

**ICT-Enabled Networks, Public Sector Performance and the  
Development of Information and Communication Technologies**

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**October 2003**

Forthcoming in  
Connected for Development: Information Kiosks and Sustainability,  
UNICT Task Force and Digital Partners,  
edited by Akhtar Badshah, Sarbuland Khan and Maria Garrido

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## Introduction

ICTs enhance the productivity and competitiveness of **firms**, as enterprises find it is less costly and more profitable to automate and link up computers for purchasing and sale operations, to form part of industrial clusters, and to set up alliances and short term business deals with other firms. ICTs are giving new vitality to **civil society**, as they give communities, not for profit organizations and informal groups, an enhanced capability to share information, ideas, activities, and assets. ICTs can also enhance **public sector** effectiveness, accountability and transparency, by enabling increased cooperation and communications across agencies, and between agencies and enterprises and ordinary citizens. To profit from ICT-enabled networks institutions need to reorganize their operational and governance structures. This is trying for any organization, but is a major challenge for public sector agencies. This challenge needs to be urgently addressed to help expand ICTs in developing countries. It is also a challenge that ICTs can help overcome.

Networks are a key feature of human interaction. Networks are founded on trust, and trust is built up through personal often informal communication, frequent contact, and the practical experience by participants that their connection to other network members are advantageous and address their particular concerns. Information and communication technologies do not change the basic character of networks. What they bring that is new, is that they enable the expansion of networks, even worldwide, at minimal cost. In so doing, they enable the diversification of the actors that can become part of the network and thus significantly change network dynamics and power relationships.

## ICT-Enabled Networks

In the modern world, administrative structures need to be light and agile, strategic alliances take on added significance, and an institution's ability to respond swiftly is a key determinant of performance. These three features - decentralization, cooperation, and rapid response - underlie ICT-based increases in productivity and institutional effectiveness. They are key attributes of ICT-enabled networks and give rise to a new institutional paradigm.

Widespread **decentralization** in the organizational structure of firms has been made possible by increased information flows between management, field workers, customers and suppliers. Field workers are closer to the customer and in the best position to make decisions that are in tune with changes in market demand. But field workers cannot be in the fringes of the firm's procedures and organizational culture. To be responsive to increasingly frequent changes in technology and markets while keeping its separate identity, the modern firm adopts an agile decision-making structure with few hierarchical levels that encourages interaction and swift communication - using ICTs - between workers at all levels of the enterprise.

**Strategic alliances** allow companies to take advantage of complementarities with other producers that do not compete in the same market, and to profit from an enhanced ability to coordinate input supply through ICT-enabled low-cost outsourcing. Agricultural and agroindustrial export ventures frequently aggregate supply from many producers within a region or locality, to jointly compete with the rest of the world to serve far away markets. Industrial clusters develop between enterprises that support each other while forming part of interlinked supply chains.

**Rapid response** is made possible by ICTs, and is at the same time indispensable in today's markets. The Internet, the mobile phone, computers interconnected across enterprises, all enable firms to remain open for business and service clients 24 hours a day, 7 days a week. And beware the firm unwilling or unable to adapt!

Non profit private organizations are also seeing their organizational structures and operating procedures radically changed by ICT-enabled networks. Their outreach has dramatically increased,<sup>1</sup> and their effectiveness and prospects for success have become conditional on their ability to adapt in much the same way as private firms. Their organizational structures need to be decentralized, their ability to network with other NGOs with shared objectives has become paramount, and opportune fund raising and rapid service capabilities are key determinants of survival.

Whereas the ICT-enabled Network paradigm calls for organizational changes on all kinds of institutions, public agencies are particularly ill suited to make the necessary adjustments. By tradition, incentive structure and at times even mandate, public organizations have vertical structures with multiple hierarchical layers.<sup>2</sup> Their efficiency and response capacity are subject to various levels of consultation, to complex formal representational protocols, and to strict functional demarcations of “turf”; all of which make interdisciplinary networking with other agencies and civil society difficult to realize.<sup>3</sup>

The main difference between public organizations, and private companies and NGOs, lies in the consequences of delays in adjusting to the new paradigm (see Table overleaf). Whereas a firm or NGO that does not adapt its strategies and structures will perish, a public agency can in most cases languish endlessly, no matter how irrelevant or ineffective its actions.

