively poor levels of participation in those they used).
- An interactive Web site that allows users to manipulate the data according to their own particular needs and interests rather than just presenting it in a static manner.

In addition, they note the value of a well-organised public relations exercise around the benchmarking report (such as press releases and interviews) to target a broader audience.

Recommendation 38: Make Use Of Dissemination Good Practices

One assumption of benchmarking appears to be that results merely need to be put into the public domain and that users such as policy makers will then be able to make effective use of them. However, this may not be true (RAWOO 2001). It may therefore be appropriate to offer guidance, exemplars, even a training guide covering use of benchmarking data. Such guidance needs to work within the framework of the strategic triangle (see Figure 15): data users may have some aspect of public value in mind when they come to use benchmarking studies but they will be guided as much by what is politically (including personally) desirable and feasible, and by what is operationally feasible.

Recommendation 39: If Necessary, Provide Guidance On Use Of Benchmarking Results

Finally, one may wish to evaluate the benchmarking study, which takes us full circle back to the issue of researching the usage of e-government benchmarking. Formal evaluation could involve use of pop-up surveys on any benchmarking report Web site; plus telephone or other interviews of key users, focusing on issues such as user demographics, usage of benchmarking data, impact of benchmarking data, and user views on quality and improvements. As mentioned above, creation of a user panel would be appropriate for regular benchmarking studies. An example of a full evaluation of an IT-related benchmarking and information service is IST Results (2006).

Recommendation 40: Develop A Mechanism For Providing User Feedback On The Benchmarking Study

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