

# Deploying e-government programs: the strategic importance of "I" before "E"

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**Abstract** Many developing countries are in the initial phases of adopting electronic government (e-government) programs to improve public services and deliver them as efficiently and conveniently as possible. Our experience with a variety of governments throughout the developing world at different stages of implementing e-government programs with citizens (G2C), businesses (G2B), and other entities of government (G2G) suggests that a major reason behind the success or failure of e-government projects is the extent to which, first, the governments address technological infrastructure encouraged by appropriate telecommunications policies; and second, the legal and regulatory instruments required for e-government. Information and communication technology (ICT) infrastructure (the "I") development is at the heart of successful deployment and sustainability of e-government programs.

## Introduction

E-governance transforms and rationalizes public sector work through the use of ICT, which may include wide area networks, the Internet, mobile computing, and mobile telephony. The ability to connect all transaction stakeholders across time and space barriers through the Internet and through a standard interface, the

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World Wide Web, is fundamental to e-government programs. The objectives of e-government are to:

- Bring government closer to citizens by providing them with easier access to information through personal computers, kiosks, and telephones, and other resources.
- Modernize public services in which "joined-up government" institutions communicate and work more effectively and efficiently.
- Reduce opportunities for petty corruption at the point of service delivery.
- Increase and capture revenue more efficiently (e.g. taxes, fines, and license fees).
- Increase mechanisms to create more accountability and transparency in the public sector.

Major e-government functions considered to be priorities for public e-services are shown in Table I.

Some developing country governments have been eager to utilize these new technologies to enable efficiency gains, cost savings, and improvement in service delivery. A number of innovative applications that provide citizens and businesses access to government information and services have emerged across developing countries, and led to greater public participation in government decision making.



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**Table I — Priorities for public e-services**

Forms processing	To enable the public to submit and process applications for certificates and services electronically
Public complaints	To provide a single interface for the public to communicate complaints effectively and conveniently
Information	To provide public access to information, statistics, budgets, legislation and laws
Payments	To enable electronic transfer of funds between the public and government for payment of service fees and fines
Procurement	To obtain information, purchase order and requisition forms electronically
Customer response	To provide the public with help information
Polling	To provide secure channels for citizen opinion polls, voting, and participating in government decision making

Table II highlights some of the applications and impacts of e-government programs in the developing world.

These embryo e-government applications, while important to the planning and establishment of e-government, are unlikely to sustain on their own the full benefits of a mature e-government environment. For countries that have embarked on e-government programs as structural elements of their economic development and public sector reform programs,

particular applications have been secondary considerations. Access to adequate information infrastructure, and defining and putting in place proper legal and regulatory frameworks have been keys to making e-government both the instrument and the scenario for governance and public sector reform. But for developing countries, a “digital divide” affects most people’s access to the information infrastructure. ICT costs, particularly Internet fees, continue to be prohibitively high. International Telecommunications Union (ITU) statistics indicate that about 95 percent of Internet hosts are located in high-income countries containing only 16 percent of the world’s population. Internet users are also concentrated in high-income countries as can be seen from Figure 1 (ITU, 1999). Countries with higher gross national product (GNP) per capita enjoy low cost access to ICT due to the liberalization and deregulation of the telecommunications sector.

The development of e-government also relies on appropriate legislation and regulations. A number of countries have yet to put in place a legal framework that addresses questions such as the legal status of electronic contracts and digital signatures, the privacy and security of data transmission, and the facilitation of electronic transactions.

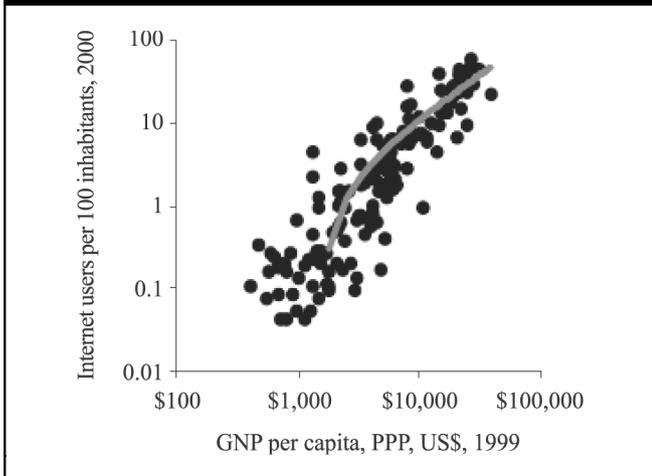
### Leveraging policy and institutional reforms

Many e-government applications are launched independent of public sector reform and ICT/telecommunication sector reform. Coordination and sequencing are less the norm and integrated planning for reforms are often hampered by

