Chapter 6

National E-Government Institutions: Functions, Models, and Trends

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The term *e-government* (electronic government) refers to the use of information and communication technology (ICT) to enhance the range and quality of public services to citizens and businesses while making government more efficient, accountable, and transparent (Schware 2005). E-government goals may include improving the following:

- Management of public finances, human resources, and service delivery

- Access to and quality of public services, particularly for poor people (World Bank 2003)

- Investment climates, including lowering regulatory burdens and business-to-government transaction costs

- Government transparency and accountability.

Different e-government programs give priority to some goals over others, in line with national development priorities.

This chapter focuses on national institutions responsible for leading, promoting, coordinating, and facilitating e-government programs. Given the many challenges of moving e-government programs from aspirations to development results in view of the fast-changing nature of technology and the need to constantly adapt to the changing expectations of different stakeholders, this chapter identifies the functions, models, and trends of e-government institutions responsible for translating vision into reality. It provides

a survey of current e-government institutional practices and takes steps toward systematically assessing institutional options and innovations.

Context matters in institutional development (North 1990), and no single institutional model will fit all countries—developing or developed. Although governments share common challenges, they are starting from very different points in e-readiness and administrative development. Thus, they need solutions adapted to different circumstances. In addition, evidence about the effectiveness and impact of alternative institutional arrangements is emerging only slowly. This chapter focuses on identifying basic institutional models, and their strengths and weaknesses, rather than on prescriptions for best practices. Much can be learned from good examples around the world, emerging trends, and systematic assessment of available options.

This chapter first highlights the importance of institutional development for e-government programs. It then identifies strategic institutional design issues in leading and coordinating e-government. To help analyze trends in institutional arrangements, the chapter outlines key functions of effective e-government institutions. Next, the chapter identifies four basic models that countries have used to fulfill these functions and compares the models' strengths and weaknesses. It reports on emerging trends in the adoption of institutional models and the use of institution-building methods. The chapter concludes by emphasizing both the

importance of best fit based on country circumstances and the need for continued institutional innovation.

Why Is Institutional Development So Important for E-Government?

ICT is a useful tool that can enable public agencies to change from routine-based, command-and-control organizations that are inwardly focused on administration to knowledge-based, networked, learning organizations that are externally focused on service (OECD 2005). This shift requires changes not only in front-end transactions and delivery of services to clients but also in integration and reengineering of back-end and core business processes in and across government agencies.

That ICT can assist in such development efforts does not mean that it will inevitably do so, or that it is easy to realize the potential benefits. ICT is expensive and complex. It is also a "disruptive technology." It changes the ways bureaucracies organize and work, power is distributed or controlled, and information is shared or protected. E-government projects have a mixed record (Heeks 2003). The main barriers are institutional—lack of leadership and the capabilities needed to leverage ICT for development strategies and to integrate ICT investments with organizational, process, and skill changes.

Moving to e-government is a major transformational and change management exercise. It entails a managerial revolution and an institutional and political reform process facilitated by technology (Rubino-Hallman and Hanna 2006). Competent leaders and empowered institutions are needed to overcome resistance to process and organizational changes, prioritize and manage complex investments, change skills and mind-sets, coordinate across multiple agencies and project portfolios, avoid duplicate efforts, leverage economies of scale, and maintain a long-term vision of transformation while insisting on concrete short-term results.

Many countries have made unsuccessful attempts to deliver e-government programs. This is largely because they lacked adequate institutional mechanisms for the programs' creative design, effective implementation, objective evaluation, and continual adaptation (Schware 2005). Even though institutions play a decisive role in the formulation and implementation of e-government strategies and programs, they are often treated as an afterthought. Some countries have ignored the need to create umbrella agencies to coordinate highly interdependent e-government activities. Others have lacked a clear division of responsibilities between various government branches and agencies, creating political and bureaucratic obstacles for e-government and inhibiting the proper allocation of resources and policy coordination across government. Yet others have overcentralized e-government management under a single agency or ministry, contributing to a separation between ICT policy and investment decisions and mainstream development issues.

Governments, supported by donors, have often resorted to creating project implementation units to carry out new investment programs, including e-government. The underlying assumption is that e-government development is a one-off project or a blueprint that can be designed by international consultants and implemented by a temporary project unit created specifically to follow the accountability and governance requirements of the donor. Lacking a vision of the leadership and institutional capabilities required for sustainable development, such project implementation units often reduce or crowd out (rather than complement) already weak state capacity (Fukuyama 2004). Different donors may work with different ministries and place their project implementation units within those ministries—reinforcing isolation, fragmentation, and duplication of e-government networks and applications.

Developing e-government, however, is a process, not a product or a blueprint. It is a continuous process of policy development, investment planning, innovation, learning, and change management (Fountain 2001; Ramsey 2004). This process must fit with and respond to a dynamic development strategy that supports evolving national goals and creates sustained institutional reforms and public service improvements. The challenge is to build effective governance and institutional frameworks for ICT-enabled public sector modernization and make the new competencies part of the country's human and institutional resources.

Moreover, the institutional culture and governance frameworks of the public sector sometimes do not fit well with the aims of innovation and transformation and the modalities of an integrated approach to e-government. Current arrangements often emphasize stability, a silo mentality, an inwardly focused bureaucracy, separation between the public and private sectors, and the isolation of technology

managers from mainstream public policy leadership. These gaps need to be bridged.

At the same time, institutional development is path dependent (North 1990). Countries must deal with their institutional legacies while adapting and innovating new ones. The design of e-government institutions should be guided by a deep understanding of the political economy of reform and modernization. This is bound to be a long-term process that involves experimentation, learning, and adaptation (Rodrik 2004).

Thus, institutional changes and innovations are needed to manage the cross-cutting nature of e-government activities in fundamental, unprecedented ways. Strong leadership, governance, and organization make it possible for economic and social systems to function effectively during periods of change and transformation. They provide the strategies, implementation methods, coordination tools, and monitoring and evaluation mechanisms that enable innovative efforts to be undertaken and scaled-up programs to be successful. Specialized institutions and new competencies are required to create, acquire, adapt, and diffuse technologies and to synchronize them with associated policy reforms, intangible investments, managerial innovations, and organizational changes.

What Strategic Issues Arise When Designing E-Government Institutions?

Countries have created various institutional arrangements to cope with the governance issues and coordination challenges posed by e-government. These include shifting from one model to another, experimenting with hybrids, and developing entirely new models. Still, countries share the same basic choices and considerations:

- *Integration with development.* What kinds of institutional arrangements are needed to integrate e-government with a country's development strategy and state modernization? What role should central ministries (finance, planning, or economy) play in the process? Which policy makers should decide on e-government investments that are congruent with national development policies and goals?