### ICT Development and Governance

Modernization of the telecommunications sector and universalization of ICT use is **necessarily a multidisciplinary undertaking that calls for cooperation and concerted action with other organizations and economic and social agents.**

- State support is needed to foster competition in the telecommunications sector and to provide a transparent, stable and independent regulatory framework that protects incentives for private investors as well as the rights of consumers; to develop public services and content online on a wide range of economic and social spheres; to provide affordable subsidies that enable the expansion of connectivity to rural areas; and to develop applications that help combat poverty and redress inequality in opportunities (employment, education, health services, etc.).

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<sup>1</sup> "Jody Williams won the Nobel Peace Prize in 1997 for her contribution to the international ban on landmines. She achieved that ban not only without much government help, but in the face of opposition from all the major powers. And what did she say was her secret weapon for organizing 1,000 different human rights and arms control groups on six continents? 'E-mail'." [Friedman 2000, page 14].

See also [Garrido and Halavais 2003].

<sup>2</sup> "The clash between the vertical structure of government and the trend towards horizontal networks, no fan of hierarchy, is one of the main problems facing government (governance) in the information society." (Curtin [2001], page 7.)

"One of the basic reasons for public-sector inefficiency—"bureaucracy"—is that, whereas departments are vertically organised, many of the services that they have to deliver require complex collaboration between employees across departments. The British government has for several years been preaching the need for "joined-up government", but has found that the underlying structures of government conspire against it." The Economist [2000].

<sup>3</sup> Stiglitz, Orzag and Orzag [2001, pág. 35-36] give the following list of reasons why failures of the State occur: i) lack of bankruptcy threat; ii) weak incentives for workers who are difficult to dismiss, and for managers aware of these difficulties; iii) misaligned incentives which may, for example, induce a manager to maximize the size of a public agency as opposed to maximizing social benefits; iv) risk aversion, since the cost of a mistake may be high, whereas the benefits of a good decision are only perceived indirectly; and v) "dynamic inconsistency" because no one can enforce the State into complying a contract agreement, and therefore public agency managers can not make credible long term commitments.

**Organization type and relative capacity to adjust to the new institutional paradigm**

	<i>Private Sector</i>	<i>NGO</i>	<i>Public Sector</i>
<b>Decentralization</b>	<p><i>Decentralization is indispensable to satisfy a clientele that is ever more demanding and facing increasing number of options.</i></p> <p><i>It is the field representative that is closest to the client.</i></p>	<p><i>Decentralization and informal relationships are dominant.</i></p> <p><i>These attributes give strengt to NGOs but are also a major source of weakness; especially for long term sustained effort.</i></p>	<p><i>By tradition, public agencies have hierarchical multilayer structures.</i></p> <p><i>Political considerations are paramount and delegation of authority is risky and unrewarding.</i></p>
<b>Partnerships</b>	<p><i>Increasing specialization of knowledge and the need for multidisciplinary work effort, give added importance to partnerships,</i></p> <p><b><i>B2B = ICT aided enterprise networks</i></b></p>	<p><i>The more effective NGOs have many partners and share information and resources enhanced by electronic networks.</i></p>	<p><i>Partnerships are difficult to achieve. Demarcation and protection of turf is the dominant concern. Duplication of effort is commonplace.</i></p>
<b>Capacity to respond to stakeholder demands.</b>	<p><i>Swift response and quality of service is rewarded through profits and higher worker earnings.</i></p>	<p><i>Rapid response and effectiveness is rewarded through achievement of objectives and, frequently, also higher staff salaries.</i></p>	<p><i>Loyalty and respect for hierarchy is rewarded. Rapid response obeys political considerations - often at the expense of technical wisdom.</i></p> <p><i>The "client" can wait.</i></p>
<b>Consequences</b>	<p><i>The enterprise that adapts to the new paradigm prospers.</i></p> <p><i>The firm that does not adapt loses money and sooner or later is forced to close down.</i></p>	<p><i>The NGO that adjusts is successful - achieves objectives and raises funds.</i></p> <p><i>The one that does not adapt, disappears.</i></p>	<p><i>A public agency that adjusts becomes effective and complies with an ever changing mandate.</i></p> <p><i>The one that does not, becomes irrelevant, but lingers along indefinitely.</i></p>