**Table II — E-government impact**

Impact	Definition	Project example
<b>Direct citizen value</b>	Citizens gain value from increased access and reduced delays, improved service delivery, and less interaction with intermediaries	India: Andhra Pradesh: Land Registration: payment of property taxes and issue of land titles at 230 locations. Process takes five minutes instead of 15 days
<b>Social value</b>	Improved trust in government. Increased sharing of information. Monitoring of regulatory compliance, greater visibility	Estonia: TOM Portal: Citizens participate in government decision-making; citizens review and comment on draft legislation online and send proposals online to the government
<b>Government operational value</b>	Improvement in current performance and in preparation for future requirements: on-time, completion rate, redundancy, network congestion flexibility	Philippines e-customs: Quick clearance of major transactions has brought down the cost of trade significantly. Cargo is released in four hours to two days as opposed to eight days in the previous system. Business can make payments at banks instead of lining up at Customs offices
<b>Strategic/political value</b>	Organization perceived as moving toward fulfilling its mission: improved public image, legislative guidelines met	Mexico: Declaranet: requires civil servants to declare their patrimonial assets online. Although Mexico's federal public servants have the right to prohibit publication of information contained in their patrimonial declarations, 72 percent have authorized the online publication of their information
<b>Government financial value</b>	Benefits that impact organizational and other federal government budgets: reduced cost and steps per transaction, decreased cost of materials, reduced cost of error correction	Chile: e-procurement system estimated to provide government with efficiency gains of \$200 million per year, a total of 1.38 percent of government expenditure

**Figure 1 — Internet use and GNP**



competing interests and administrative roadblocks. E-government's building blocks are ICT tools. These tools rely on the availability of inexpensive, high quality telecommunications services. Without parallel reform initiatives countries have faced a number of problems:

- *Redundancy of efforts and costs.* Separate agencies within government have redundant planning committees for e-government. Committees within these agencies seldom have the mandate to influence ICT or telecommunications policy. Lack of coordination results in duplication of projects, redundant spending on similar projects and equipment, software licenses, and consulting services.
- *Inability of the ICT sector to thrive in a monopoly telecommunications climate.* Without a competitive environment, the ICT sector lacks the means and motivation to generate innovations required to support new initiatives in e-government and e-commerce. The available pool of ICT skilled workers leave the workforce and migrate, intensifying the brain drain.
- *Significant new public investments in rolling out pilot applications for testing fail to provide "proof of concept".* Citizens and businesses do not access e-government applications due to prohibitive access costs for the Internet and Internet services.
- *Lack of internal buy-in and sustained funding from different government stakeholders and government agencies.* Especially when complex applications systems are developed and implemented without an e-government umbrella, they suffer from lack of common policies, standards and guidelines. There are numerous examples of well-conceived e-government efforts by individual ministries or departments that have faltered in the medium term because of inadequate budgeting for recurring expenses such as upgrades,

maintenance tied to equipment life cycles, training, and staff.

Projects and programs for e-government still tend to be driven by individual ministries and agencies and usually succeed or fail depending on the level of donor financing from multi- and bi-lateral agencies. Once donor financing expires, ongoing funding for these disaggregated efforts depends on the budgeting process of the individual ministry or department. We have encountered many e-government plans of such ministries and departments, some more sophisticated or closer to implementation than others, but few with the budgetary funding necessary to maintain a minimum threshold of sustainability.

Countries that have linked the separate stakeholders in their planning and sequencing of concrete action plans have seen e-government applications thrive. For instance, in the Republic of Korea, the Ministry of Government Administration and Home Affairs, the Ministry of Information and Communication, and the Ministry of Planning and Budget all play a major role in the development and diffusion of e-government services. The first collaboration among the ministries is in business process reengineering of front-office e-services to citizens at local service centers (Song, 2002). In Hong Kong the government requires individual bureaus and departments to consult with their client groups with regard to the scope and implementation of e-government services. To ensure an integrated approach, Jordan's government has appointed the Ministry of Information and Communication Technologies (MoICT) to set goals and plan out all phases of ICT and E-Government development. Most government agencies, private sector leaders, and civil society organizations coordinate with MoICT and recognize it as a focal point for e-government and ICT activities. The MoICT is also training e-government managers in other agencies and organizing workshops with the private sector. These initiatives ensure a cross-agency cooperation as the government moves forward in its e-government strategy (McConnell International LLC, 2002). Estonia is another example of coordinated reform efforts.