- *Synergies between e-government and the rest of e-development.*[1] What kinds of institutional leadership and networks are needed to tap the synergies among e-government,

telecommunications infrastructure, ICT literacy and human resources, ICT as a sector or core competency, and ICT as an enabler or productivity driver for all sectors of the economy?

- *Coordination across e-government components.* How should governments coordinate and balance their ICT-enabled transformation? How can the technological imperatives of building a common enterprise architecture be reconciled with the need to empower agencies and ministries to articulate their service priorities, implement their ICT-enabled service transformations, and integrate ICT with their sector strategies? How can public leaders achieve client-centered public services that span agencies and ministries? Beyond coordination, what incentives and institutional frameworks could encourage collaboration?

- *Degree of centralization.* How much should governments centralize or decentralize planning and decision making in e-government investments? Which elements of e-government are amenable to central direction and coordination, and which are best left to bottom-up initiatives and decentralized innovation? What institutional arrangements are needed to promote both bottom-up innovation and top-down reforms, and to enable scaling up of successful local e-government initiatives? How can e-government institutions enforce this optimal level?

- *Fit with institutional architecture and capabilities.* How should new e-government institutions and capabilities be designed to fit with—or perhaps transform—a country's political culture and institutional structures? For example, what kinds of institutional arrangements and capabilities would be most conducive to building effective partnerships among government, the private sector, academia, and civil society? What role should be played by the ministry currently responsible for ICT? How much authority and autonomy should be given to a central coordinating ICT agency?

What Are the Key Functions of Effective E-Government Institutions?

The analysis in this section is based on a review of national approaches to e-government leadership (box 6.1) in 30 developing and developed countries (see annex 6A

> **Box 6.1** The Functions of E-Government Institutions
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> The key functions of central leadership institutions are grouped into three areas: strategy and policy making, governance and coordination, and facilitation of e-government implementation.
> The area of *strategy and policy making* aims to ensure that e-government goals, policies, and strategies are consistent with the country's overall development and state modernization objectives. Having an interministerial committee chaired by the head of state indicates that high priority and leadership are given to e-government strategy and policy making.
> *Governance and coordination* functions include the following:
>
> - Developing governmentwide information infrastructure, shared networks, data centers, business processes, and one-stop service delivery centers
>
> - Formulating e-laws and frameworks for IT (information technology) governance
>
> - Mobilizing, prioritizing, and allocating resources for e-government infrastructure and services
>
> - Monitoring, evaluating, and communicating lessons of experience, providing feedback, and ensuring accountability.
>
> *Facilitation of e-government implementation* is handled in most countries by a single ministry responsible for e-sector (vertical e-government) applications. This study does not track implementation of these single-sector e-government applications. However, ministries involved with vertical or sectoral applications often need technical support to implement their e-services. Common support services—such as IT human resources development, public-private partnerships, and IT procurement and contract management—may be provided by a specialized central agency. In some countries, ICT agencies or councils of chief information officers (CIOs) help share experiences and lessons across ministries.
>
> **Source:** Authors' analysis.

for a list of the countries). The review was shaped by three questions:

- What is the country's arrangement for e-government strategy and policy making?

- What is the country's approach to e-government governance and coordination?

- How does the country facilitate e-government implementation?

Strategy and Policy Making

In more than two-thirds of the countries studied, e-government strategy and policy are coordinated by an interministerial committee—often led by the head of state and part of his or her (or the cabinet's) office. Examples include China's State Council Information Leading Group, the Republic of Korea's Presidential Committee on Government Innovation and Decentralization, Kenya's Directorate of e-Government, Mexico's President's Office for Government Innovation (box 6.2), Pakistan's National E-Government Council, Tunisia's E-Government Ministerial Committee, and the United Kingdom's Office of the e-Envoy and subsequently e-Government Unit.

These committees formulate e-government strategy and policy and direct their implementation across ministries and agencies. Though these entities are rarely granted executive powers, they act as independent bodies for strategic oversight and policy coordination for a range of ministries. Other institutions remain responsible for implementing specific components of the national e-government plan.

To develop e-government strategies and policies, countries must rigorously analyze their development and state modernization priorities and encourage active participation by all major stakeholders. E-government is a highly dynamic process, with constant innovations in technologies, applications, products, and processes. It cannot be pushed or defined solely by government. Institutional frameworks should provide opportunities for all major stakeholders—government, the private sector, academia, and civil society—to build mutual understanding and

> **Box 6.2** Kenya's and Mexico's Experiences with Formulating
> E-Government Strategy Using Interministerial Steering
> Committees
>
> Kenya makes e-government a priority in its development agenda. The Directorate of
> e-Government, located in the Cabinet Office under the Office of the President, formulates
> the country's e-government strategy. This directorate is chaired by the Secretary for
> e-Government and is the secretariat to two interministerial committees: the Cabinet Stand-
> ing Committee and the Permanent Secretaries' Committee.
>
> The Cabinet Standing Committee is chaired by the Minister of Public Service and provides
> the political leadership needed for the e-government program. The Permanent Secretaries'
> Committee is made up of permanent secretaries from all ministries and provides the institu-
> tional ownership and support needed to marshal staff and resources to expedite e-government
> implementation.
>
> In Mexico, the President's Office for Government Innovation sets the direction for
> e-government and coordinates e-government activities within the framework of the coun-
> try's Good Government Agenda. The office provides political support and leadership for
> e-government, which includes establishing an e-government network and ensuring broad
> participation across agencies.
>
> In late 2005, an interministerial commission—drawing on 50 ministries and departments—
> was created for e-government development. The commission serves as a governance and
> regulatory framework in support of the national e-government strategy. The Executive Council
> under the commission sets policies and standards and is responsible for coordinating, imple-
> menting, and operating horizontal initiatives (such as gateways and citizen portals).
>
> **Sources:** Authors' analysis; Evalueserve 2007.

provide input into e-government strategies and policies. This is especially important given the size and interdependencies of e-government investments, innovation efforts, and spillover effects for major stakeholders.

E-government evolves along with a country's needs and implementation capabilities. Therefore, to ensure continuity as well as adaptation, the strategy formulation process must be institutionalized. Institutionalization is also needed to secure ownership and commitment to the strategy adopted and to translate shared visions and strategy documents into actions. Links to development can be forged only when the e-government strategy process is driven by institutional mechanisms that engage and coordinate potential e-government users from all sectors of the economy.