- Private enterprise is indispensable, to invest risk capital to develop infrastructure and help further technological innovation, and to operate complex telecommunications and private service networks.
- NGOs are an important source of innovation in the design and implementation of initiatives that benefit low-income communities and marginalized groups, and may play an important advocacy role in support of fairness in opportunities and a more equitable development.

The participation and interaction of a broad range of stakeholders – entrepreneurs, researchers, NGOs and public administration authorities - in networks that provide for the exchange of experiences and up to date information on ICTs will facilitate the updating of State institutions by upgrading the proficiency and knowledge of public officials regarding innovations, analytical tools and best practices.

More importantly, if such networks are structured so that they bring about critical, open discussion and analysis of political decisions and negotiations of national interest, or if they enable the participation of a wide range of sectors of society in the supervision of the implementation of specific projects, they can also modify the incentive structure that public officials face and thus contribute to making State action more effective. Seen from this perspective, **the formation and strengthening of public-private-civil society alliances is a key element in any strategy that aims to provide for universal access and the development of ICTs in developing countries.**

### Sample Applications

Consider three areas of prime importance to developing countries<sup>4</sup>: i) Rural telecenter establishment, ii) school-based telecenters, iii) business development services online in support of microenterprise development.

#### Rural Telecenter Establishment

Argentina's experience with the establishment of its *Centros Tecnológicos Comunitarios* (CTCs) exemplifies a traditional bureaucratic approach and reads like a set of guidelines for disappointment.<sup>5</sup> **First**, assume that the Government will be able to service all telecenter users for free. In the case of the CTCs, time proved that the Government simply could not afford to continue the subsidies required. The unknown number of centers that are still operational find a way to pay for operating costs by charging for services under the guise of “voluntary contributions” from users. **Second**, set them up in a hurry. The CTC program was implemented during the last year of a Government's term in office in a politically charged transitional setting. The **third** guideline is a corollary of a rush job: When you are in a hurry, it is

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<sup>4</sup> In the US, the enactment of the E-Government Act of 2002 [US Congress 2002] and the establishment of a site specifically dedicated to e-rulemaking ([www.regulations.gov](http://www.regulations.gov)) has stimulated considerable interest and research on the applications of ICTs to public sector governance (Coglianese 2003a,b, Brandon and Carlitz [2003], Carlitz and Gunn [2002]). Visit also the Harvard's Regulatory Policy Program papers e-rulemaking: [www.ksg.harvard.edu/cbg/rpp/papers.htm](http://www.ksg.harvard.edu/cbg/rpp/papers.htm). Similar discussions in Europe (e.g. Curtin 2001), were stimulated by the publication of the European Commission's White Paper on Governance [EC 2001].

For developing countries, Schwarc [2000] has given concrete examples of the application of ICTs to improve public sector performance. Here we focus on the use of ICTs in developing countries to strengthen public sector performance in the development of ICT infrastructure and online public services.