### **Estonia's strong reform efforts**

Estonia has implemented a number of initiatives to promote the reform and growth of its ICT sector, which have been key to the success of Estonia's e-government strategy. For instance, the government adopted a policy of demonopolization of the telecommunications sector, including liberalization of the wireless industry, and a legal and regulatory framework for telecommunications that is consistent with EU principles. Thomas Hendrik Ilves, Estonian Minister of Foreign Affairs, stated that:

... a combination of well-designed concession agreements with foreign telecommunications operators, clear government support for a broad e-readiness program, aggressive public awareness-raising,

and governmental commitment to the digital revolution (particularly in education and e-government) were the factors making for Estonia's successful adoption of ICT to both position the economy, but also to address selected development goals (Accenture, 2002).

Estonia committed to provide broad-based connectivity, and access to ICT as a basic right. The country is now a leader in most modern telecommunications networks in Europe, boasting low connectivity costs and high rates of computer literacy. By 1997, 40 percent of Estonia's population was connected to the Internet. Estonia's investment in ICT was followed by broad use of ICT applications in public administration, banking, education, health, and transport.

Estonia's commitment to universal connectivity was based on the following strategies:

- Complete liberalization of the telecommunications market in January 2001 which resulted in a 50-80 percent reduction in prices of long distance calls and Internet connections.
- Provision of 300 public Internet access points offering free e-mail and Internet access.
- Connectivity in rural and scarcely populated areas was managed through concession agreement with foreign telecommunications companies. Rural telecottages funded by local and state governments help to promote economic development, education, and scientific research in rural areas. Farmers are accessing markets by creating auction sites.

E-government applications in Estonia are diverse. Cabinet ministers carry out legislation and communication, and vote online over a portal. All government documents and live broadcasts and full-text transcripts of parliament sessions are posted instantly on the government's main Web site. The portal allows citizens, businesses, and nongovernmental organizations to submit proposals to the government and comment on government's own proposals, thus increasing public participation in decision making. All government business is conducted via a secure Web-based government electronic information system.

### **Developing an enabling telecommunications environment**

Evidence across the world shows that removing barriers to entry and to competition can positively influence information infrastructure growth and expansion in almost all developing countries. Liberalization has helped to create a competitive environment for Internet service providers (ISPs) and encouraged demand for telecommunications services. Regulations that block competition have retarded the growth of Internet services both in government and the private sector, while deregulation and market competition have promoted Internet access and e-government.

### **Internet access and costs**

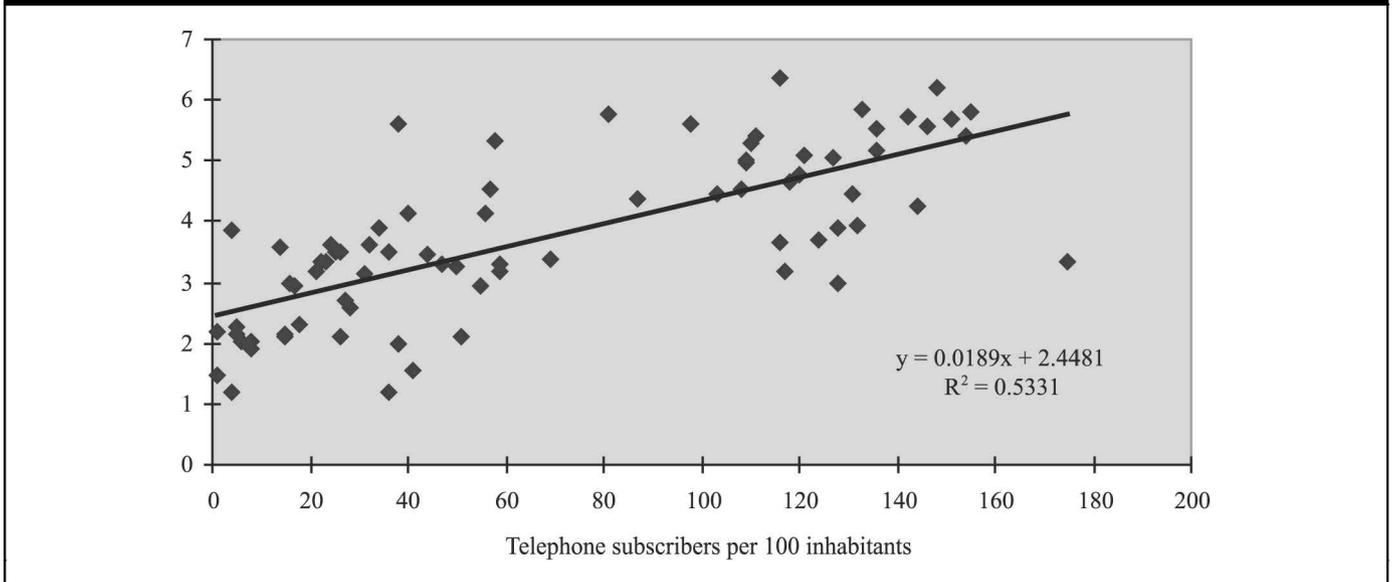
Penetration rates for the Internet depend heavily on access costs. There is a strong correlation between the level of Internet penetration in a country and user costs. Where costs are prohibitively high, penetration rates are below two percent. The affordability of the Internet affects the availability of government services online. A recent opinion survey conducted by the World Economic Forum (WEF) assessed the availability of government services online to ascertain the presence of downloadable permit applications, tax payments, government tenders, etc. (see Figure 2). The scale ranges from not available "1" to commonly available "7" (WEF, 2001). The higher the teledensity of a country, the more likely is the presence of government services online.