Governance and Coordination

Organizing e-government involves assigning responsibilities for governing, coordinating, prioritizing, and monitoring e-government programs and activities. Given that e-government has emerged relatively recently as a national issue and given its pervasive impact, many countries have made

e-government a specific portfolio in order to ensure that shared infrastructure is in place, e-government applications are prioritized, adequate resources allocated to agencies, interoperability promoted through common standards, and outputs and outcomes monitored and evaluated.

The fact that national e-government portfolios (where they exist) reside in several different ministries and involve various administrative arrangements implies that e-government does not have a natural home for governance and coordination. Regardless, e-government institutions should be able to perform several governance and coordination functions, as described below.

Developing governmentwide information infrastructure, shared networks, data centers, common business processes, and one-stop service delivery centers. Governments need to reform, reengineer, and connect systems and processes that have resulted from decades of inwardly focused operating strategies. Ministries and agencies often have independent ICT programs, and some operational independence is needed. But when e-government funds are mainly invested autonomously or coordination is limited

to single applications or donor portfolios, it results in duplication, interoperability problems, and substantial waste of resources.

One role of central e-government institutions is to promote, develop, and support common information infrastructure and applications, including governmentwide networks, government portals, data centers, and common business processes (for example, for financial and accounting systems, payment systems, human resource management, and public procurement systems). They also need to <mark>coordinate or integrate service delivery channels and thus move government agencies from fragmented, multiple, discrete channels to a networked, multichannel approach to service delivery</mark> (OECD 2005).

Identifying and standardizing common functions across government address the challenges arising from the silo structure of public administration. It reduces duplication of systems and processes, captures process innovations and reusage solutions across government, focuses on improving core activities and outsourcing secondary ones, consolidates ICT expertise, and promotes interoperability and administrative simplification. These efforts imply that central e-government institutions should have resources under their control to invest in shared information infrastructure, induce collaboration across agencies to develop standardized business processes and shared networks, and push for governmentwide interoperability.

Formulating e-laws and frameworks for IT governance. To set and enforce common laws, regulations, and IT governance in support of e-government development and operation, governments should create institutions responsible for, among other things, developing e-government policies and legal and regulatory frameworks for issues such as e-transactions, e-security and privacy, and access to information. E-laws are likely to affect many stakeholders. Thus, their formulation and enforcement involve more than the ministry of justice or ICT. A central agency or institutional mechanism should therefore lead and coordinate the process of designing and adapting such laws and of monitoring and evaluating their impact. Such an agency should also harmonize country-specific e-laws with international conventions and best practices.

A number of countries—including developing ones such as Jordan, Morocco, Romania, and Vietnam—have made adopting and promoting governmentwide ICT architecture frameworks, approaches, and technology standards an integral part of their e-government strategies. A key requisite for achieving compatibility and interoperability in government departments is the establishment of institutional mechanisms and organizational processes for enforcement and compliance. Equally important is the institutional setup for maintaining and updating ICT architecture and standards. ICT architecture and governance frameworks should be dynamic and reflect fast-changing technologies and innovation possibilities.

Several countries have opted for a centralized institutional structure to facilitate interoperability. For example, the United Kingdom has established a centralized accreditation authority to implement its e-Government Interoperability Framework. A similar role is played by Canada's Treasury Board and Singapore's Infocomm Development Authority.

Mobilizing, prioritizing, and allocating resources for e-government infrastructure and services. Most developing countries suffer from huge deficits in the reach and quality of public services. Thus, there is often a temptation to do everything at once, and political pressures, growing expectations, and interest groups often encourage new ICT agencies or e-government institutional arrangements to take on too many projects and spread resources across too many initiatives. Although many governments invest heavily in ICT and e-government programs, investment levels are seldom a good gauge of progress or results. In fact, even substantial investments in e-government often fail to bring about the results they are intended to achieve (Fountain 2001; Heeks 2003).

Moreover, in developing countries, public resources for e-government are likely to be scarce. Absorptive capacity, change management capabilities and leadership, and project management and technical skills are also binding constraints on e-government. As a result, governments often rely on strategic analysis to survey and prioritize public services, develop sequenced investments, and mobilize resources outside the public budget for such investments. Donor agencies have encouraged such planning and prioritization. The goal is to identify and allocate resources to high-impact services.

But such efforts have often been treated as one-time events, driven by ad hoc institutional arrangements or donors. Yet technology, service priorities, and infrastructure need to sustain change over time. This requires that e-government

institutions develop new and rigorous frameworks to maximize the impact of their investments and ensure that the resulting outputs are affordable, scalable, and sustainable.

E-government institutions must have a strong influence over ICT resource management, particularly through ICT budgeting and procurement. Budgeting and procurement are key to translating the prioritizing and sequencing of investments in services into reality. Given the scarcity of public funds and skills, innovative financing schemes and partnerships with the private sector and civil society are needed.

Monitoring, evaluating, and communicating lessons of experience; providing feedback; and ensuring accountability. Evaluating e-government programs is challenging. Even most developed countries have done only limited assessments of how well ICT investments have been used. Governments need to develop systematic monitoring and evaluation mechanisms that can serve as tools for improving program management, answering questions from stakeholders, meeting official reporting requirements, increasing the understanding of program strategies and goals, and promoting interest in and support for e-government programs and activities (see chapter 5 on existing frameworks for monitoring and evaluating e-government). Furthermore, information from monitoring and evaluation must be used to redesign, change direction, and implement new strategies where necessary.

Monitoring and evaluation is often confused with cost-benefit analysis. The latter is an administrative practice in efficiency-focused investment choices, whereas the former is about realizing public value in service offerings as part of the business strategy practice. E-government programs are concerned with creating public value and achieving development results. Canada provides a good example of best practices in using monitoring and evaluation for timely feedback and accountability with its series of studies on the use of e-government services, and with its use of the findings to reshape its e-government strategy and investments.[2]

E-government development often neglects strategic communication of visions shared, progress made, impacts measured, and lessons learned to all concerned stakeholders (Hanna 2007a, 2007b). Yet without such awareness and communication, e-government cannot be broadly owned or sustained or integrated with the overall development agenda. As a demanding transformational task, e-government requires mobilizing policy makers to lead policy reforms and institutional changes and mobilizing potential communities of ICT users to innovate and press for change (box 6.3).

The ICT governance and coordination functions described above lie at the heart of mandates for e-government institutions. They could make the difference between e-government success and failure; between exploiting economies of scale and suffering substantial duplication of investments; and between focused, coherent investment portfolios and diffuse, poorly planned resource allocations. These functions are key to creating a vibrant e-government ecosystem and an enabling legal and regulatory environment for e-services. Establishing a shared vision of modern, ICT-enabled government and developing the needed monitoring and evaluation systems further ensure an adaptive and learning strategy for public sector modernization and service innovation.