<sup>5</sup> We know that a number of measures adopted by Argentina undermined its *Centros Tecnológicos Comunitarios* (CTC) program. Whether in fact these measures will lead to failure in a different country context is difficult to anticipate; but the Argentinian experience should, at least, serve as a warning.

more expedient to determine site locations following political as opposed to technical criteria.<sup>6</sup> The end result: no buy-in from local telecenter administrators (government pays for everything, and center managers had little say in the program); no transparency (everything is done under the directive of “authorities”) and no accountability (it was all done by a departing government).<sup>7</sup>

The experience of Chile and Perú with Telecommunications Development Funds, is more encouraging.<sup>8</sup> Their reverse auction programs award subsidies on a competitive basis to operators that establish and run telecenters in low profit rural areas. Even if a poor country cannot afford to serve all rural towns, these schemes enable Governments to control how much of a subsidy they are willing and able to spend in order to serve rural communities. A suitable auction design is vital, not just to assure accountability, transparency and sustainability, but to increase competitive pressures by encouraging a large number of bidders to participate.

Neither OSIPTEL in Peru nor Subtel in Chile<sup>9</sup> are impervious to political pressures. Nevertheless, both of these agencies have considerable operational independence. Both agencies have adopted a policy of open dialogue – making extensive use of ICT networking – through several rounds of consultation with a broad range of stakeholders. The selection of sites and the design of the telecenter programs are determined by a government agency, but only after considerable consultation (networking) with civil society and private enterprise organizations.<sup>10</sup> Under these institutional arrangements, stakeholder buy-in is easier to achieve, public officials are under greater pressure from the public to address technical issues in a fair, transparent and efficient way, and in association with other agencies as required.

### **School-based Telecenters**

Commercial telecenters everywhere get very little business in the morning, which is when most schools can make use of connectivity services. It is common to find commercial telecenters serving private schools during the day time under private terms. Public school systems present a greater challenge.

Although in principle an ideal way to share scarce connectivity resources, public school telecenters have in practice proven to be quite difficult to implement. Public school systems are usually run under highly centralized authority, whereas telecenters thrive under local management and decision-making. National school administrators are weary of sharing their school’s equipment and connectivity, and they discourage the charging of fees by local school officials. Without the means to pay for operation and maintenance - be it through fees or direct support if governments can afford it - telecenter sustainability is compromised.

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<sup>6</sup> Center locations and equipment allocations “were in many cases determined solely according to the will of project authorities”. Ruffa and Zubieta [2000], page 52.

<sup>7</sup> There is nothing atypical or special about the Argentinian case. It is only a recent and well documented example of a telecenter establishment program that followed a traditional public organization's approach (Davidziuk [2002], Rabadan and Bassi [2002], and Proenza [2003]). According to the Performance Institute [2002], page 8, "Of the \$48 billion spent on information technology in FY 2002, this survey indicates that most of those expenditures were not justified by mission-aligned performance measures. This practice represents a “high risk” business practice that could result in failed IT projects and losses to the taxpayer."

<sup>8</sup> The mechanisms involved in telecenter establishment are described in detail by Wellenius [2001]. Here we wish to emphasize some key institutional features involved.

<sup>9</sup> OSIPTEL is Peru’s *Organismo Supervisor de Inversión Privada en Telecomunicaciones*. Subtel is Chile’s Telecommunications Subsecretariat. Both institutions are highly reputable telecommunications regulators. They were recently nominated by Pyramid Research as candidates for its first “Regulator of the year” Annual Telecommunications Award (along with Brazil’s Anatel and El Salvador’s Siget). According to Pyramid, its nominees for regulator of the year using the following criteria: innovation (25%), autonomy (25%), credibility (20%), transparency (20%) and efficiency (10%).

([www.pyramidresearch.com/conf/lasum03/votepyr.asp](http://www.pyramidresearch.com/conf/lasum03/votepyr.asp))

<sup>10</sup> The consultative process that has been followed by OSIPTEL may be appreciated with respect to their latest project in the pipeline, that will provide for the establishment of about 800 cabinas publicas in the country’s District capitals. The project’s descriptions and public comments may be downloaded from: <http://www.fitel.gob.pe/contenido.php?ID=13>

Chile has put together a workable program that is opening up public school labs to serve the community at large after school hours. The program aims for a total coverage of 5,000 schools and hopes to provide ICT training to a total of about one million people between 2002 and 2005. The first set 500 schools opened for service to the public in 2002. In exchange for a service agreement and a sustainable operational plan from the school, the program offers financial support to participating schools, to help them cover the administrative costs including the salary of the teacher in charge of the program.