### **ICT access and costs for citizens and the private sector**

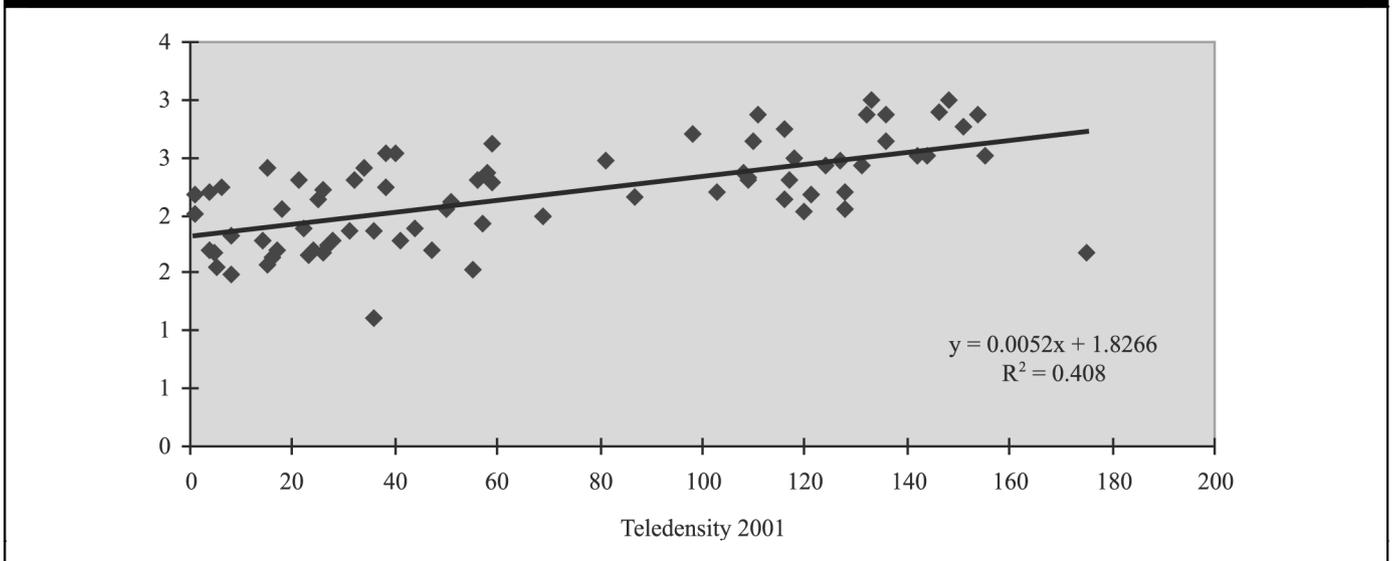
Governments providing online transaction capabilities must consider the cost of access. It is no surprise that the volume of e-business transactions is much higher in countries with liberalized telecommunications markets and a high demand for telecommunications services. Singapore and Hong Kong enjoy the most liberalized telecommunications markets in the world, with the USA and northern European countries trailing behind (Economist Intelligence Unit and IBM, 2002). Both Singapore and Hong Kong have high levels of government online. Other countries with high government access online are Sweden, Norway, Denmark, Finland, Canada, Australia, and the USA[1]. Countries where governments continue to maintain control over telecommunications providers have less e-business transactions due to the prohibitive costs and lack of infrastructure. Tunisia, where telecommunications liberalization is scheduled for 2006, embarked on Tunisie Tradenet, an ambitious online customs project aimed at facilitating the export sector's interaction with the government. While the project has drastically reduced the number of days needed for document filing and customs declarations, it suffers from low usage partly because of the prohibitive Internet dial up costs – about \$20 a day. Fixed-line monopolies, often the largest providers of Internet services such as in the case of Tunisia, create obstacles to the growth of e-business in the developing world even when governments invest in the development of particular online applications (see Figure 3).