Facilitating E-Government Implementation

Coordination is important for minimizing redundancy and duplication, but it is insufficient for redesigning and reforming business processes, facilitating collaboration and knowledge sharing, and implementing a user-focused approach to delivering services. Most government agencies are unlikely to have in-house expertise that can simultaneously define a country's ICT requirements, cost-effectively procure IT hardware and software, engage in business process reengineering and change management of services, institute public-private partnerships and service-level agreements, and establish timely access to best practices in adopting new technology or knowledge of trends transforming governments around the world.

Thus, it is necessary to have institutions with the expertise, budgets, and other means to facilitate implementation of e-government strategies and ensure that key stakeholders are engaged at all levels. Given the scarcity of ICT and change management skills in the public sector and the potential economies of scale involved in e-government development, facilitation and technical support functions are often shared across agencies or provided by the private sector. Moreover, implementation problems change over time, presenting novel situations that demand innovation and peer support. E-government institutions should facilitate partnerships in e-government investments and operations and promote collaboration among government agencies for process innovation and integrated solutions.

A key function of e-government institutions is human resource development and capacity building to help government agencies absorb and manage ICT. The central e-government ministry or agency may take the lead in the professional development of ICT specialists and chief information officers (CIOs) in government, including defining roles and career structures and certifying education programs for minimal qualifications and professional development. E-government institutions can also support the development of communities of practices and knowledge sharing systems for public ICT professionals, and raise awareness among policy makers.

What Are the Institutional Models for E-Government?

This section describes four models that governments have used to create a national institutional framework to lead the e-government agenda and fulfill the key functions of strategy and policy making, governance and coordination, and facilitation of implementation (table 6.1). The actual arrangements are more diverse than suggested by these groupings and do not fit neatly into these simplifying models. Moreover, countries' institutional arrangements shift over time—often from one model to another. Thus, the countries here are classified based on their most distinguishable structural features for the most recent period or longest duration, with the understanding that these institutional models are used only for comparative analysis and for detecting patterns and trends in a rich, complex institutional reality.

Model 1: Policy and Investment Coordination

Working from the ministry of finance (or treasury, economy, budget, or planning) gives the entity responsible for governing and coordinating e-government activities direct access to the funding it needs. In addition, it enables easy control over funds required by other ministries in pursuing e-government goals set for them. It also facilitates integration of the e-government agenda with the country's overall economic development agenda. This model seems to have worked relatively well in countries that have a powerful central agency with cross-cutting mandates (examples of such organizations include the Treasury Board of Canada and the U.S. Office of Management and Budget). It enforces policies and priorities through the budget process, yet allows effective decentralization of implementation.

Most countries using this model started adopting e-government initiatives early on and made sustained

Table 6.1 Models for E-Government Institutions in Various Countries

Model	Countries	Benefits	Drawbacks
Policy and investment coordination (cross-cutting ministry such as finance, treasury, economy, budget, or planning)	Australia, Brazil, Canada, Chile, China, Finland, France, Ireland, Israel, Japan, Rwanda, Sri Lanka, United Kingdom, United States	Has direct control over funds required by other ministries to implement e-government. Helps integrate e-government with overall economic management.	May lack the focus and technical expertise needed to coordinate e-government and facilitate implementation.
Administrative coordination (ministry of public administration, services, affairs, interior, state, or administrative reform)	Bulgaria, Arab Republic of Egypt, Germany, Republic of Korea, Mexico, Slovenia, South Africa	Facilitates integration of administrative simplification and reforms into e-government.	May lack the technical expertise required to coordinate e-government or the financial and economic knowledge to set priorities.
Technical coordination (ministry of ICT, science and technology, or industry)	Ghana, India, Jordan, Kenya, Pakistan, Romania, Singapore, Thailand, Vietnam	Ensures that technical staff is available; eases access to nongovernmental stakeholders (firms, NGOs, and academia).	May be too focused on technology or industry and disconnected from administrative reform.
Shared or no coordination	Russian Federation, Sweden, Tunisia	Least demanding and with little political sensitivity (does not challenge the existing institutional framework and responsibilities of ministries).	May lead to rivalries among ministries. No cross-cutting perspective. Fails to exploit shared services and infrastructure and economies of scale.

Source: Hanna and Qiang 2009 (chapter 6 in this volume).

commitments. Today, Canada is a leader in terms of e-government strategies; its government laid out a clear, specific, comprehensive, actionable strategy at an early stage. The strategy has been effectively rolled out to and implemented by government departments. Other countries, such as the United States, have had similar success attributable to early beginnings and sustained commitments. These countries also tend to spend more government funds per capita on ICT than do most other countries (Booz Allen Hamilton 2002). A drawback is the lack of focus and technical expertise of the coordinating body.

Model 2: Administrative Coordination

Countries that adopt a model of e-government led by the ministry of public administration (or services, affairs, interior, state, or administrative reform) coordinate e-government within the framework of their good governance agendas. This model facilitates the integration of e-government efforts with administrative reform, simplification, and decentralization. It raises the visibility of the e-government agenda and encourages broad participation across agencies. Moreover, increasing government efficiency and transforming public services are the ultimate goals of any e-government initiative, making this

model outcome-oriented rather than technology-driven. But a potential downside is that the leading ministry may lack the technical expertise and budget mechanisms required to ensure technical coordination.

Model 3: Technical Coordination

Governing and coordinating e-government activities under a technical ministry such as the ministry of ICT (or science and technology or industry) ensures that specialized technical staff are available to address ICT issues. This approach may be a natural evolution of the traditional role of the ministry of telecommunications—typically when the approach to e-government is focused on infrastructure. It may also have the advantage of involving the private sector and other nongovernmental stakeholders more effectively in the e-government process and thus allow for innovative public-private partnerships. But if the technical ministry has limited leadership competencies, the e-government agenda remains outside broad public sector reform efforts and the core development agenda. Accordingly, strong financial mechanisms with well-defined carrots and sticks must be in place to ensure compliance and cooperation.

Model 4: Shared or No Coordination

In this model, e-government development and implementation functions are distributed among existing ministries. Thus, each ministry is responsible for the part of the e-government strategy that falls within its field of expertise. This model does not involve any new coordination mechanisms and is the least politically demanding, making it the easiest to adopt for the short term. Funding for e-government activities comes from the ministries' budgets. However, agencies set up their own information systems—and in some cases, proprietary communications networks—leading to duplication and impairing information sharing. This approach is likely to result in uneven development across ministries and missed opportunities to leverage economies of scale in shared infrastructure, applications, and support services.