The program is run by a Subtel staff member, a systems engineer who was previously in charge of Subtel's Telecommunications Development Fund, and is now under secondment working for the Ministry of Education. Herein is a prime example of cooperation across agencies and disciplines, in support of ICT development. The program was established only after practically all schools in the country were connected to the Internet. Since schools are connected, the program is advertised and operated through ICT-enabled networks that engage target schools in a consultative and training process during program design and implementation.

### **Business Development Services Online**

The past couple of years have witnessed a dramatic surge in business development services offerings online, mostly geared to small and microenterprise development, many provided under government sponsorship. What is the impact of these "services? It is impossible to tell because practically no monitoring is taking place, but with so much duplication it is safe to say that many of these websites are used infrequently and yield little that is of practical value.

Chile's "Advice online" service provided by its small and microenterprise support agency, Sercotec, stands apart for its brilliant use of ICT-enabled networks to provide public services online.<sup>11</sup> Chilean entrepreneurs registered in the site ([www.redsercotec.cl](http://www.redsercotec.cl)) may send specific queries to any one of 80 specialists covering 40 different fields of expertise. These messages are answered within 48 hours. For each advice category, the site gives the user a choice of several specialists, providing for each of them his or her picture, location, summary curriculum vitae, and a record of the responses that the specialist has already given to date. Since its inception on March 2002, a total of 2,000 queries have been answered and recorded and may be read online. Over 20 private and public institutions have allied with Sercotec to support the service. Queries related to agriculture may, for instance, be addressed to the National Institute of Agricultural Development (INDAP); legal queries may be directed to upper class students of the University of Chile's Law School; and so on.

Think of the impact on public service incentives, and of the implications for public agency efficiency, accountability and transparency. Imagine you are a public servant and that every question you are asked, you are obliged to answer within 48 hours, in the understanding that your response will be placed on record, identifying you as the author, and made available for everyone in the world to read!

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<sup>11</sup> That Chile keeps coming up in examples of best e-Government practices is not an accident. According to the World Economic Forum's ranking of 80 countries with respect to the quality of public institutions, Chile (along with Uruguay) comes ahead of more industrialized nations like Belgium, France, Italy, Japan, Korea, Portugal, Spain, Taiwan. Public sector reform has been a governmental priority for over ten years now; and the application of ICTs as an input to enhancing public sector performance is well recognized. See Gobierno de Chile-INAP [2003], Gobierno de Chile-Universidad de Chile [2003], Comité Interministerial de Modernización de la Gestión Pública [2000], and visit [www.gestionpublica.gov.cl](http://www.gestionpublica.gov.cl) and [www.modernizacion.cl/](http://www.modernizacion.cl/).

## **Concluding Remarks**

Countries worldwide are gearing up to be part of the information society. Many are recognizing the importance of governmental leadership and inter-agency cooperation for the implementation of comprehensive e-Government programs.<sup>12</sup> There is less awareness of the high risks associated with investments in ICTs, of the urgency of improving public sector efficiency, accountability and transparency, and of the possibilities for relying on ICT-enabled networks to change institutional incentives and develop mechanisms that provide for coordination, control, monitoring and consultation with full participation of civil society.

International cooperation can contribute to fill this gap, mainly through thorough careful detailed studies that provide rigorous examinations of best practices, benchmarking initiatives that let governments know where they stand and helps them identify the obstacles they face and need to overcome, and through a comprehensive worldwide network of knowledge exchange on e-Government best practices.

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<sup>12</sup> According to Accenture [2002] the figure of Chief Information Officer, with responsibility for inter-agency coordination of e-Government initiatives, is now well established in many countries.



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