In addition to developing e-business applications, governments can take action to create a legal system that enables e-business. Legal and regulatory measures should include allowing for more entrants into the telecommunications industry, passing legislation that protects intellectual property rights of Internet content, and creating mechanisms to ensure online security. To support e-business, governments need to change administrative legislation to simplify procedures and shift to more

**Figure 2 — Teledensity and e-government**



**Figure 3 — E-business transaction with government and teledensity**



streamlined Web based processes, such as for the registration of a new business, or for paying taxes.

**ICT access and costs for the public sector**

Civil servants in developed economies enjoy almost a one to one ratio in terms of PC access. However, lack of resources in the developing world keep the access rates of governments low, and manual processes continue to be the norm. Limited skills of civil servants inhibit e-applications, while in the absence of necessary infrastructure government are unable to interact with citizens and businesses through online channels. Lack of government access to networks

and costs associated with building these networks affect the public sector's performance. Internet access is also often limited by the lack of Broadband and high speed access, which are critical for ensuring the efficiency gains and frequency of information exchanges within governments and with governments and their clients.

One of the benefits realized through e-government is cost reduction in the transfer of information and online transactions. Transferring information over the Internet implies more rapid information sharing (see Table III). However, if telecommunications costs are high, this may not result in

Country	IT budget as percentage of overall budget	PC per employee	Percentage of Internet access
Finland	3.00	0.87	84.50
France	3.40	2.58	77.00
Jordan	1.00	4.00	10.00
Morocco	0.80	3.42	20.00
Sweden	1.30	0.89	90.00
USA	2.10	1.00	95.00

reducing the cost of the transactions. Health insurance claims processing, which rely so intensively on paper records, could see large cost reductions through the use of electronic systems. Electronic Data Interchange (EDI) can reduce the cost of processing forms from \$10-15 per paper claim to \$2-4 per EDI claim. Web based processing could deliver the same service for less; however, this is dependent on the cost of telecommunications access fees (Litan and Rivlin, 2000). The presence of government agencies online is often rather arbitrary. While some agencies within the same government have an online presence that is sophisticated, up-to-date, and content-rich, other agencies have no Web presence at all. Much of this imbalance stems from agency access to infrastructure and to public networks. Governments often invest in the development and maintenance of Web sites because they see this as a useful way to disseminate information. High teledensity is often an important motivating factor behind government agencies putting information online, as it ensures an audience for Internet-based content (see Figure 4).

### Telecommunications policy considerations

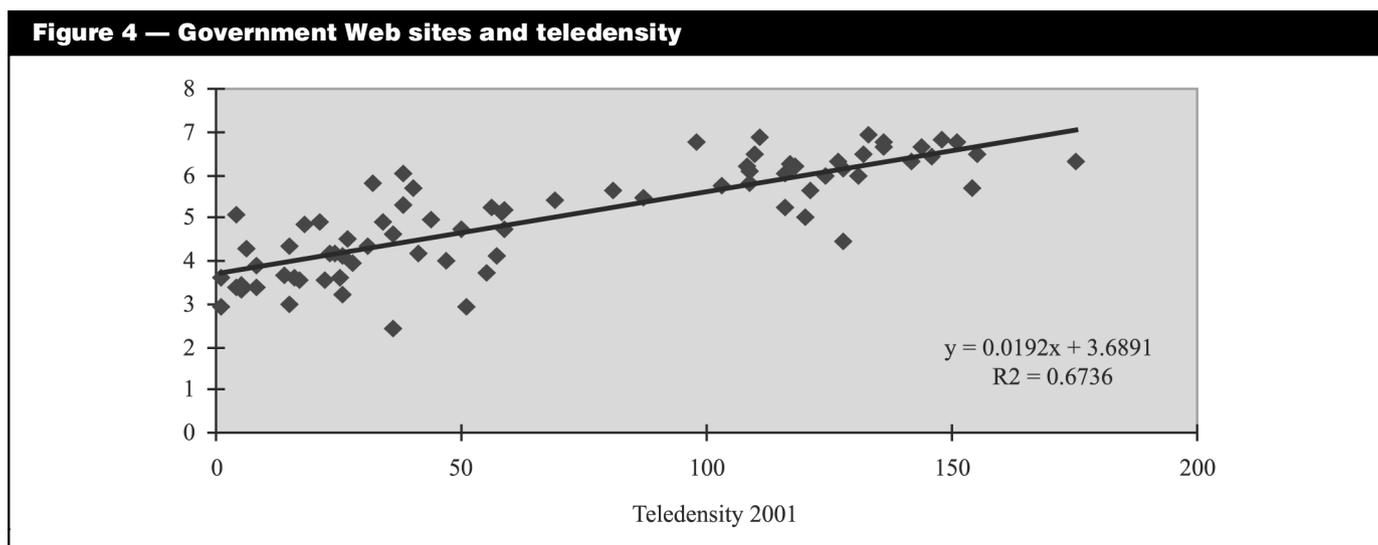
The availability of e-government services is often directly impacted by the level of reform that a specific country has achieved in telecommunications. An analysis of 74 countries was conducted to assess the level of sector reform achieved. The criteria for measuring the strength of the telecommunications sector reform process were competition in local service, privatization of incumbent, and separation of regulatory authority. Countries that had implemented all three criteria were classified as high level reformers, those with any two as moderate level reformers, and those with only one as poor reformers. Figure 5 indicates that on average, the high level reformers have a higher e-government services score than the moderate and low reformers by one and two points of difference, respectively[2].