The choice of institutional location for e-government governance and coordination may reflect more general tendencies or legacies: faced with a new challenge, a government may have a preference about where it locates responsibility. While administrative control can be wielded to ensure cross-agency coordination, placement of e-government responsibility under each model has clear advantages and disadvantages that should be borne in mind—and perhaps complemented by capacity building and cross-agency policy and strategy mechanisms.

Alternative Models

The four institutional models just described focus on the leading or central institution for e-government strategy and policy making, and governance and coordination. But governments have increasingly created and experimented with new arrangements outside the ministerial structure—including ICT agencies and councils of CIOs—to overcome sectoral silos and civil service constraints and to create a new capability to engage various stakeholders and agencies in facilitating implementation.

ICT agency. When implementing ICT strategies, governments inevitably compete with the private sector for scarce ICT talent. For example, the first CIOs (or their equivalents) in Italy, the United Kingdom, and the United States were recruited from the private sector. Such competition is no longer local: it is global. This highlights the challenges involved in hiring, training, and retaining skilled staff for e-government institutions and ICT programs in ministries and agencies. This challenge goes

beyond ICT specialists, and includes people with a broad understanding of and talent in public sector reform, ICT-enabled business process reengineering, service innovation, supply chain management, public-private partnerships, change management, knowledge management, and transformational leadership.

Several countries have created dedicated executive ICT agencies in their civil services but have given them special autonomy and salary structures to attract and motivate the best technical talent. Such agencies prioritize investments and coordinate and monitor implementation of e-government, often under the supervision of an interministerial committee that sets policies and strategies. The chiefs of these agencies sometimes serve as national CIOs. Moreover, such agencies are often charged with developing mechanisms that encourage all stakeholders to become involved in e-government and the exchange of information, experience, and best practices through focus groups, workshops, seminars, and online tools. Bulgaria, Ireland, the Republic of Korea, and Singapore have adopted variations of such central ICT agencies (box 6.4).

Given the innate conservatism of public agencies and the transformative nature of e-government, it is not surprising when government leaders turn to bodies outside standard ministerial structures. Having a focal ICT agency also makes it easier and more effective to focus on e-government goals. The creation of such an agency typically involves adopting comprehensive approaches to integrate e-government with broader development strategies.

However, a new entity may struggle to obtain needed political weight and resources. An ICT agency's impact on e-government thus depends on institutional links to the leadership of the line ministries responsible for process transformation and sectoral (vertical) applications, as well as strong ties to powerful ministries such as finance or public administration. The viability of an ICT agency also critically depends on the authorizing environment, and whether political leaders are committed to giving the agency the autonomy needed to act in an agile manner and avoid political interference in staffing and day-to-day management.

A variation of the ICT agency described above is a public-private partnership or quasi-public enterprise. Private sector participation in public sector ICT policy and strategy formulation, as well as rigorous public-private partnership frameworks for investing in and implementing e-government programs, are more common in developed than in

Box 6.4 Singapore: Pioneering a Centrally Driven Public ICT Agency

Singapore developed one of the world's first national ICT plans in 1980. Successive plans and e-government institutions have become increasingly broadened, deepened, and decentralized.

The InfoComm Development Authority was created in 1999 with the merger of the National Computer Board and the Telecommunications Authority of Singapore.[a] The Authority operates under the Ministry of Information, Communications, and the Arts. As the government's chief information office, it drives the implementation of Singapore's e-government action plan and provides the technical expertise for various e-government programs, under the guidance and oversight of the interministerial E-government Policy Committee and the Ministry of Finance's E-government Office.

Since 2002, the InfoComm Development Authority has focused on creating relevant content, promoting public use of e-government services, and ensuring universal access to such services. Government agencies were required to survey their customers' needs and launch marketing campaigns to promote e-government services through the single window, eCitizen. To secure ownership of e-government by civil servants, the InfoComm Development Authority has been empowering public officers with training and resources for ICT-enabled innovation and knowledge sharing. The InfoComm Education Program was launched to equip officers with needed ICT skills, and the Knowledge Management Experimentation Program provided seed funding to encourage public agencies to pioneer knowledge management projects that nurture knowledge sharing.

Some of the technical expertise developed in the public sector under the InfoComm Development Authority was subsequently transferred to semipublic enterprises such as National Computer Services to deliver e-government advisory services beyond Singapore. More recently, Singapore has been positioning itself to go global, sourcing talent from and partnering with other Asian countries and leveraging infrastructure and capital to become a knowledge services hub for the world economy.

Source: Authors' analysis.

a. See http://www.ida.gov.sg.

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developing countries. But in recent years such partnerships and business influence on government ICT use have been increasing in developing countries—particularly where public sector performance suffers from civil service constraints and the private sector's technological know-how is relatively advanced.

Under this institutional innovation, an ICT agency would be semipublic, operating like a business but ultimately answerable to a country's political leadership (Hanna 2008). Such an agency typically has a government-appointed board of directors, the chair of which reports directly to the head of state, and is composed of representatives of key stakeholders from the private sector and civil society. The agency's responsibilities may cover only the central leadership of e-government or extend to the entire range of the e-development agenda. The national chief information officer may be the chief executive of such an agency. Sri Lanka is

currently experimenting with this institutional model (box 6.5). In India, the National Institute for Smart Government was created as a public-private partnership, with joint financing from the government and the National Association of Software Services Companies, to advise on e-government progress.

To succeed, these public-private partnerships should be staffed by experienced development strategists, ICT professionals in various disciplines, and project coordination specialists who can liaise between the public and private sectors. These staff members could be hired from the public or the private sector, as available. A hybrid staff will reflect the diversity of skills and experiences needed to cut across the public, private, and civil society sectors, and be able to understand and partner with diverse groups of beneficiaries. The staff must strike the right balance of business culture and public values and accountability.

The main advantages of the public-private partnership model are that the ICT agency is free from government bureaucratic requirements and has the flexibility to react swiftly to changing demands. In addition, the agency can more easily hire the required cutting-edge staff at competitive wages. It also has the freedom to provide shared technical services (such as for network infrastructure) to the government or to contract out to the private sector. By pursuing public-private partnerships and extensive outsourcing, the agency can remain lean, focused, and agile. Finally, active private sector participation would help the agency operate in a businesslike way and make the best use of scarce resources. This model fits well with—and compensates for—the weak civil service environment in many developing countries.

One disadvantage of a public-private partnership in an e-government institution is that it may not receive the political and financial support it needs if it is not directly linked to a powerful ministry or the prime minister's office. In addition, the public sector bureaucracy may reassert control over the agency, and political interference may reduce the effectiveness of agency staff and undermine its businesslike culture. A comparative study of public-private partnership innovations in different sociopolitical contexts is warranted to reach more generalized and robust conclusions about the merits of this model.

Council of chief information officers. About one-third of the countries in this study's analysis are instituting or experimenting with national councils of CIOs, supported by CIOs in ministries and agencies. This approach combines centralized governance and coordination with decentralized implementation and ownership. The role of such councils has evolved and become increasingly critical to e-government development. These councils vary in mandate but often involve addressing common CIO concerns and challenges, such as investment planning, IT procurement practices, information security policies, and IT human resource development (box 6.6). They also have been engaged in CIO capacity development by providing inputs into defining core competencies, accrediting CIO education and training programs, and sharing information

Box 6.6 Chief Information Officer Councils in Various Countries

Australia. Significant e-government matters affecting all jurisdictions are processed by the Online and Communications Council. The council includes a cross-jurisdiction CIO committee chaired by the Australian government's CIO—who also chairs the Australian Government Information Management Office (AGIMO)—and the Chief Information Officer Committee, which investigates ICT issues, endorses solutions, and undertakes strategic ICT projects. The AGIMO and Chief Information Officer Committee also collaborate with the Business Process Transformation Committee, which coordinates reform of agencies' business processes (ICA-IT 2006a, pp. 1–6).

Canada. To promote interjurisdictional collaboration, the Public Sector Chief Information Officer Council and the Public Sector Service Delivery Council bring together various levels of CIOs and leading service officials to exchange best practices, conduct joint research, and evaluate and pursue opportunities to adopt common practice and collaborate on integrated service delivery.[a]

Singapore. The ICT Committee aims to share experiences, promote integration across agencies, streamline processes, and share data (Tan 2007). The CIO Forum, comprised of CIOs from key agencies, was created in 2004 to promote interagency sharing of best practices and systems as well as consultancy on and review of central systems and investments, increasing opportunities for collaboration. The forum also provides a venue for giving feedback to central authorities on servicewide e-government initiatives (ICA-IT 2006b, pp. 3–5; Infocomm Development Authority of Singapore 2005, p. 4).

South Africa. The Government Information Technology Officers Council serves as a coordination and oversight unit, involved in the development of IT security policy, e-government policy and strategy, IT procurement guidelines, and project coordination.[b]

United Kingdom. The CIO Council was created to support the Cabinet Office's E-government Unit on research, monitoring of major government IT projects and investment decisions, management of and career development for government IT professionals, and management and analysis of relationships with strategic government ICT suppliers. The council also enables partnerships between IT professionals in various areas of government.[c]

United States. The Federal CIO Council's role includes developing recommendations for IT management policies, procedures, and standards; identifying opportunities to share information resources; and assessing and addressing the federal government's IT workforce needs. It also addresses cross-cutting issues—such as financial management and procurement—with other federal executive agencies.[d]

a. See http://www.tbs-sct.gc.ca/organisation/ciob-ddpi_e.asp and http://www.servicecanada .gc.ca/en/about/index.shtml.
b. See http://www.southafrica.info/public_services/citizens/services_gov/sagovtonline.htm and http://www.dpsa.gov.za/egov_documents.asp.
c. See http://ec.europa.eu/idabc/servlets/Doc?id=21032 and http://www.cio.gov.uk/about _the_council/the_cio_ council.asp.
d. See http://www.cio.gov/index.cfm?function=aboutthecouncil.

and best practices among CIOs. CIO councils are expected to play an increasing role in consensus building, vertical and horizontal communication, team-based problem solving, and knowledge sharing.

Many countries view e-government as a catalyst for developing indigenous ICT industries and local technological capabilities. Furthermore, there is growing awareness that e-government depends on other elements of e-development, including IT literacy among citizens and small enterprises, countrywide connectivity and access, public policies on e-commerce, and the availability of local skills to adapt and support information systems. National ICT agencies or CIO councils may help tap synergies and coordinate investments across all the key elements of e-development.

What Are the Broad Trends in the Evolution of E-Government Leadership Institutions

The promises of e-government have been slow to come to fruition because deep transformation of how government works and relates to citizens and businesses is difficult and time consuming. Transformation takes sustained leadership and targeted incentives to reshape relationships and create networked, adaptive, ICT-enabled government agencies. It also requires building coalitions, aligning e-government programs with political goals, and achieving effective coordination across agencies, including effective implementation and learning.

The models of e-government institutions presented in this chapter are used for comparative analysis and for detecting broad trends in a complex reality of rich institutional innovation and learning. They can serve as starting points or options for governments interested in advancing their institutional frameworks for e-government. Hybrids of these models are increasingly common, tailored to a country's needs and conditions. Governments can choose from and build on these basic approaches, understanding the advantages and disadvantages of each.

The country studies suggest some broad trends in the evolution of e-government institutions:

- *Countries have moved from ad hoc responses, informal processes, and temporary relationships to institutionalized structures that respond to the challenges of developing*

e-government. At the outset of the ICT revolution, when awareness of e-government's potential was nascent, governments convened task forces, commissions, and panels to advise them on directions to take. These ad hoc entities typically made their recommendations to relevant ministers or the head of state. Among the countries that turned to such task forces were Singapore in 1992 and the United States in 1993, followed by China, Japan, and the Republic of Korea, among others (Wilson 2004). At that time, the central message was to raise awareness about the enabling role of ICT across the bureaucracy and society. Over time, these temporary bodies and ad hoc processes were transformed into permanent institutions and formal coordination mechanisms. The ad hoc processes were often used to reach out to key leaders and constituencies beyond government and to identify potential leaders and stakeholders for the subsequent institutions. In many countries, the institutionalized structures were given legislative mandates to enhance their influence and authority, often covering issues of ICT budgeting, procurement, and data and technology architecture.

- *There has been a move toward direct, institutionalized engagement of the head of state or an interministerial steering committee to formulate national e-government strategies and policies.* This process occurs as part of the search for an overarching strategic framework for e-government development in the knowledge economy, placing the capacity for orchestration and policy coordination under the highest authority. A common trend for e-government leadership is to place a coordinating unit within the office of the president or to establish a policy coordinating committee chaired by the prime minister or head of state. The head of the coordinating unit or committee becomes the visible e-leader, using e-government as a core component of his or her public management reform agenda and, more broadly, as a key to transforming the country to a knowledge-based, innovation-driven economy.