Other telecommunications policy areas, discussed below, often play a critical role in the quality and availability of e-government services and affect a country's readiness to embark on e-government.

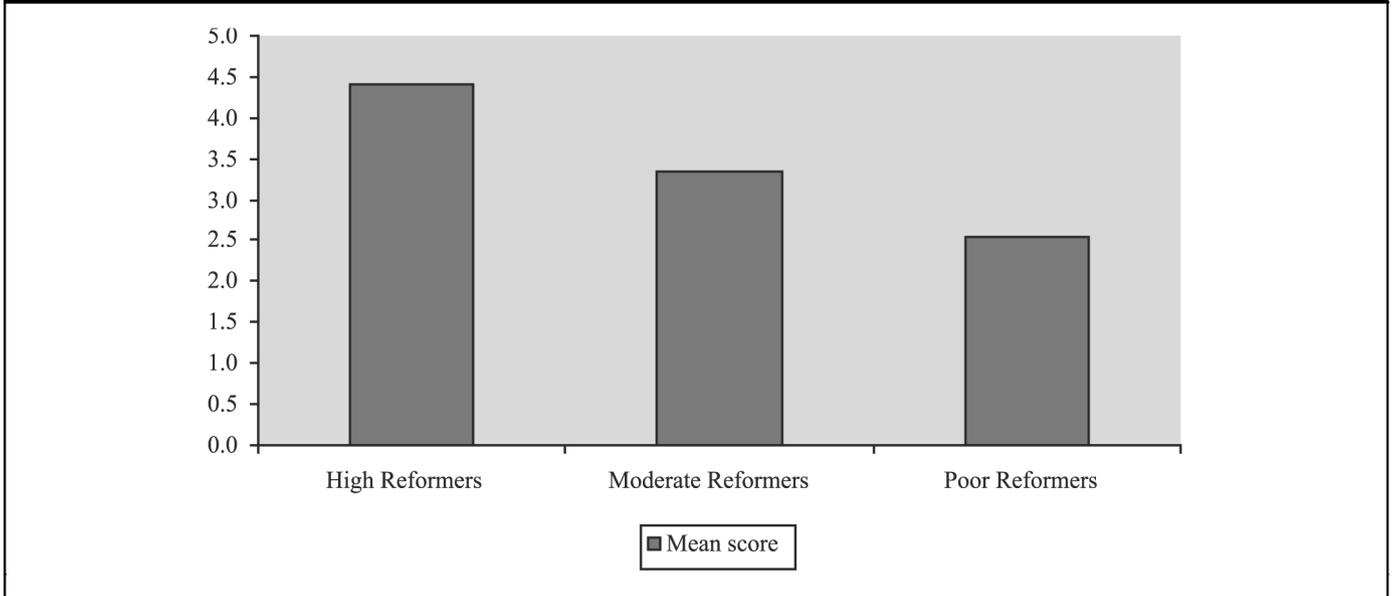
### Planning public networks

When implementing e-government, governments have built and operated separate network infrastructure, and not made much use of existing public and private networks to support their own online initiatives. Better management of such networks as well the introduction of new services and optimization of the existing infrastructure can facilitate e-government.

In Lithuania two public networks have been built for government use. Expansion plans are underway for both networks, but there is no coordination involved in the expansion process. It is envisioned that one of these networks could help support e-government applications. Two ministries within the Government of Indonesia are



**Figure 5 — E-government availability in three levels of reform**



managing two separate networks without much coordination and have run into overlap. One network is underutilized and in need of technical upgrading and repairs the Ministry cannot afford. The other network is catering to the Science and Technology community and is competing with a number of public and semipublic networks to manage e-government applications. On the other hand, in an effort to rationalize public network expansion and utilization, the Government of Malaysia is spending RM20 million to set up the Government Integrated Telecommunications Network (GITN) infrastructure which comprises a nationwide telecommunications frame relay and a computing network built for the public sector.