- *Emphasis is shifting from computerization and technology management to public sector reform, service transformation, process innovation, and cross-agency integration.* As e-government programs mature, countries move beyond concern about front-end electronic delivery of services. Instead, they start to rationalize and integrate back-office processes and the entire value chain and to fully integrate e-government with the governance framework and

activity of each sector and agency. There is also a shift in mind-set from an inside-out, agency-bound perspective to an outside-in, client-oriented perspective of service delivery. In the process, the role of central agencies also changes, from providing top-down solutions to playing catalytic roles for service innovation and cross-agency coordination. The aim is to facilitate public service innovation at all levels of government, institutionalize and scale up process innovation, promote collaboration across boundaries, engage more stakeholders, and disseminate best practices—and thus achieve deeper transformation and sustainable improvements in public sector performance.

- *As a further evolution, many countries are opting to create strong, independent national e-government agencies.* These agencies tend to focus on policy development, governance mechanisms, integrated government approaches to public interaction, enterprise architecture, and strategic investments that cut across many agencies. In some countries, such as Canada, Ireland, and Singapore, these relatively independent agencies tend to coordinate all components of e-development, of which e-government is key. They often operate under a special act or civil service framework that allows them to provide competitive compensation and attractive career paths and to operate in a businesslike manner, yet enjoy the legitimacy and authority of top political leadership and retain alignment with public service value creation. The shift to this model is driven by growing recognition that e-government development is a cross-sectoral, cross-agency, cross-hierarchical process. It is a major transformation that requires political leadership, a holistic view of government, and the ability to partner with nongovernmental actors. These needs are more likely to be achieved by an agile, independent agency, a semipublic enterprise, or a powerful coordinating ministry such as finance or economy.

- *E-government institutions are taking on increasing responsibility for promoting and managing private-public partnerships.* A key competency of e-government institutions is the capacity to identify, procure, and manage private-public partnerships on behalf of the entire government. They should also be able to establish the policy and legal frameworks to support the sound procurement and management of such partnerships by individual government agencies—consistent with the politically acceptable

role of the state, allocation of risks to parties most likely to mitigate them, and relative competencies of the country's public and private sectors. E-government institutions are expected to ensure that private-public partnerships are priority projects. A central cross-government pool of expertise in private-public partnerships is likely to be needed to supplement any nascent capacity in line agencies that contract for them. The degree of centralization of this function will vary. It may be limited to sharing information and broad guidance, promoting the use of private-public partnerships to accelerate e-government financing and implementation, and developing the legal and regulatory framework for such partnerships. Or the role may extend to approving private-public partnerships entered into by line ministries, understanding and monitoring the fiscal costs of the partnerships, and directly establishing and executing complex private-public partnerships on behalf of all government agencies.

- *Broadly, the nature and priorities of e-government are changing, and the institutional models adopted tend to evolve with the maturity of a country's e-government programs and its changing development priorities.* In recent years, a number of countries have shifted responsibility for their e-government portfolios. Each change reflects the countries' needs, given the point they reached in developing e-government. These changes should be viewed as responses to strategic policy needs and issues as they develop and implement solutions, rather than absolute illustrations of right or wrong approaches. For example, some countries are shifting from political or ad hoc e-government programs to more systematic administrative control in order to institutionalize e-government and lock in the gains they have achieved (Mexico and Portugal). Other changes have been driven by an increased focus on the use of e-services following a rapid increase in online services (Canada and the United Kingdom). In terms of tie-in with related policy areas, some countries have separated their e-government and information society portfolios (Australia and the United Kingdom), while others have consolidated their leadership of these portfolios (Norway and Sri Lanka). Many countries are currently engaged in internal discussions about the impact of e-government on the public sector in general and the consequences that this should have in how initiatives should be structured.

- *The structures and functions of central e-government institutions evolve in response to the growing decentralization of government services to the state and city levels.* Subnational economies—particularly cities—are playing a central role in economic growth, competitiveness, and globalization. Leading states and cities have greater agility to pilot e-government services and seize opportunities in rapidly changing environments (Lanvin and Lewin 2006). Accordingly, e-government program success will depend on institutional arrangements at the state and city levels, where most government services are delivered, pilots and innovations are conducted, and partnerships with central governments are forged.[3] This movement to decentralize government functions tends to favor the administrative coordination model of e-government, where e-government functions are assigned to the ministry of public administration and local government (or services, affairs, interior, state, or administrative reform). Central e-government institutions then become engaged in disseminating best practices across states and cities, providing matching funds for innovation in local e-government services, addressing common human and infrastructure constraints to local e-government efforts, and leveraging economies of scale across local jurisdictions, among other activities.[4]

Conclusion

The basic e-government institutional functions and models identified in this review suggest the wide range of possibilities open to governments. Governments have moved from ad hoc responses to institutionalized structures to lead and manage e-government programs. They have put increasing emphasis on engaging top political leadership in their e-government programs and have devoted increasing attention to ICT-enabled process innovation and institutional reform. Moreover, some governments have changed their institutional arrangements and developed new models for e-government in response to institutional learning, technological progress, and new phases in e-government.

Today's knowledge and evaluation research does not enable definitive prescriptions for the best e-government institutional model, especially given the diverse conditions facing both developing and developed countries. But understanding available options, current trends, and the core capabilities that e-government institutions must possess is

critical to building effective institutions that can achieve ICT-enabled transformation. Identifying appropriate institutional functions and capabilities should guide institutional development and capacity building efforts for better governance and coordination of e-government programs.

Although there is no one-size-fits-all institutional model for all countries, the strengths and weaknesses of the models described above suggest reasonable approaches for countries at different phases of e-government development. The appropriate level of centralization and decentralization is a key consideration in the design of national e-government institutions. The balance is often determined by a country's general political and institutional architecture and the availability and distribution of local capacity.

Another key institutional design issue is the balance between, on the one hand, technological leadership to invest in sound technologies and manage complex systems development projects and, on the other hand, business and institutional leadership to ensure general management ownership and true business process and service transformation. Businesses have been struggling much longer with various governance and institutional arrangements to get this balance right (Weill and Ross 2004). The models described in this chapter present alternative emphases in striking this balance. Shifts to recent and hybrid models suggest that e-government programs have evolved from computerization and online front-end delivery of services to organizational transformation. Governments are experimenting with and learning to manage this new paradigm—but it has taken about a decade for leading governments to appreciate this paradigm shift.

Another key lesson is the importance of cross-sector partnerships. Adopting a national e-government strategy will always demand a comprehensive policy approach. The cross-cutting nature of ICT makes it highly challenging to use traditional institutional arrangements that designate the entire agenda to a single ministry. E-government requires strong coordination of activities among various government agencies. Public leadership styles need to change from silo thinking and turf protection to management through collaboration and partnerships across agencies.[5] Equally important is the need to build partnerships among government, the private sector, and civil society to account for the needs and capabilities of the private sector and civil society.