#### **Dominant carrier regulation and leased line tariffs**

The Internet is accessed by dialing up an ISP over the public switched telephone network. Internet access costs depend on the price that providers charge users. Typically, ISPs have to lease lines from the dominant telecommunications provider who depends on the traffic over the lines for revenue. The role and behavior of the incumbent telecommunications operator directly impacts the growth of an efficient and vibrant ISP market. The introduction of competition – permitting unlimited market entry by ISPs – is one key measure employed by governments to promote such growth.

Regulatory intervention is particularly important in formulating rules for competition and tariff setting. Dominant/incumbent operators have a number of advantages in the ISP market and, in the absence of adequate regulation, can inhibit market growth. For example, an incumbent

telecommunications provider can use its dominance to capture market share for its own ISP. The dominant operator can provide lower prices for high capacity leased lines to its own ISP and sell the same lines at a higher price to its competitors. Such unequal pricing has a direct impact on competition and market share. Dominant carriers may have other advantages too. They can provide Internet and other telecommunications services at attractive prices by bundling the services, which competing ISPs cannot. The delay of providing dial-up and leased data lines can put competing ISPs at a further disadvantage. The incumbent provider can also offer higher quality services at lower prices, thereby capturing a larger part of the market. Competing ISPs will leave the market as the dominant carrier increases its market share.

#### **Quality of service**

Successful e-government requires reliable and continued access to telecommunications networks. Therefore, it is necessary for governments to establish minimum standards in quality. Performance indicators that are critical for e-government include the call failure rate during the busy hour and data speeds. The tariff rules for leased data lines, and regulations regarding service quality and unfair trade practices, can advance competition by limiting price and service quality discrimination.

#### **Frequency management**

E-government deployment will also depend on the management of the national spectrum. Radio spectrum use is being affected by two global trends: the increasing convergence between traditionally separate sectors, such as

fixed and mobile telephony, broadcasting and telecommunications, and information technology and communications; and the rapid innovations that allow new ways to use Internet and mobile communications. Mobile technology is being used in Europe and Korea for e-government transactions to track applications and pay parking fines and permits. The fair allocation, distribution, and pricing of spectrum assignments will affect the growth in mobile technology use for e-government. Allocation for spectrum, which is a scarce resource, will need to be examined in light of these new uses and in keeping with the commitments of the WTO's Basic Telecom Agreement.

### **Numbering plan**

The management of the numbering scheme is also an important enabler of e-government. Since numbers, like spectrum, are a scarce resource, they must be allocated in a fair, nondiscriminatory, and timely manner. While not readily apparent, poor numbering plan allocation and management can have a negative effect. If the availability and quality of numbers assigned to ISPs and data service providers for leased and dial-up lines are inadequate and inferior, or if their assignment is unreasonably delayed, the performance of both e-commerce and e-government will be affected.

### **Universal access**

Obligations to extend telecommunications services to remote and under-served areas must ensure that remote locations have the infrastructure to allow access to e-government services. Brazil's efforts to provide universal access to ICT are noteworthy, particularly since they have been a catalyst for the deployment of e-government applications.

#### *Brazil's ICT development*

Brazil's telecommunications monopoly ended in the 1990s. This was followed by rapid investment in ICT infrastructure from the private sector, though most network rollout took place in urban areas. Brazil has committed to a series of national plans to make ICT more broadly available to all citizens. The government adopted a Universal Access Plan designed to subsidize the provision of infrastructure to low-income areas and to areas that are difficult to serve because of geographic reasons. This led to the creation of the Fund for Universal Access to Telecommunications, a mechanism that subsidizes access to information technology services and programs through funding from the privatization of the national operator, and mandatory contributions from telecommunications operators. One goal under the fund is for all public schools to have computers and Internet access by 2006. The increase in ICT infrastructure has allowed the Brazilian government to provide services over online channels. Brazil's Br@sil.gov initiative calls for the creation of a unified network available to

all citizens via electronic points of presence installed in town halls, schools, and other public buildings. Citizens will access the Internet via satellites. There is significant evidence that Brazil's efforts to provide universal access to ICT have proved to be the catalyst for the development of e-government and high usage. Government services are almost fully integrated within the main government portal ([www.redegoverno.gov.br](http://www.redegoverno.gov.br)) and information and services made available electronically to the public include social security benefits, income tax payment services, distance learning programs, and school enrollment.

### **E-government legislation and regulatory actions**

Commercial activity is increasingly based on the process and electronic transmission of digitized data, including text, sound, and visual images. Government online enables the movement of transactions in which the government is a party from a "paper" to an "electronic" environment. Issues such as contract formation, electronic signature, record keeping, evidence, intellectual property rights, privacy, illegal and harmful content, and taxation present new challenges for traditional regulations when transactions occur in e-space.

"Cyber laws" provide the legal basis for electronic information exchange, payment, and transactions. They are used to establish parity between paper and electronic documents, electronic signatures, e-banking, evidence, and electronic contracts. Electronic communications and record keeping become legal equivalents of stamp duties, government authorizations and certifications, and paper record keeping. Cyber laws also protect electronic data and create provisions to handle fraud and cyber crime. These laws would not only establish trust in payment transactions and information exchanges, but also allow government agencies to reduce costs incurred in keeping manual records. The following issues must be addressed in formulating a legal framework for e-government:

- *Electronic signatures.* The tradition in English common law on which many legal systems are based is manual signatures and witnesses who are physically present in the court of law. For instance, contracts and record keeping have always been based on paper documents and the courts rely on written documents for evidence to enforce contracts and adjudicate matters. However, digital environments and the marketplace make the notion of physical presence and the reliance on physical records somewhat redundant. Laws are required to establish trust among consumers that electronic signatures have the same legal validity as manual signatures. Electronic signature legislation is critical to e-commerce as well as to e-government. A legal framework is also necessary to manage electronic

signatures. Many countries have established separate authorities to handle electronic signature verification using authentication mechanisms such as public key infrastructure (PKI). Mechanisms to ensure authenticity are critical to establish the legality of contracts and banking transactions, and therefore electronic signature protection relies on tight security. An authority needs to establish processes for handling digital signature procedures, security measures, operational rules, and insurance against liabilities. Either a government body or private body can perform this task. To issue and validate customer identity, a Certificate Agency infrastructure is necessary as well[3].

■ *Evidence requirements for electronic transactions, electronic documents and electronic record keeping.* Courts and private parties need legal support to establish the validity of e-transactions. Particularly for courts, electronic documents and electronic signatures need to be put on an equal footing with their paper equivalents. Modifications to notarization laws may be required for circumstances in which notarization and authentication can be conducted electronically and with predetermined procedures established for that purpose. Most agencies and departments of government do not accept documents that do not comply with authentication rules in the same way as paper based documents with original signatures, notarization, and original copies. Electronic records often have no legal value in courts and public administration. This is problematic, particularly since e-commerce transactions result in records that are not stored in a single file in the computer. Transmission and receipt data and other "meta-data" are generally not retained. Some government requirements for authentication prohibit transition to a paperless environment. Archives regulations also enforce paper-based record keeping which limits the ability of governments to transfer records into a paperless format.

■ *Criminal law.* Laws aimed at computer fraud can help governments handle cases of hacking, Web site defacement, appropriation of material not within copyright and tampering or changing data. These laws should also include protections for privacy and intellectual property interests.

For G2B and G2C online initiatives to be implemented effectively, the timing and urgency of each legal or regulatory instrument must be defined, as well as a plan for bridging the gap between current paper-based policies, procedures, and processes, and proposed legislation.

## Conclusion

A competitive telecommunications market and legal enabling environment will permit e-government to become an affordable channel for citizens and businesses to interact with government. Legal frameworks provide the legitimacy and guarantees needed to secure and protect electronic transactions and data exchanges. Where telecommunications infrastructure is available (more phones per capita is associated with more government online) and affordable as a result of competition, e-government applications are quickly embraced and projects are more likely to succeed. Governments have seen the rapid uptake of e-government when there is an integrated approach to planning and implementation of public sector reform, ICT, and telecommunications reform. Governments should promote strategies that focus on ICT infrastructure development as a prerequisite to e-government – an "I before E" strategy. ■

## Notes

1. A caveat worth mentioning is that government online is highly correlated with GDP per capita.
2. Using the availability of government online WEF scores (which run from 1 to 7) and scoring countries' reform progress from 0 to 2 on three factors (privatized incumbent, independent regulator, local loop competition), those that score 0 on reform average 2.6 on the WEF score, those that score 1 on reform score 3.3 on WEF, and those that have fully reformed their telecommunications sector score 4.4 on the availability of government online statistics. In other words, reform of telecommunications is correlated with considerably more government online.
3. See United Nations Commission on International Trade Law (2001), for "model" laws that may be tailored to meet specific local needs; and <http://bankernet.com/ecommerce> for a good source of national e-commerce legislation.

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