Top-down leadership and institutional coordination must be complemented by bottom-up collaboration and

local initiative. Centrally driven coordination alone will not be sufficient for e-government to mature and lead to continuous innovation in governance, service provision, and citizen participation. It must be complemented by bottom-up initiatives, knowledge sharing, and incentives for collaboration across bureaucratic boundaries. Implementation facilitation and peer-to-peer coordination are essential complements to central coordination. National e-government institutions and CIO councils are increasingly used to support their counterpart state- and municipal-level e-government institutions and councils. Countries continue to innovate and experiment with institutional arrangements to maintain an appropriate balance. These innovations should be identified, evaluated, and disseminated.

Further research is urgently needed to understand the governance and institutional mechanisms needed to guide e-government. This survey, which focuses on central institutions at the national level, is only a start, as much of e-government's potential for decentralization and much of the rich institutional experience at subnational levels remain untapped. The various models and trends of e-government institutions at the state and city levels need to be examined, perhaps starting from the typology of models identified here at the national level. It would also be useful to investigate the implications of decentralized e-government strategies and of virtual vertical integration of public services across all levels of government, the division of functions between central and local e-government institutions, and the role of central institutions in scaling up local successes and supporting the development of common capabilities among local e-government institutions.

Research is also required to further understand the institutional implications of different priorities being assigned to e-government program goals. Would an emphasis on increasing efficiency in public sector management and e-government programs imply more centralized e-government institutional mechanisms and adoption of the technical coordination model? Would a goal of transparency and anticorruption highlight the governance agenda and point to the advantage of the administrative coordination model? Would an emphasis on making public services work for poor people lead to relatively broad mandates for national ICT agencies to overcome access barriers and the underlying causes of the digital divide?

Similarly, research is needed on the supply and demand of CIO capacity and professional development programs,

and on the kinds of networks and support services required to help public CIOs in developing countries break out of their isolation and increase access to peer groups in developed countries.

Finally, this survey represents only a snapshot of institutional arrangements for e-government development—a field that is fast changing as countries are continuously adapting and replacing their institutional models. Thus, a regular mechanism for monitoring, updating, and evaluating countries' institutional arrangements is needed.

Annex: Characteristics of E-Government Institutions in Selected Countries

Annex table 6A.1 describes the characteristics of e-government institutions for 30 countries. Because of its length, the table can be found at the end of this chapter on pages 101–102.

Notes

1. For a treatment of e-leadership institutions in the broader context of e-development, see Hanna (2007b).
2. See http://www.iccs-isac.org.
3. The same arguments can be made for other knowledge economy institutions (Hanna 2007c). Much of the experimentation and many of the support services and partnerships must be forged at the regional, city, and cluster levels, where cooperation, competition, and institutional partnerships occur.
4. India provides an example of the services supplied by the central Department of IT at the federal level. The department diffuses and scales up successful priority e-government applications at the state level and adapts and matches central support to local state priorities.
5. This is a major human resource management challenge for the public sector because government employment practices and incentives often lead to turf protection, one way of doing business, ossification of business processes and practices, and reluctance to collaborate across sectors.

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Table 6A.1 Characteristics of E-Government Institutions in Selected Countries

Country	Strategy formulation — No steering committee	Strategy formulation — Steering/inter-ministerial committee/office	E-government program coordination — Policy and investment coordination (ministry of finance, treasury, economy, budget, or planning)	E-government program coordination — Administrative coordination (ministry of public administration, services, affairs, interior, state, or administrative reform)	E-government program coordination — Technical coordination (ministry of ICT)	Facilitator of implementation — No facilitator	Facilitator of implementation — Ministry of ICT	Facilitator of implementation — ICT agency under other ministries (e.g., public services, finance)	Facilitator of implementation — CIO council	Facilitator of implementation — Public-private partnership/quasi-public ICT agency
Australia		X	X[abcd]					X[e]	X	
Brazil		X		X[bd]				X		
Bulgaria		X		X[acd]				X		X
Canada		X	X[abcd]	X[ce]				X[ef]	X	
Chile	X[g]		X[ab]					X[f]		
China	X[g]		X[acd]				X			
Egypt, Arab Rep. of		X		X			X[f]			
Finland	X[g]		X[a]					X		
Ghana	X				X[ab]		X		X	
India	X[g]		X[c]	X[abcd]						X
Ireland	X[g]		X[abc]					X[ef]		X
Israel		X	X[abc]				X		X	
Japan	X[g]		X[abc]						X[f]	
Jordan	X				X[bcd]		X			
Kenya		X		X[abcd]				X[ef]		
Korea, Rep. of	X[g]		X[ab]				X		X	X
Mexico		X		X[abd]			X		X[a]	
Pakistan	X[g]				X[abcd]		X			
Romania	X[g]				X[a]		X			
Russia		X	X		X	X				
Rwanda		X	X[ab]				X			

(Table continues on the next page.)

Table 6A.1 *continued*

Country	Strategy formulation		E-government program coordination			Facilitator of implementation				
	No steering committee	Steering/inter-ministerial committee/office	Policy and investment coordination (ministry of finance, treasury, economy, budget, or planning)	Administrative coordination (ministry of public admin-istration, serv-ices, affairs, interior, state, or administra-tive reform)	Technical coordination (ministry of ICT)	No facilitator	Ministry of ICT	ICT agency under other ministries (e.g., public services, finance)	CIO council	Public-private partnership/ quasi-public ICT agency
Singapore		X	X^c		X^{ab}		X^{ef}		X^f	
Slovenia	X			X^{abcd}				X^f	X	
South Africa	X			X^{abd}						X^f
Sri Lanka	X		X^{abc}						X	X^f
Thailand		X^g	X		X^{ab}		X			
Tunisia		X^g	X^g					X		
United Kingdom		X	X						X	
United States		X	X^{cd}						X^{ef}	
Vietnam		X			X^{bd}		X			

Source: Authors' analysis.

Note: CIO = chief information officer.

a. Develop governmentwide information infrastructures, shared networks, data centers, and common business processes.

b. Formulate e-laws and frameworks for IT governance.

c. Mobilize, prioritize, and allocate resources for e-government infrastructure and services.

d. Monitore, evaluate, and communicate lessons of experience, providing feedback, and ensuring accountability.

e. Handle ICT procurement.

f. Process reengineering.

g. Chaired by the head of state, head of government, or cabinet office.